San Juan de Fuca

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Transform the original data set into an array of dimension `c(n, d+1, r)`, where `n` is the time instant, `r` is the number of (latitude and longitude) coordinates and `d+1` are the Cartesian angles which in this cases is equal to 2.

```r
# Get long format data from strait of Juan de Fuca
juanfuca_pkg <-  paste(here("data-raw", "strait-juan-fuca"), "jdf.rda", sep = "/")
load(juanfuca_pkg)

# Get the entries for the whole year of 2021
jdf_long_fmt <- jdf_long_fmt %>%
  filter(time >= as.POSIXct("2021-01-01 00:00:00", tz = "UTC") &
           time < as.POSIXct("2022-01-01 00:00:00", tz = "UTC"))

# Obtain other data frame
# Transform into coordinates (value formed by lat and lon separated by a comma)
# Remove speed from the dataset
jdf_coor <- jdf_long_fmt %>%
  unite(col = "coordinates", lat, lon, sep = ",") %>%
  dplyr::select(-"speed")

# Transform the data frame into a 3-dimensional array
jdf_coor <- abind(split(jdf_coor, jdf_coor$coordinates), along = 3)

# Sum the number of NA's by each row
to_remove <- colSums(t(sapply(1:dim(jdf_coor)[3],
                              function(k) is.na(jdf_coor[ , 3, k]))))
# Indexes of the rows without NA's
index_to_remove <- to_remove == 0

# Select only those rows without NA's
jdf_coor <- jdf_coor[index_to_remove , , ]

# Calculate the Cartesian angles
jdf_pscsne <- sapply(1:dim(jdf_coor)[3],
                     function(k) DirStats::to_cir(as.numeric(jdf_coor[ , 3, k])),
                     simplify = 'array')

# Get the rho values for a specific perplexity
perplexity <- 30
rho_30 <- rho_optim_bst(jdf_pscsne, perplexity, 7)

# Save dataset in long format
save(
```

```
  list = ls(),
  file = paste(here("data-raw", "strait-juan-fuca"), "pscsne.rda", sep = "/")
)

# Remove all objects
rm(list = ls())
gc()
```

Let's load the data objects generated in the previous chunk.

```
# Loading the psc-sne input object
load(paste(here("data-raw", "strait-juan-fuca"), "pscsne.rda", sep = "/"))
```

Now we are ready to reduce the dimension using the polyspherical Cauchy SNE. First, optimized rho is based on a perplexity of 30, $d = 1$ and initializing the resultant reduced data with random uniformed points:

```
Y <- psc_sne(X=jdf_pscsne, d=1,
             rho_psc_list = rho_30,
             num_iteration=1000, init = "random")
```

```
## It: 1; obj: 2.354e+01; abs: 0.000e+00; rel: 0.000e+00; norm: 5.313e-02
## It: 2; obj: 2.328e+01; abs: 2.523e-01; rel: 1.072e-02; norm: 6.485e-02
## It: 3; obj: 2.301e+01; abs: 2.736e-01; rel: 1.175e-02; norm: 8.178e-02
## It: 4; obj: 2.273e+01; abs: 2.768e-01; rel: 1.203e-02; norm: 1.002e-01
## It: 5; obj: 2.246e+01; abs: 2.767e-01; rel: 1.217e-02; norm: 1.194e-01
## It: 6; obj: 2.218e+01; abs: 2.776e-01; rel: 1.236e-02; norm: 1.382e-01
## It: 7; obj: 2.190e+01; abs: 2.752e-01; rel: 1.241e-02; norm: 1.569e-01
## It: 8; obj: 2.165e+01; abs: 2.586e-01; rel: 1.180e-02; norm: 1.758e-01
## It: 9; obj: 2.141e+01; abs: 2.351e-01; rel: 1.086e-02; norm: 1.945e-01
## It: 10; obj: 2.120e+01; abs: 2.080e-01; rel: 9.716e-03; norm: 2.121e-01
## It: 11; obj: 2.102e+01; abs: 1.849e-01; rel: 8.720e-03; norm: 2.278e-01
## It: 12; obj: 2.085e+01; abs: 1.663e-01; rel: 7.911e-03; norm: 2.415e-01
## It: 13; obj: 2.071e+01; abs: 1.446e-01; rel: 6.933e-03; norm: 2.542e-01
## It: 14; obj: 2.058e+01; abs: 1.244e-01; rel: 6.009e-03; norm: 2.658e-01
## It: 15; obj: 2.048e+01; abs: 1.038e-01; rel: 5.041e-03; norm: 2.759e-01
## It: 16; obj: 2.039e+01; abs: 9.114e-02; rel: 4.451e-03; norm: 2.842e-01
## It: 17; obj: 2.031e+01; abs: 8.137e-02; rel: 3.991e-03; norm: 2.913e-01
## It: 18; obj: 2.024e+01; abs: 7.040e-02; rel: 3.467e-03; norm: 2.973e-01
## It: 19; obj: 2.017e+01; abs: 6.106e-02; rel: 3.018e-03; norm: 3.021e-01
## It: 20; obj: 2.012e+01; abs: 5.693e-02; rel: 2.822e-03; norm: 3.059e-01
## It: 21; obj: 2.006e+01; abs: 5.674e-02; rel: 2.820e-03; norm: 3.091e-01
## It: 22; obj: 2.000e+01; abs: 5.731e-02; rel: 2.857e-03; norm: 3.121e-01
## It: 23; obj: 1.995e+01; abs: 5.448e-02; rel: 2.723e-03; norm: 3.152e-01
## It: 24; obj: 1.990e+01; abs: 4.917e-02; rel: 2.465e-03; norm: 3.182e-01
## It: 25; obj: 1.985e+01; abs: 4.628e-02; rel: 2.326e-03; norm: 3.206e-01
## It: 26; obj: 1.981e+01; abs: 4.635e-02; rel: 2.335e-03; norm: 3.225e-01
## It: 27; obj: 1.976e+01; abs: 4.708e-02; rel: 2.377e-03; norm: 3.241e-01
## It: 28; obj: 1.972e+01; abs: 4.359e-02; rel: 2.206e-03; norm: 3.257e-01
## It: 29; obj: 1.968e+01; abs: 4.013e-02; rel: 2.035e-03; norm: 3.269e-01
## It: 30; obj: 1.964e+01; abs: 3.657e-02; rel: 1.859e-03; norm: 3.280e-01
## It: 31; obj: 1.961e+01; abs: 3.224e-02; rel: 1.641e-03; norm: 3.289e-01
## It: 32; obj: 1.958e+01; abs: 2.857e-02; rel: 1.457e-03; norm: 3.296e-01
## It: 33; obj: 1.955e+01; abs: 2.598e-02; rel: 1.327e-03; norm: 3.302e-01
## It: 34; obj: 1.953e+01; abs: 2.424e-02; rel: 1.240e-03; norm: 3.308e-01
## It: 35; obj: 1.951e+01; abs: 2.297e-02; rel: 1.176e-03; norm: 3.316e-01
```

```
## It: 36; obj: 1.948e+01; abs: 2.225e-02; rel: 1.141e-03; norm: 3.323e-01
## It: 37; obj: 1.946e+01; abs: 2.209e-02; rel: 1.134e-03; norm: 3.332e-01
## It: 38; obj: 1.944e+01; abs: 2.219e-02; rel: 1.140e-03; norm: 3.342e-01
## It: 39; obj: 1.942e+01; abs: 2.199e-02; rel: 1.131e-03; norm: 3.353e-01
## It: 40; obj: 1.940e+01; abs: 2.105e-02; rel: 1.084e-03; norm: 3.367e-01
## It: 41; obj: 1.938e+01; abs: 2.029e-02; rel: 1.046e-03; norm: 3.382e-01
## It: 42; obj: 1.936e+01; abs: 1.993e-02; rel: 1.028e-03; norm: 3.397e-01
## It: 43; obj: 1.934e+01; abs: 1.960e-02; rel: 1.013e-03; norm: 3.413e-01
## It: 44; obj: 1.932e+01; abs: 1.897e-02; rel: 9.813e-04; norm: 3.429e-01
## It: 45; obj: 1.930e+01; abs: 1.805e-02; rel: 9.341e-04; norm: 3.445e-01
## It: 46; obj: 1.928e+01; abs: 1.716e-02; rel: 8.890e-04; norm: 3.460e-01
## It: 47; obj: 1.927e+01; abs: 1.632e-02; rel: 8.465e-04; norm: 3.475e-01
## It: 48; obj: 1.925e+01; abs: 1.569e-02; rel: 8.146e-04; norm: 3.489e-01
## It: 49; obj: 1.923e+01; abs: 1.537e-02; rel: 7.984e-04; norm: 3.502e-01
## It: 50; obj: 1.922e+01; abs: 1.523e-02; rel: 7.915e-04; norm: 3.514e-01
## It: 51; obj: 1.920e+01; abs: 1.523e-02; rel: 7.924e-04; norm: 3.526e-01
## It: 52; obj: 1.919e+01; abs: 1.536e-02; rel: 7.999e-04; norm: 3.537e-01
## It: 53; obj: 1.917e+01; abs: 1.501e-02; rel: 7.822e-04; norm: 3.547e-01
## It: 54; obj: 1.916e+01; abs: 1.451e-02; rel: 7.567e-04; norm: 3.556e-01
## It: 55; obj: 1.915e+01; abs: 1.404e-02; rel: 7.329e-04; norm: 3.564e-01
## It: 56; obj: 1.913e+01; abs: 1.340e-02; rel: 6.997e-04; norm: 3.571e-01
## It: 57; obj: 1.912e+01; abs: 1.264e-02; rel: 6.608e-04; norm: 3.577e-01
## It: 58; obj: 1.911e+01; abs: 1.194e-02; rel: 6.246e-04; norm: 3.582e-01
## It: 59; obj: 1.910e+01; abs: 1.137e-02; rel: 5.949e-04; norm: 3.586e-01
## It: 60; obj: 1.909e+01; abs: 1.092e-02; rel: 5.717e-04; norm: 3.589e-01
## It: 61; obj: 1.907e+01; abs: 1.056e-02; rel: 5.533e-04; norm: 3.592e-01
## It: 62; obj: 1.906e+01; abs: 1.021e-02; rel: 5.351e-04; norm: 3.596e-01
## It: 63; obj: 1.905e+01; abs: 9.776e-03; rel: 5.128e-04; norm: 3.600e-01
## It: 64; obj: 1.905e+01; abs: 9.360e-03; rel: 4.912e-04; norm: 3.604e-01
## It: 65; obj: 1.904e+01; abs: 9.146e-03; rel: 4.802e-04; norm: 3.609e-01
## It: 66; obj: 1.903e+01; abs: 9.145e-03; rel: 4.804e-04; norm: 3.615e-01
## It: 67; obj: 1.902e+01; abs: 8.977e-03; rel: 4.718e-04; norm: 3.623e-01
## It: 68; obj: 1.901e+01; abs: 8.271e-03; rel: 4.349e-04; norm: 3.630e-01
## It: 69; obj: 1.900e+01; abs: 7.442e-03; rel: 3.915e-04; norm: 3.638e-01
## It: 70; obj: 1.900e+01; abs: 6.921e-03; rel: 3.642e-04; norm: 3.646e-01
## It: 71; obj: 1.899e+01; abs: 6.685e-03; rel: 3.519e-04; norm: 3.654e-01
## It: 72; obj: 1.898e+01; abs: 6.669e-03; rel: 3.512e-04; norm: 3.661e-01
## It: 73; obj: 1.898e+01; abs: 6.856e-03; rel: 3.612e-04; norm: 3.668e-01
## It: 74; obj: 1.897e+01; abs: 7.190e-03; rel: 3.789e-04; norm: 3.675e-01
## It: 75; obj: 1.896e+01; abs: 7.587e-03; rel: 4.000e-04; norm: 3.682e-01
## It: 76; obj: 1.895e+01; abs: 8.038e-03; rel: 4.240e-04; norm: 3.689e-01
## It: 77; obj: 1.894e+01; abs: 8.559e-03; rel: 4.516e-04; norm: 3.695e-01
## It: 78; obj: 1.893e+01; abs: 9.144e-03; rel: 4.827e-04; norm: 3.702e-01
## It: 79; obj: 1.892e+01; abs: 9.772e-03; rel: 5.161e-04; norm: 3.709e-01
## It: 80; obj: 1.891e+01; abs: 1.035e-02; rel: 5.470e-04; norm: 3.716e-01
## It: 81; obj: 1.890e+01; abs: 1.073e-02; rel: 5.674e-04; norm: 3.724e-01
## It: 82; obj: 1.889e+01; abs: 1.098e-02; rel: 5.808e-04; norm: 3.731e-01
## It: 83; obj: 1.888e+01; abs: 1.129e-02; rel: 5.977e-04; norm: 3.738e-01
## It: 84; obj: 1.887e+01; abs: 1.167e-02; rel: 6.179e-04; norm: 3.745e-01
## It: 85; obj: 1.886e+01; abs: 1.206e-02; rel: 6.389e-04; norm: 3.752e-01
## It: 86; obj: 1.885e+01; abs: 1.245e-02; rel: 6.602e-04; norm: 3.759e-01
## It: 87; obj: 1.883e+01; abs: 1.284e-02; rel: 6.811e-04; norm: 3.767e-01
## It: 88; obj: 1.882e+01; abs: 1.322e-02; rel: 7.017e-04; norm: 3.775e-01
## It: 89; obj: 1.881e+01; abs: 1.365e-02; rel: 7.254e-04; norm: 3.784e-01
```

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## It: 90; obj: 1.879e+01; abs: 1.423e-02; rel: 7.567e-04; norm: 3.793e-01
## It: 91; obj: 1.878e+01; abs: 1.489e-02; rel: 7.922e-04; norm: 3.803e-01
## It: 92; obj: 1.876e+01; abs: 1.528e-02; rel: 8.140e-04; norm: 3.813e-01
## It: 93; obj: 1.875e+01; abs: 1.543e-02; rel: 8.224e-04; norm: 3.825e-01
## It: 94; obj: 1.873e+01; abs: 1.558e-02; rel: 8.311e-04; norm: 3.836e-01
## It: 95; obj: 1.871e+01; abs: 1.563e-02; rel: 8.347e-04; norm: 3.848e-01
## It: 96; obj: 1.870e+01; abs: 1.546e-02; rel: 8.263e-04; norm: 3.861e-01
## It: 97; obj: 1.868e+01; abs: 1.503e-02; rel: 8.038e-04; norm: 3.875e-01
## It: 98; obj: 1.867e+01; abs: 1.433e-02; rel: 7.671e-04; norm: 3.889e-01
## It: 99; obj: 1.866e+01; abs: 1.338e-02; rel: 7.167e-04; norm: 3.904e-01
## It: 100; obj: 1.864e+01; abs: 1.218e-02; rel: 6.529e-04; norm: 3.919e-01
## It: 101; obj: 3.270e+00; abs: 1.537e+01; rel: 8.246e-01; norm: 6.173e-02
## It: 102; obj: 3.265e+00; abs: 5.008e-03; rel: 1.532e-03; norm: 6.196e-02
## It: 103; obj: 3.260e+00; abs: 4.405e-03; rel: 1.349e-03; norm: 6.214e-02
## It: 104; obj: 3.257e+00; abs: 3.691e-03; rel: 1.132e-03; norm: 6.230e-02
## It: 105; obj: 3.254e+00; abs: 3.071e-03; rel: 9.429e-04; norm: 6.244e-02
## It: 106; obj: 3.251e+00; abs: 2.570e-03; rel: 7.898e-04; norm: 6.256e-02
## It: 107; obj: 3.249e+00; abs: 2.167e-03; rel: 6.667e-04; norm: 6.265e-02
## It: 108; obj: 3.247e+00; abs: 1.842e-03; rel: 5.671e-04; norm: 6.274e-02
## It: 109; obj: 3.246e+00; abs: 1.579e-03; rel: 4.862e-04; norm: 6.280e-02
## It: 110; obj: 3.244e+00; abs: 1.365e-03; rel: 4.207e-04; norm: 6.286e-02
## It: 111; obj: 3.243e+00; abs: 1.193e-03; rel: 3.677e-04; norm: 6.292e-02
## It: 112; obj: 3.242e+00; abs: 1.054e-03; rel: 3.251e-04; norm: 6.296e-02
## It: 113; obj: 3.241e+00; abs: 9.426e-04; rel: 2.907e-04; norm: 6.300e-02
## It: 114; obj: 3.240e+00; abs: 8.532e-04; rel: 2.633e-04; norm: 6.304e-02
## It: 115; obj: 3.239e+00; abs: 7.821e-04; rel: 2.414e-04; norm: 6.308e-02
## It: 116; obj: 3.239e+00; abs: 7.261e-04; rel: 2.242e-04; norm: 6.311e-02
## It: 117; obj: 3.238e+00; abs: 6.828e-04; rel: 2.108e-04; norm: 6.314e-02
## It: 118; obj: 3.237e+00; abs: 6.500e-04; rel: 2.007e-04; norm: 6.318e-02
## It: 119; obj: 3.237e+00; abs: 6.260e-04; rel: 1.934e-04; norm: 6.321e-02
## It: 120; obj: 3.236e+00; abs: 6.094e-04; rel: 1.883e-04; norm: 6.324e-02
## It: 121; obj: 3.235e+00; abs: 5.986e-04; rel: 1.850e-04; norm: 6.326e-02
## It: 122; obj: 3.235e+00; abs: 5.917e-04; rel: 1.829e-04; norm: 6.329e-02
## It: 123; obj: 3.234e+00; abs: 5.866e-04; rel: 1.813e-04; norm: 6.332e-02
## It: 124; obj: 3.234e+00; abs: 5.806e-04; rel: 1.795e-04; norm: 6.334e-02
## It: 125; obj: 3.233e+00; abs: 5.719e-04; rel: 1.768e-04; norm: 6.337e-02
## It: 126; obj: 3.233e+00; abs: 5.596e-04; rel: 1.731e-04; norm: 6.339e-02
## It: 127; obj: 3.232e+00; abs: 5.445e-04; rel: 1.684e-04; norm: 6.340e-02
## It: 128; obj: 3.231e+00; abs: 5.280e-04; rel: 1.634e-04; norm: 6.342e-02
## It: 129; obj: 3.231e+00; abs: 5.115e-04; rel: 1.583e-04; norm: 6.343e-02
## It: 130; obj: 3.230e+00; abs: 4.956e-04; rel: 1.534e-04; norm: 6.344e-02
## It: 131; obj: 3.230e+00; abs: 4.808e-04; rel: 1.488e-04; norm: 6.345e-02
## It: 132; obj: 3.230e+00; abs: 4.675e-04; rel: 1.447e-04; norm: 6.345e-02
## It: 133; obj: 3.229e+00; abs: 4.561e-04; rel: 1.412e-04; norm: 6.346e-02
## It: 134; obj: 3.229e+00; abs: 4.466e-04; rel: 1.383e-04; norm: 6.347e-02
## It: 135; obj: 3.228e+00; abs: 4.373e-04; rel: 1.354e-04; norm: 6.347e-02
## It: 136; obj: 3.228e+00; abs: 4.240e-04; rel: 1.314e-04; norm: 6.348e-02
## It: 137; obj: 3.227e+00; abs: 4.025e-04; rel: 1.247e-04; norm: 6.349e-02
## It: 138; obj: 3.227e+00; abs: 3.743e-04; rel: 1.160e-04; norm: 6.350e-02
## It: 139; obj: 3.227e+00; abs: 3.475e-04; rel: 1.077e-04; norm: 6.352e-02
## It: 140; obj: 3.226e+00; abs: 3.285e-04; rel: 1.018e-04; norm: 6.353e-02
## It: 141; obj: 3.226e+00; abs: 3.165e-04; rel: 9.809e-05; norm: 6.354e-02
## It: 142; obj: 3.226e+00; abs: 3.082e-04; rel: 9.554e-05; norm: 6.355e-02
## It: 143; obj: 3.225e+00; abs: 3.018e-04; rel: 9.356e-05; norm: 6.357e-02
```

```
## It: 144; obj: 3.225e+00; abs: 2.957e-04; rel: 9.169e-05; norm: 6.358e-02
## It: 145; obj: 3.225e+00; abs: 2.874e-04; rel: 8.910e-05; norm: 6.359e-02
## It: 146; obj: 3.225e+00; abs: 2.735e-04; rel: 8.481e-05; norm: 6.360e-02
## It: 147; obj: 3.224e+00; abs: 2.544e-04; rel: 7.888e-05; norm: 6.362e-02
## It: 148; obj: 3.224e+00; abs: 2.347e-04; rel: 7.279e-05; norm: 6.363e-02
## It: 149; obj: 3.224e+00; abs: 2.182e-04; rel: 6.769e-05; norm: 6.364e-02
## It: 150; obj: 3.224e+00; abs: 2.052e-04; rel: 6.366e-05; norm: 6.365e-02
## It: 151; obj: 3.223e+00; abs: 1.946e-04; rel: 6.037e-05; norm: 6.367e-02
## It: 152; obj: 3.223e+00; abs: 1.853e-04; rel: 5.749e-05; norm: 6.368e-02
## It: 153; obj: 3.223e+00; abs: 1.768e-04; rel: 5.485e-05; norm: 6.369e-02
## It: 154; obj: 3.223e+00; abs: 1.688e-04; rel: 5.236e-05; norm: 6.370e-02
## It: 155; obj: 3.223e+00; abs: 1.611e-04; rel: 4.998e-05; norm: 6.371e-02
## It: 156; obj: 3.223e+00; abs: 1.537e-04; rel: 4.769e-05; norm: 6.373e-02
## It: 157; obj: 3.222e+00; abs: 1.467e-04; rel: 4.552e-05; norm: 6.374e-02
## It: 158; obj: 3.222e+00; abs: 1.401e-04; rel: 4.346e-05; norm: 6.375e-02
## It: 159; obj: 3.222e+00; abs: 1.338e-04; rel: 4.154e-05; norm: 6.376e-02
## It: 160; obj: 3.222e+00; abs: 1.281e-04; rel: 3.975e-05; norm: 6.377e-02
## It: 161; obj: 3.222e+00; abs: 1.227e-04; rel: 3.810e-05; norm: 6.377e-02
## It: 162; obj: 3.222e+00; abs: 1.178e-04; rel: 3.658e-05; norm: 6.378e-02
## It: 163; obj: 3.222e+00; abs: 1.133e-04; rel: 3.518e-05; norm: 6.379e-02
## It: 164; obj: 3.222e+00; abs: 1.092e-04; rel: 3.390e-05; norm: 6.380e-02
## It: 165; obj: 3.221e+00; abs: 1.054e-04; rel: 3.271e-05; norm: 6.381e-02
## It: 166; obj: 3.221e+00; abs: 1.018e-04; rel: 3.160e-05; norm: 6.382e-02
## It: 167; obj: 3.221e+00; abs: 9.844e-05; rel: 3.056e-05; norm: 6.382e-02
## It: 168; obj: 3.221e+00; abs: 9.520e-05; rel: 2.955e-05; norm: 6.383e-02
## It: 169; obj: 3.221e+00; abs: 9.205e-05; rel: 2.858e-05; norm: 6.384e-02
## It: 170; obj: 3.221e+00; abs: 8.892e-05; rel: 2.761e-05; norm: 6.385e-02
## It: 171; obj: 3.221e+00; abs: 8.577e-05; rel: 2.663e-05; norm: 6.385e-02
## It: 172; obj: 3.221e+00; abs: 8.257e-05; rel: 2.563e-05; norm: 6.386e-02
## It: 173; obj: 3.221e+00; abs: 7.927e-05; rel: 2.461e-05; norm: 6.387e-02
## It: 174; obj: 3.221e+00; abs: 7.586e-05; rel: 2.355e-05; norm: 6.388e-02
## It: 175; obj: 3.221e+00; abs: 7.233e-05; rel: 2.246e-05; norm: 6.388e-02
## It: 176; obj: 3.221e+00; abs: 6.871e-05; rel: 2.133e-05; norm: 6.389e-02
## It: 177; obj: 3.220e+00; abs: 6.501e-05; rel: 2.019e-05; norm: 6.390e-02
## It: 178; obj: 3.220e+00; abs: 6.129e-05; rel: 1.903e-05; norm: 6.390e-02
## It: 179; obj: 3.220e+00; abs: 5.760e-05; rel: 1.789e-05; norm: 6.391e-02
## It: 180; obj: 3.220e+00; abs: 5.399e-05; rel: 1.676e-05; norm: 6.392e-02
## It: 181; obj: 3.220e+00; abs: 5.050e-05; rel: 1.568e-05; norm: 6.393e-02
## It: 182; obj: 3.220e+00; abs: 4.718e-05; rel: 1.465e-05; norm: 6.393e-02
## It: 183; obj: 3.220e+00; abs: 4.403e-05; rel: 1.367e-05; norm: 6.394e-02
## It: 184; obj: 3.220e+00; abs: 4.106e-05; rel: 1.275e-05; norm: 6.395e-02
## It: 185; obj: 3.220e+00; abs: 3.829e-05; rel: 1.189e-05; norm: 6.395e-02
## It: 186; obj: 3.220e+00; abs: 3.570e-05; rel: 1.109e-05; norm: 6.396e-02
## It: 187; obj: 3.220e+00; abs: 3.329e-05; rel: 1.034e-05; norm: 6.396e-02
## It: 188; obj: 3.220e+00; abs: 3.105e-05; rel: 9.643e-06; norm: 6.397e-02
## It: 189; obj: 3.220e+00; abs: 2.897e-05; rel: 8.996e-06; norm: 6.398e-02
## It: 190; obj: 3.220e+00; abs: 2.703e-05; rel: 8.395e-06; norm: 6.398e-02
## It: 191; obj: 3.220e+00; abs: 2.524e-05; rel: 7.838e-06; norm: 6.399e-02
## It: 192; obj: 3.220e+00; abs: 2.357e-05; rel: 7.320e-06; norm: 6.399e-02
## It: 193; obj: 3.220e+00; abs: 2.202e-05; rel: 6.840e-06; norm: 6.400e-02
## It: 194; obj: 3.220e+00; abs: 2.059e-05; rel: 6.394e-06; norm: 6.400e-02
## It: 195; obj: 3.220e+00; abs: 1.926e-05; rel: 5.980e-06; norm: 6.401e-02
## It: 196; obj: 3.220e+00; abs: 1.802e-05; rel: 5.597e-06; norm: 6.401e-02
## It: 197; obj: 3.220e+00; abs: 1.688e-05; rel: 5.242e-06; norm: 6.402e-02
```

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## It: 198; obj: 3.220e+00; abs: 1.582e-05; rel: 4.914e-06; norm: 6.402e-02
## It: 199; obj: 3.220e+00; abs: 1.485e-05; rel: 4.611e-06; norm: 6.403e-02
## It: 200; obj: 3.220e+00; abs: 1.395e-05; rel: 4.332e-06; norm: 6.403e-02
## It: 201; obj: 3.220e+00; abs: 1.312e-05; rel: 4.075e-06; norm: 6.404e-02
## It: 202; obj: 3.220e+00; abs: 1.236e-05; rel: 3.839e-06; norm: 6.404e-02
## It: 203; obj: 3.220e+00; abs: 1.166e-05; rel: 3.622e-06; norm: 6.405e-02
## It: 204; obj: 3.220e+00; abs: 1.102e-05; rel: 3.424e-06; norm: 6.405e-02
## It: 205; obj: 3.220e+00; abs: 1.044e-05; rel: 3.243e-06; norm: 6.405e-02
## It: 206; obj: 3.220e+00; abs: 9.912e-06; rel: 3.078e-06; norm: 6.406e-02
## It: 207; obj: 3.220e+00; abs: 9.430e-06; rel: 2.929e-06; norm: 6.406e-02
## It: 208; obj: 3.220e+00; abs: 8.994e-06; rel: 2.794e-06; norm: 6.406e-02
## It: 209; obj: 3.220e+00; abs: 8.600e-06; rel: 2.671e-06; norm: 6.407e-02
## It: 210; obj: 3.220e+00; abs: 8.245e-06; rel: 2.561e-06; norm: 6.407e-02
## It: 211; obj: 3.220e+00; abs: 7.925e-06; rel: 2.462e-06; norm: 6.408e-02
## It: 212; obj: 3.220e+00; abs: 7.639e-06; rel: 2.373e-06; norm: 6.408e-02
## It: 213; obj: 3.220e+00; abs: 7.382e-06; rel: 2.293e-06; norm: 6.408e-02
## It: 214; obj: 3.220e+00; abs: 7.152e-06; rel: 2.222e-06; norm: 6.409e-02
## It: 215; obj: 3.220e+00; abs: 6.947e-06; rel: 2.158e-06; norm: 6.409e-02
## It: 216; obj: 3.220e+00; abs: 6.762e-06; rel: 2.100e-06; norm: 6.409e-02
## It: 217; obj: 3.220e+00; abs: 6.596e-06; rel: 2.049e-06; norm: 6.410e-02
## It: 218; obj: 3.220e+00; abs: 6.446e-06; rel: 2.002e-06; norm: 6.410e-02
## It: 219; obj: 3.220e+00; abs: 6.307e-06; rel: 1.959e-06; norm: 6.410e-02
## It: 220; obj: 3.220e+00; abs: 6.178e-06; rel: 1.919e-06; norm: 6.410e-02
## It: 221; obj: 3.220e+00; abs: 6.054e-06; rel: 1.880e-06; norm: 6.411e-02
## It: 222; obj: 3.220e+00; abs: 5.930e-06; rel: 1.842e-06; norm: 6.411e-02
## It: 223; obj: 3.220e+00; abs: 5.805e-06; rel: 1.803e-06; norm: 6.411e-02
## It: 224; obj: 3.220e+00; abs: 5.673e-06; rel: 1.762e-06; norm: 6.412e-02
## It: 225; obj: 3.219e+00; abs: 5.531e-06; rel: 1.718e-06; norm: 6.412e-02
## It: 226; obj: 3.219e+00; abs: 5.378e-06; rel: 1.670e-06; norm: 6.412e-02
## It: 227; obj: 3.219e+00; abs: 5.211e-06; rel: 1.619e-06; norm: 6.413e-02
## It: 228; obj: 3.219e+00; abs: 5.031e-06; rel: 1.563e-06; norm: 6.413e-02
## It: 229; obj: 3.219e+00; abs: 4.840e-06; rel: 1.503e-06; norm: 6.413e-02
## It: 230; obj: 3.219e+00; abs: 4.639e-06; rel: 1.441e-06; norm: 6.413e-02
## It: 231; obj: 3.219e+00; abs: 4.433e-06; rel: 1.377e-06; norm: 6.414e-02
## It: 232; obj: 3.219e+00; abs: 4.225e-06; rel: 1.312e-06; norm: 6.414e-02
## It: 233; obj: 3.219e+00; abs: 4.019e-06; rel: 1.248e-06; norm: 6.414e-02
## It: 234; obj: 3.219e+00; abs: 3.818e-06; rel: 1.186e-06; norm: 6.414e-02
## It: 235; obj: 3.219e+00; abs: 3.626e-06; rel: 1.126e-06; norm: 6.415e-02
## It: 236; obj: 3.219e+00; abs: 3.443e-06; rel: 1.069e-06; norm: 6.415e-02
## It: 237; obj: 3.219e+00; abs: 3.272e-06; rel: 1.016e-06; norm: 6.415e-02
## It: 238; obj: 3.219e+00; abs: 3.113e-06; rel: 9.670e-07; norm: 6.415e-02
## It: 239; obj: 3.219e+00; abs: 2.967e-06; rel: 9.217e-07; norm: 6.415e-02
## It: 240; obj: 3.219e+00; abs: 2.834e-06; rel: 8.804e-07; norm: 6.415e-02
## It: 241; obj: 3.219e+00; abs: 2.714e-06; rel: 8.429e-07; norm: 6.416e-02
## It: 242; obj: 3.219e+00; abs: 2.605e-06; rel: 8.092e-07; norm: 6.416e-02
## It: 243; obj: 3.219e+00; abs: 2.508e-06; rel: 7.791e-07; norm: 6.416e-02
## It: 244; obj: 3.219e+00; abs: 2.423e-06; rel: 7.525e-07; norm: 6.416e-02
## It: 245; obj: 3.219e+00; abs: 2.347e-06; rel: 7.291e-07; norm: 6.416e-02
## It: 246; obj: 3.219e+00; abs: 2.282e-06; rel: 7.089e-07; norm: 6.416e-02
## It: 247; obj: 3.219e+00; abs: 2.227e-06; rel: 6.918e-07; norm: 6.416e-02
## It: 248; obj: 3.219e+00; abs: 2.758e-06; rel: 8.568e-07; norm: 6.417e-02
## It: 249; obj: 3.219e+00; abs: 3.111e-06; rel: 9.662e-07; norm: 6.417e-02
## It: 250; obj: 3.219e+00; abs: 3.350e-06; rel: 1.041e-06; norm: 6.417e-02
## It: 251; obj: 3.219e+00; abs: 3.527e-06; rel: 1.096e-06; norm: 6.417e-02
```

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## It: 252; obj: 3.219e+00; abs: 3.680e-06; rel: 1.143e-06; norm: 6.417e-02
## It: 253; obj: 3.219e+00; abs: 3.839e-06; rel: 1.192e-06; norm: 6.417e-02
## It: 254; obj: 3.219e+00; abs: 4.027e-06; rel: 1.251e-06; norm: 6.417e-02
## It: 255; obj: 3.219e+00; abs: 4.263e-06; rel: 1.324e-06; norm: 6.417e-02
## It: 256; obj: 3.219e+00; abs: 4.565e-06; rel: 1.418e-06; norm: 6.417e-02
## It: 257; obj: 3.219e+00; abs: 4.947e-06; rel: 1.537e-06; norm: 6.417e-02
## It: 258; obj: 3.219e+00; abs: 5.426e-06; rel: 1.685e-06; norm: 6.417e-02
## It: 259; obj: 3.219e+00; abs: 6.018e-06; rel: 1.869e-06; norm: 6.418e-02
## It: 260; obj: 3.219e+00; abs: 6.742e-06; rel: 2.094e-06; norm: 6.418e-02
## It: 261; obj: 3.219e+00; abs: 7.620e-06; rel: 2.367e-06; norm: 6.418e-02
## It: 262; obj: 3.219e+00; abs: 8.678e-06; rel: 2.696e-06; norm: 6.418e-02
## It: 263; obj: 3.219e+00; abs: 9.950e-06; rel: 3.091e-06; norm: 6.418e-02
## It: 264; obj: 3.219e+00; abs: 1.147e-05; rel: 3.564e-06; norm: 6.418e-02
## It: 265; obj: 3.219e+00; abs: 1.330e-05; rel: 4.130e-06; norm: 6.418e-02
## It: 266; obj: 3.219e+00; abs: 1.547e-05; rel: 4.806e-06; norm: 6.418e-02
## It: 267; obj: 3.219e+00; abs: 1.805e-05; rel: 5.607e-06; norm: 6.418e-02
## It: 268; obj: 3.219e+00; abs: 2.109e-05; rel: 6.551e-06; norm: 6.418e-02
## It: 269; obj: 3.219e+00; abs: 2.461e-05; rel: 7.646e-06; norm: 6.418e-02
## It: 270; obj: 3.219e+00; abs: 2.860e-05; rel: 8.886e-06; norm: 6.418e-02
## It: 271; obj: 3.219e+00; abs: 3.295e-05; rel: 1.024e-05; norm: 6.419e-02
## It: 272; obj: 3.219e+00; abs: 3.739e-05; rel: 1.161e-05; norm: 6.419e-02
## It: 273; obj: 3.219e+00; abs: 4.149e-05; rel: 1.289e-05; norm: 6.420e-02
## It: 274; obj: 3.219e+00; abs: 4.462e-05; rel: 1.386e-05; norm: 6.421e-02
## It: 275; obj: 3.219e+00; abs: 4.605e-05; rel: 1.430e-05; norm: 6.422e-02
## It: 276; obj: 3.219e+00; abs: 4.518e-05; rel: 1.404e-05; norm: 6.423e-02
## It: 277; obj: 3.219e+00; abs: 4.193e-05; rel: 1.303e-05; norm: 6.424e-02
## It: 278; obj: 3.219e+00; abs: 3.676e-05; rel: 1.142e-05; norm: 6.425e-02
## It: 279; obj: 3.219e+00; abs: 3.029e-05; rel: 9.410e-06; norm: 6.426e-02
## It: 280; obj: 3.219e+00; abs: 2.308e-05; rel: 7.170e-06; norm: 6.427e-02
## It: 281; obj: 3.219e+00; abs: 1.617e-05; rel: 5.025e-06; norm: 6.428e-02
## It: 282; obj: 3.219e+00; abs: 1.101e-05; rel: 3.421e-06; norm: 6.429e-02
## It: 283; obj: 3.219e+00; abs: 8.225e-06; rel: 2.555e-06; norm: 6.429e-02
## It: 284; obj: 3.219e+00; abs: 7.134e-06; rel: 2.216e-06; norm: 6.430e-02
## It: 285; obj: 3.219e+00; abs: 6.607e-06; rel: 2.053e-06; norm: 6.430e-02
## It: 286; obj: 3.219e+00; abs: 5.985e-06; rel: 1.860e-06; norm: 6.431e-02
## It: 287; obj: 3.219e+00; abs: 5.176e-06; rel: 1.608e-06; norm: 6.431e-02
## It: 288; obj: 3.219e+00; abs: 4.292e-06; rel: 1.334e-06; norm: 6.431e-02
## It: 289; obj: 3.219e+00; abs: 3.418e-06; rel: 1.062e-06; norm: 6.432e-02
## It: 290; obj: 3.219e+00; abs: 2.601e-06; rel: 8.081e-07; norm: 6.432e-02
## It: 291; obj: 3.219e+00; abs: 1.887e-06; rel: 5.864e-07; norm: 6.432e-02
## It: 292; obj: 3.219e+00; abs: 1.321e-06; rel: 4.104e-07; norm: 6.432e-02
## It: 293; obj: 3.219e+00; abs: 9.142e-07; rel: 2.840e-07; norm: 6.433e-02
## It: 294; obj: 3.219e+00; abs: 6.418e-07; rel: 1.994e-07; norm: 6.433e-02
## It: 295; obj: 3.219e+00; abs: 4.609e-07; rel: 1.432e-07; norm: 6.433e-02
## It: 296; obj: 3.219e+00; abs: 3.338e-07; rel: 1.037e-07; norm: 6.433e-02
## It: 297; obj: 3.219e+00; abs: 2.391e-07; rel: 7.428e-08; norm: 6.433e-02
## It: 298; obj: 3.219e+00; abs: 1.679e-07; rel: 5.215e-08; norm: 6.433e-02
## It: 299; obj: 3.219e+00; abs: 1.162e-07; rel: 3.609e-08; norm: 6.433e-02
## It: 300; obj: 3.219e+00; abs: 8.025e-08; rel: 2.493e-08; norm: 6.434e-02
## It: 301; obj: 3.219e+00; abs: 5.610e-08; rel: 1.743e-08; norm: 6.434e-02
## It: 302; obj: 3.219e+00; abs: 4.017e-08; rel: 1.248e-08; norm: 6.434e-02
## It: 303; obj: 3.219e+00; abs: 2.978e-08; rel: 9.251e-09; norm: 6.434e-02
## It: 304; obj: 3.219e+00; abs: 2.295e-08; rel: 7.130e-09; norm: 6.434e-02
## It: 305; obj: 3.219e+00; abs: 1.827e-08; rel: 5.676e-09; norm: 6.434e-02
```

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## It: 306; obj: 3.219e+00; abs: 1.487e-08; rel: 4.620e-09; norm: 6.434e-02
## It: 307; obj: 3.219e+00; abs: 1.230e-08; rel: 3.820e-09; norm: 6.434e-02
## It: 308; obj: 3.219e+00; abs: 1.033e-08; rel: 3.208e-09; norm: 6.434e-02
## It: 309; obj: 3.219e+00; abs: 8.788e-09; rel: 2.730e-09; norm: 6.434e-02
## It: 310; obj: 3.219e+00; abs: 7.532e-09; rel: 2.340e-09; norm: 6.434e-02
## It: 311; obj: 3.219e+00; abs: 6.461e-09; rel: 2.007e-09; norm: 6.434e-02
## It: 312; obj: 3.219e+00; abs: 5.529e-09; rel: 1.718e-09; norm: 6.434e-02
## It: 313; obj: 3.219e+00; abs: 4.731e-09; rel: 1.470e-09; norm: 6.434e-02
## It: 314; obj: 3.219e+00; abs: 4.065e-09; rel: 1.263e-09; norm: 6.434e-02
## It: 315; obj: 3.219e+00; abs: 3.515e-09; rel: 1.092e-09; norm: 6.434e-02
## It: 316; obj: 3.219e+00; abs: 3.068e-09; rel: 9.532e-10; norm: 6.434e-02
## It: 317; obj: 3.219e+00; abs: 2.705e-09; rel: 8.403e-10; norm: 6.434e-02
## It: 318; obj: 3.219e+00; abs: 2.408e-09; rel: 7.483e-10; norm: 6.434e-02
## It: 319; obj: 3.219e+00; abs: 2.163e-09; rel: 6.719e-10; norm: 6.434e-02
## It: 320; obj: 3.219e+00; abs: 1.951e-09; rel: 6.061e-10; norm: 6.434e-02
## It: 321; obj: 3.219e+00; abs: 1.761e-09; rel: 5.472e-10; norm: 6.434e-02
## It: 322; obj: 3.219e+00; abs: 1.586e-09; rel: 4.928e-10; norm: 6.434e-02
## It: 323; obj: 3.219e+00; abs: 1.420e-09; rel: 4.413e-10; norm: 6.434e-02
## It: 324; obj: 3.219e+00; abs: 1.262e-09; rel: 3.921e-10; norm: 6.434e-02
## It: 325; obj: 3.219e+00; abs: 1.111e-09; rel: 3.452e-10; norm: 6.434e-02
## It: 326; obj: 3.219e+00; abs: 9.682e-10; rel: 3.008e-10; norm: 6.434e-02
## It: 327; obj: 3.219e+00; abs: 8.380e-10; rel: 2.604e-10; norm: 6.434e-02
## It: 328; obj: 3.219e+00; abs: 7.212e-10; rel: 2.240e-10; norm: 6.434e-02
## It: 329; obj: 3.219e+00; abs: 6.203e-10; rel: 1.927e-10; norm: 6.434e-02
## It: 330; obj: 3.219e+00; abs: 5.352e-10; rel: 1.663e-10; norm: 6.434e-02
## It: 331; obj: 3.219e+00; abs: 4.650e-10; rel: 1.445e-10; norm: 6.434e-02
## It: 332; obj: 3.219e+00; abs: 4.087e-10; rel: 1.270e-10; norm: 6.434e-02
## It: 333; obj: 3.219e+00; abs: 3.643e-10; rel: 1.132e-10; norm: 6.434e-02
## It: 334; obj: 3.219e+00; abs: 3.306e-10; rel: 1.027e-10; norm: 6.434e-02
## It: 335; obj: 3.219e+00; abs: 3.030e-10; rel: 9.413e-11; norm: 6.434e-02
## It: 336; obj: 3.219e+00; abs: 2.808e-10; rel: 8.725e-11; norm: 6.434e-02
## It: 337; obj: 3.219e+00; abs: 2.608e-10; rel: 8.102e-11; norm: 6.434e-02
## It: 338; obj: 3.219e+00; abs: 2.417e-10; rel: 7.510e-11; norm: 6.434e-02
## It: 339; obj: 3.219e+00; abs: 2.234e-10; rel: 6.941e-11; norm: 6.434e-02
## It: 340; obj: 3.219e+00; abs: 2.042e-10; rel: 6.345e-11; norm: 6.434e-02
## It: 341; obj: 3.219e+00; abs: 1.841e-10; rel: 5.720e-11; norm: 6.434e-02
## It: 342; obj: 3.219e+00; abs: 1.634e-10; rel: 5.075e-11; norm: 6.434e-02
## It: 343; obj: 3.219e+00; abs: 1.441e-10; rel: 4.478e-11; norm: 6.434e-02
## It: 344; obj: 3.219e+00; abs: 1.251e-10; rel: 3.888e-11; norm: 6.434e-02
## It: 345; obj: 3.219e+00; abs: 1.077e-10; rel: 3.345e-11; norm: 6.434e-02
## It: 346; obj: 3.219e+00; abs: 9.213e-11; rel: 2.862e-11; norm: 6.434e-02
## It: 347; obj: 3.219e+00; abs: 7.924e-11; rel: 2.462e-11; norm: 6.434e-02
## It: 348; obj: 3.219e+00; abs: 6.865e-11; rel: 2.133e-11; norm: 6.434e-02
## It: 349; obj: 3.219e+00; abs: 6.031e-11; rel: 1.874e-11; norm: 6.434e-02
## It: 350; obj: 3.219e+00; abs: 5.400e-11; rel: 1.678e-11; norm: 6.434e-02
## It: 351; obj: 3.219e+00; abs: 4.878e-11; rel: 1.516e-11; norm: 6.434e-02
## It: 352; obj: 3.219e+00; abs: 4.548e-11; rel: 1.413e-11; norm: 6.434e-02
## It: 353; obj: 3.219e+00; abs: 4.319e-11; rel: 1.342e-11; norm: 6.434e-02
## It: 354; obj: 3.219e+00; abs: 4.059e-11; rel: 1.261e-11; norm: 6.434e-02
## It: 355; obj: 3.219e+00; abs: 3.845e-11; rel: 1.194e-11; norm: 6.434e-02
## It: 356; obj: 3.219e+00; abs: 3.638e-11; rel: 1.130e-11; norm: 6.434e-02
## It: 357; obj: 3.219e+00; abs: 3.395e-11; rel: 1.055e-11; norm: 6.434e-02
## It: 358; obj: 3.219e+00; abs: 3.036e-11; rel: 9.432e-12; norm: 6.434e-02
## It: 359; obj: 3.219e+00; abs: 2.825e-11; rel: 8.776e-12; norm: 6.434e-02
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## It: 360; obj: 3.219e+00; abs: 2.417e-11; rel: 7.511e-12; norm: 6.434e-02
## It: 361; obj: 3.219e+00; abs: 2.163e-11; rel: 6.719e-12; norm: 6.434e-02
## It: 362; obj: 3.219e+00; abs: 1.881e-11; rel: 5.844e-12; norm: 6.434e-02
## It: 363; obj: 3.219e+00; abs: 1.593e-11; rel: 4.949e-12; norm: 6.434e-02
## It: 364; obj: 3.219e+00; abs: 1.333e-11; rel: 4.140e-12; norm: 6.434e-02
## It: 365; obj: 3.219e+00; abs: 1.173e-11; rel: 3.644e-12; norm: 6.434e-02
## It: 366; obj: 3.219e+00; abs: 9.932e-12; rel: 3.086e-12; norm: 6.434e-02
## It: 367; obj: 3.219e+00; abs: 9.261e-12; rel: 2.877e-12; norm: 6.434e-02
## It: 368; obj: 3.219e+00; abs: 8.265e-12; rel: 2.568e-12; norm: 6.434e-02
## It: 369; obj: 3.219e+00; abs: 7.880e-12; rel: 2.448e-12; norm: 6.434e-02
## It: 370; obj: 3.219e+00; abs: 7.319e-12; rel: 2.274e-12; norm: 6.434e-02
## It: 371; obj: 3.219e+00; abs: 7.050e-12; rel: 2.190e-12; norm: 6.434e-02
## It: 372; obj: 3.219e+00; abs: 6.620e-12; rel: 2.057e-12; norm: 6.434e-02
## It: 373; obj: 3.219e+00; abs: 6.406e-12; rel: 1.990e-12; norm: 6.434e-02
## It: 374; obj: 3.219e+00; abs: 6.418e-12; rel: 1.994e-12; norm: 6.434e-02
## It: 375; obj: 3.219e+00; abs: 5.182e-12; rel: 1.610e-12; norm: 6.434e-02
## It: 376; obj: 3.219e+00; abs: 5.631e-12; rel: 1.750e-12; norm: 6.434e-02
## It: 377; obj: 3.219e+00; abs: 3.922e-12; rel: 1.219e-12; norm: 6.434e-02
## It: 378; obj: 3.219e+00; abs: 3.853e-12; rel: 1.197e-12; norm: 6.434e-02
## It: 379; obj: 3.219e+00; abs: 3.478e-12; rel: 1.080e-12; norm: 6.434e-02
## It: 380; obj: 3.219e+00; abs: 2.941e-12; rel: 9.138e-13; norm: 6.434e-02
## It: 381; obj: 3.219e+00; abs: 2.461e-12; rel: 7.645e-13; norm: 6.434e-02
## It: 382; obj: 3.219e+00; abs: 1.972e-12; rel: 6.126e-13; norm: 6.434e-02
## It: 383; obj: 3.219e+00; abs: 1.864e-12; rel: 5.792e-13; norm: 6.434e-02
## It: 384; obj: 3.219e+00; abs: 1.601e-12; rel: 4.974e-13; norm: 6.434e-02
## It: 385; obj: 3.219e+00; abs: 1.310e-12; rel: 4.070e-13; norm: 6.434e-02
## It: 386; obj: 3.219e+00; abs: 1.524e-12; rel: 4.734e-13; norm: 6.434e-02
## It: 387; obj: 3.219e+00; abs: 1.267e-12; rel: 3.938e-13; norm: 6.434e-02
## It: 388; obj: 3.219e+00; abs: 1.231e-12; rel: 3.826e-13; norm: 6.434e-02
## It: 389; obj: 3.219e+00; abs: 1.245e-12; rel: 3.867e-13; norm: 6.434e-02
## It: 390; obj: 3.219e+00; abs: 1.402e-12; rel: 4.354e-13; norm: 6.434e-02
## It: 391; obj: 3.219e+00; abs: 7.216e-13; rel: 2.242e-13; norm: 6.434e-02
## It: 392; obj: 3.219e+00; abs: 1.013e-12; rel: 3.146e-13; norm: 6.434e-02
## It: 393; obj: 3.219e+00; abs: 7.265e-13; rel: 2.257e-13; norm: 6.434e-02
## It: 394; obj: 3.219e+00; abs: 1.091e-12; rel: 3.390e-13; norm: 6.434e-02
## It: 395; obj: 3.219e+00; abs: 6.271e-13; rel: 1.948e-13; norm: 6.434e-02
## It: 396; obj: 3.219e+00; abs: 8.464e-13; rel: 2.630e-13; norm: 6.434e-02
## It: 397; obj: 3.219e+00; abs: 7.465e-13; rel: 2.319e-13; norm: 6.434e-02
## It: 398; obj: 3.219e+00; abs: 3.784e-13; rel: 1.176e-13; norm: 6.434e-02
## It: 399; obj: 3.219e+00; abs: 1.008e-13; rel: 3.132e-14; norm: 6.434e-02
## It: 400; obj: 3.219e+00; abs: 1.799e-13; rel: 5.588e-14; norm: 6.434e-02
## It: 401; obj: 3.219e+00; abs: 1.190e-13; rel: 3.698e-14; norm: 6.434e-02
## It: 402; obj: 3.219e+00; abs: 2.847e-13; rel: 8.844e-14; norm: 6.434e-02
## It: 403; obj: 3.219e+00; abs: 1.399e-13; rel: 4.346e-14; norm: 6.434e-02
## It: 404; obj: 3.219e+00; abs: 3.348e-13; rel: 1.040e-13; norm: 6.434e-02
## It: 405; obj: 3.219e+00; abs: 1.883e-13; rel: 5.850e-14; norm: 6.434e-02
## It: 406; obj: 3.219e+00; abs: 4.863e-13; rel: 1.511e-13; norm: 6.434e-02
## It: 407; obj: 3.219e+00; abs: 6.617e-14; rel: 2.056e-14; norm: 6.434e-02
## It: 408; obj: 3.219e+00; abs: 6.515e-13; rel: 2.024e-13; norm: 6.434e-02
## It: 409; obj: 3.219e+00; abs: 9.326e-14; rel: 2.897e-14; norm: 6.434e-02
## It: 410; obj: 3.219e+00; abs: 1.088e-13; rel: 3.380e-14; norm: 6.434e-02
## It: 411; obj: 3.219e+00; abs: 1.599e-13; rel: 4.967e-14; norm: 6.434e-02
## It: 412; obj: 3.219e+00; abs: 1.554e-13; rel: 4.829e-14; norm: 6.434e-02
## It: 413; obj: 3.219e+00; abs: 3.602e-13; rel: 1.119e-13; norm: 6.434e-02
```

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## It: 414; obj: 3.219e+00; abs: 3.242e-13; rel: 1.007e-13; norm: 6.434e-02
## It: 415; obj: 3.219e+00; abs: 1.199e-14; rel: 3.725e-15; norm: 6.434e-02
## It: 416; obj: 3.219e+00; abs: 2.087e-13; rel: 6.485e-14; norm: 6.434e-02
## It: 417; obj: 3.219e+00; abs: 3.002e-13; rel: 9.327e-14; norm: 6.434e-02
## It: 418; obj: 3.219e+00; abs: 1.332e-13; rel: 4.139e-14; norm: 6.434e-02
## It: 419; obj: 3.219e+00; abs: 2.665e-14; rel: 8.278e-15; norm: 6.434e-02
## It: 420; obj: 3.219e+00; abs: 7.816e-14; rel: 2.428e-14; norm: 6.434e-02
## It: 421; obj: 3.219e+00; abs: 7.461e-14; rel: 2.318e-14; norm: 6.434e-02
## It: 422; obj: 3.219e+00; abs: 1.559e-13; rel: 4.843e-14; norm: 6.434e-02
## It: 423; obj: 3.219e+00; abs: 9.726e-14; rel: 3.022e-14; norm: 6.434e-02
## It: 424; obj: 3.219e+00; abs: 2.900e-13; rel: 9.009e-14; norm: 6.434e-02
## It: 425; obj: 3.219e+00; abs: 4.445e-13; rel: 1.381e-13; norm: 6.434e-02
## It: 426; obj: 3.219e+00; abs: 2.101e-13; rel: 6.526e-14; norm: 6.434e-02
## It: 427; obj: 3.219e+00; abs: 3.597e-13; rel: 1.118e-13; norm: 6.434e-02
## It: 428; obj: 3.219e+00; abs: 2.709e-14; rel: 8.416e-15; norm: 6.434e-02
## It: 429; obj: 3.219e+00; abs: 5.329e-15; rel: 1.656e-15; norm: 6.434e-02
## It: 430; obj: 3.219e+00; abs: 9.281e-14; rel: 2.884e-14; norm: 6.434e-02
## It: 431; obj: 3.219e+00; abs: 2.087e-14; rel: 6.485e-15; norm: 6.434e-02
## It: 432; obj: 3.219e+00; abs: 7.150e-14; rel: 2.221e-14; norm: 6.434e-02
## It: 433; obj: 3.219e+00; abs: 1.497e-13; rel: 4.650e-14; norm: 6.434e-02
## It: 434; obj: 3.219e+00; abs: 1.243e-13; rel: 3.863e-14; norm: 6.434e-02
## It: 435; obj: 3.219e+00; abs: 9.370e-14; rel: 2.911e-14; norm: 6.434e-02
## It: 436; obj: 3.219e+00; abs: 9.548e-14; rel: 2.966e-14; norm: 6.434e-02
## It: 437; obj: 3.219e+00; abs: 9.326e-14; rel: 2.897e-14; norm: 6.434e-02
## It: 438; obj: 3.219e+00; abs: 1.736e-13; rel: 5.395e-14; norm: 6.434e-02
## It: 439; obj: 3.219e+00; abs: 4.308e-14; rel: 1.338e-14; norm: 6.434e-02
## It: 440; obj: 3.219e+00; abs: 1.426e-13; rel: 4.429e-14; norm: 6.434e-02
## It: 441; obj: 3.219e+00; abs: 4.374e-13; rel: 1.359e-13; norm: 6.434e-02
## It: 442; obj: 3.219e+00; abs: 1.501e-13; rel: 4.663e-14; norm: 6.434e-02
## It: 443; obj: 3.219e+00; abs: 1.843e-13; rel: 5.726e-14; norm: 6.434e-02
## It: 444; obj: 3.219e+00; abs: 7.994e-15; rel: 2.483e-15; norm: 6.434e-02
## It: 445; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 446; obj: 3.219e+00; abs: 5.018e-14; rel: 1.559e-14; norm: 6.434e-02
## It: 447; obj: 3.219e+00; abs: 7.283e-14; rel: 2.263e-14; norm: 6.434e-02
## It: 448; obj: 3.219e+00; abs: 5.951e-14; rel: 1.849e-14; norm: 6.434e-02
## It: 449; obj: 3.219e+00; abs: 5.951e-14; rel: 1.849e-14; norm: 6.434e-02
## It: 450; obj: 3.219e+00; abs: 6.528e-14; rel: 2.028e-14; norm: 6.434e-02
## It: 451; obj: 3.219e+00; abs: 5.818e-14; rel: 1.807e-14; norm: 6.434e-02
## It: 452; obj: 3.219e+00; abs: 2.256e-13; rel: 7.009e-14; norm: 6.434e-02
## It: 453; obj: 3.219e+00; abs: 2.429e-13; rel: 7.547e-14; norm: 6.434e-02
## It: 454; obj: 3.219e+00; abs: 2.256e-13; rel: 7.009e-14; norm: 6.434e-02
## It: 455; obj: 3.219e+00; abs: 1.030e-13; rel: 3.201e-14; norm: 6.434e-02
## It: 456; obj: 3.219e+00; abs: 1.110e-13; rel: 3.449e-14; norm: 6.434e-02
## It: 457; obj: 3.219e+00; abs: 2.665e-14; rel: 8.278e-15; norm: 6.434e-02
## It: 458; obj: 3.219e+00; abs: 1.172e-13; rel: 3.642e-14; norm: 6.434e-02
## It: 459; obj: 3.219e+00; abs: 1.203e-13; rel: 3.739e-14; norm: 6.434e-02
## It: 460; obj: 3.219e+00; abs: 1.199e-14; rel: 3.725e-15; norm: 6.434e-02
## It: 461; obj: 3.219e+00; abs: 6.750e-14; rel: 2.097e-14; norm: 6.434e-02
## It: 462; obj: 3.219e+00; abs: 5.373e-14; rel: 1.669e-14; norm: 6.434e-02
## It: 463; obj: 3.219e+00; abs: 1.230e-13; rel: 3.822e-14; norm: 6.434e-02
## It: 464; obj: 3.219e+00; abs: 3.553e-14; rel: 1.104e-14; norm: 6.434e-02
## It: 465; obj: 3.219e+00; abs: 2.185e-13; rel: 6.788e-14; norm: 6.434e-02
## It: 466; obj: 3.219e+00; abs: 2.229e-13; rel: 6.926e-14; norm: 6.434e-02
## It: 467; obj: 3.219e+00; abs: 1.186e-13; rel: 3.684e-14; norm: 6.434e-02
```

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## It: 468; obj: 3.219e+00; abs: 1.479e-13; rel: 4.594e-14; norm: 6.434e-02
## It: 469; obj: 3.219e+00; abs: 7.816e-14; rel: 2.428e-14; norm: 6.434e-02
## It: 470; obj: 3.219e+00; abs: 4.352e-14; rel: 1.352e-14; norm: 6.434e-02
## It: 471; obj: 3.219e+00; abs: 1.861e-13; rel: 5.781e-14; norm: 6.434e-02
## It: 472; obj: 3.219e+00; abs: 7.550e-15; rel: 2.345e-15; norm: 6.434e-02
## It: 473; obj: 3.219e+00; abs: 3.997e-14; rel: 1.242e-14; norm: 6.434e-02
## It: 474; obj: 3.219e+00; abs: 3.135e-13; rel: 9.741e-14; norm: 6.434e-02
## It: 475; obj: 3.219e+00; abs: 2.602e-13; rel: 8.085e-14; norm: 6.434e-02
## It: 476; obj: 3.219e+00; abs: 7.372e-14; rel: 2.290e-14; norm: 6.434e-02
## It: 477; obj: 3.219e+00; abs: 2.842e-13; rel: 8.830e-14; norm: 6.434e-02
## It: 478; obj: 3.219e+00; abs: 2.882e-13; rel: 8.954e-14; norm: 6.434e-02
## It: 479; obj: 3.219e+00; abs: 1.248e-13; rel: 3.877e-14; norm: 6.434e-02
## It: 480; obj: 3.219e+00; abs: 2.398e-14; rel: 7.450e-15; norm: 6.434e-02
## It: 481; obj: 3.219e+00; abs: 1.164e-13; rel: 3.615e-14; norm: 6.434e-02
## It: 482; obj: 3.219e+00; abs: 2.052e-13; rel: 6.374e-14; norm: 6.434e-02
## It: 483; obj: 3.219e+00; abs: 1.310e-13; rel: 4.070e-14; norm: 6.434e-02
## It: 484; obj: 3.219e+00; abs: 4.441e-15; rel: 1.380e-15; norm: 6.434e-02
## It: 485; obj: 3.219e+00; abs: 9.903e-14; rel: 3.077e-14; norm: 6.434e-02
## It: 486; obj: 3.219e+00; abs: 5.329e-14; rel: 1.656e-14; norm: 6.434e-02
## It: 487; obj: 3.219e+00; abs: 1.434e-13; rel: 4.456e-14; norm: 6.434e-02
## It: 488; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 489; obj: 3.219e+00; abs: 1.248e-13; rel: 3.877e-14; norm: 6.434e-02
## It: 490; obj: 3.219e+00; abs: 9.903e-14; rel: 3.077e-14; norm: 6.434e-02
## It: 491; obj: 3.219e+00; abs: 1.958e-13; rel: 6.084e-14; norm: 6.434e-02
## It: 492; obj: 3.219e+00; abs: 3.597e-14; rel: 1.118e-14; norm: 6.434e-02
## It: 493; obj: 3.219e+00; abs: 2.265e-14; rel: 7.036e-15; norm: 6.434e-02
## It: 494; obj: 3.219e+00; abs: 5.107e-14; rel: 1.587e-14; norm: 6.434e-02
## It: 495; obj: 3.219e+00; abs: 1.465e-14; rel: 4.553e-15; norm: 6.434e-02
## It: 496; obj: 3.219e+00; abs: 7.017e-14; rel: 2.180e-14; norm: 6.434e-02
## It: 497; obj: 3.219e+00; abs: 9.770e-14; rel: 3.035e-14; norm: 6.434e-02
## It: 498; obj: 3.219e+00; abs: 1.155e-14; rel: 3.587e-15; norm: 6.434e-02
## It: 499; obj: 3.219e+00; abs: 8.438e-15; rel: 2.621e-15; norm: 6.434e-02
## It: 500; obj: 3.219e+00; abs: 1.688e-13; rel: 5.243e-14; norm: 6.434e-02
## It: 501; obj: 3.219e+00; abs: 1.164e-13; rel: 3.615e-14; norm: 6.434e-02
## It: 502; obj: 3.219e+00; abs: 1.319e-13; rel: 4.098e-14; norm: 6.434e-02
## It: 503; obj: 3.219e+00; abs: 1.279e-13; rel: 3.974e-14; norm: 6.434e-02
## It: 504; obj: 3.219e+00; abs: 1.572e-13; rel: 4.884e-14; norm: 6.434e-02
## It: 505; obj: 3.219e+00; abs: 1.554e-14; rel: 4.829e-15; norm: 6.434e-02
## It: 506; obj: 3.219e+00; abs: 1.643e-14; rel: 5.105e-15; norm: 6.434e-02
## It: 507; obj: 3.219e+00; abs: 9.903e-14; rel: 3.077e-14; norm: 6.434e-02
## It: 508; obj: 3.219e+00; abs: 7.727e-14; rel: 2.401e-14; norm: 6.434e-02
## It: 509; obj: 3.219e+00; abs: 9.814e-14; rel: 3.049e-14; norm: 6.434e-02
## It: 510; obj: 3.219e+00; abs: 1.066e-14; rel: 3.311e-15; norm: 6.434e-02
## It: 511; obj: 3.219e+00; abs: 1.084e-13; rel: 3.366e-14; norm: 6.434e-02
## It: 512; obj: 3.219e+00; abs: 3.642e-14; rel: 1.131e-14; norm: 6.434e-02
## It: 513; obj: 3.219e+00; abs: 8.216e-14; rel: 2.552e-14; norm: 6.434e-02
## It: 514; obj: 3.219e+00; abs: 1.332e-14; rel: 4.139e-15; norm: 6.434e-02
## It: 515; obj: 3.219e+00; abs: 1.341e-13; rel: 4.167e-14; norm: 6.434e-02
## It: 516; obj: 3.219e+00; abs: 1.292e-13; rel: 4.015e-14; norm: 6.434e-02
## It: 517; obj: 3.219e+00; abs: 1.399e-13; rel: 4.346e-14; norm: 6.434e-02
## It: 518; obj: 3.219e+00; abs: 8.171e-14; rel: 2.539e-14; norm: 6.434e-02
## It: 519; obj: 3.219e+00; abs: 3.109e-14; rel: 9.658e-15; norm: 6.434e-02
## It: 520; obj: 3.219e+00; abs: 1.563e-13; rel: 4.857e-14; norm: 6.434e-02
## It: 521; obj: 3.219e+00; abs: 1.217e-13; rel: 3.780e-14; norm: 6.434e-02
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## It: 522; obj: 3.219e+00; abs: 1.821e-14; rel: 5.657e-15; norm: 6.434e-02
## It: 523; obj: 3.219e+00; abs: 9.326e-15; rel: 2.897e-15; norm: 6.434e-02
## It: 524; obj: 3.219e+00; abs: 3.952e-14; rel: 1.228e-14; norm: 6.434e-02
## It: 525; obj: 3.219e+00; abs: 4.619e-14; rel: 1.435e-14; norm: 6.434e-02
## It: 526; obj: 3.219e+00; abs: 7.594e-14; rel: 2.359e-14; norm: 6.434e-02
## It: 527; obj: 3.219e+00; abs: 6.439e-14; rel: 2.001e-14; norm: 6.434e-02
## It: 528; obj: 3.219e+00; abs: 3.375e-14; rel: 1.049e-14; norm: 6.434e-02
## It: 529; obj: 3.219e+00; abs: 1.052e-13; rel: 3.270e-14; norm: 6.434e-02
## It: 530; obj: 3.219e+00; abs: 1.408e-13; rel: 4.374e-14; norm: 6.434e-02
## It: 531; obj: 3.219e+00; abs: 1.465e-14; rel: 4.553e-15; norm: 6.434e-02
## It: 532; obj: 3.219e+00; abs: 1.101e-13; rel: 3.422e-14; norm: 6.434e-02
## It: 533; obj: 3.219e+00; abs: 3.997e-15; rel: 1.242e-15; norm: 6.434e-02
## It: 534; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 535; obj: 3.219e+00; abs: 2.398e-14; rel: 7.450e-15; norm: 6.434e-02
## It: 536; obj: 3.219e+00; abs: 1.261e-13; rel: 3.918e-14; norm: 6.434e-02
## It: 537; obj: 3.219e+00; abs: 1.714e-13; rel: 5.326e-14; norm: 6.434e-02
## It: 538; obj: 3.219e+00; abs: 7.594e-14; rel: 2.359e-14; norm: 6.434e-02
## It: 539; obj: 3.219e+00; abs: 7.416e-14; rel: 2.304e-14; norm: 6.434e-02
## It: 540; obj: 3.219e+00; abs: 5.107e-14; rel: 1.587e-14; norm: 6.434e-02
## It: 541; obj: 3.219e+00; abs: 1.252e-13; rel: 3.891e-14; norm: 6.434e-02
## It: 542; obj: 3.219e+00; abs: 6.661e-14; rel: 2.070e-14; norm: 6.434e-02
## It: 543; obj: 3.219e+00; abs: 2.025e-13; rel: 6.291e-14; norm: 6.434e-02
## It: 544; obj: 3.219e+00; abs: 1.350e-13; rel: 4.194e-14; norm: 6.434e-02
## It: 545; obj: 3.219e+00; abs: 3.553e-15; rel: 1.104e-15; norm: 6.434e-02
## It: 546; obj: 3.219e+00; abs: 2.709e-14; rel: 8.416e-15; norm: 6.434e-02
## It: 547; obj: 3.219e+00; abs: 5.285e-14; rel: 1.642e-14; norm: 6.434e-02
## It: 548; obj: 3.219e+00; abs: 4.308e-14; rel: 1.338e-14; norm: 6.434e-02
## It: 549; obj: 3.219e+00; abs: 1.221e-13; rel: 3.794e-14; norm: 6.434e-02
## It: 550; obj: 3.219e+00; abs: 2.132e-14; rel: 6.623e-15; norm: 6.434e-02
## It: 551; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 552; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 553; obj: 3.219e+00; abs: 1.297e-13; rel: 4.029e-14; norm: 6.434e-02
## It: 554; obj: 3.219e+00; abs: 1.865e-14; rel: 5.795e-15; norm: 6.434e-02
## It: 555; obj: 3.219e+00; abs: 1.732e-14; rel: 5.381e-15; norm: 6.434e-02
## It: 556; obj: 3.219e+00; abs: 1.767e-13; rel: 5.491e-14; norm: 6.434e-02
## It: 557; obj: 3.219e+00; abs: 1.061e-13; rel: 3.297e-14; norm: 6.434e-02
## It: 558; obj: 3.219e+00; abs: 6.928e-14; rel: 2.152e-14; norm: 6.434e-02
## It: 559; obj: 3.219e+00; abs: 7.105e-15; rel: 2.208e-15; norm: 6.434e-02
## It: 560; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 561; obj: 3.219e+00; abs: 8.749e-14; rel: 2.718e-14; norm: 6.434e-02
## It: 562; obj: 3.219e+00; abs: 8.260e-14; rel: 2.566e-14; norm: 6.434e-02
## It: 563; obj: 3.219e+00; abs: 8.660e-14; rel: 2.690e-14; norm: 6.434e-02
## It: 564; obj: 3.219e+00; abs: 1.510e-14; rel: 4.691e-15; norm: 6.434e-02
## It: 565; obj: 3.219e+00; abs: 1.332e-13; rel: 4.139e-14; norm: 6.434e-02
## It: 566; obj: 3.219e+00; abs: 1.421e-14; rel: 4.415e-15; norm: 6.434e-02
## It: 567; obj: 3.219e+00; abs: 7.550e-15; rel: 2.345e-15; norm: 6.434e-02
## It: 568; obj: 3.219e+00; abs: 7.017e-14; rel: 2.180e-14; norm: 6.434e-02
## It: 569; obj: 3.219e+00; abs: 1.767e-13; rel: 5.491e-14; norm: 6.434e-02
## It: 570; obj: 3.219e+00; abs: 3.197e-14; rel: 9.934e-15; norm: 6.434e-02
## It: 571; obj: 3.219e+00; abs: 8.349e-14; rel: 2.594e-14; norm: 6.434e-02
## It: 572; obj: 3.219e+00; abs: 4.841e-14; rel: 1.504e-14; norm: 6.434e-02
## It: 573; obj: 3.219e+00; abs: 4.974e-14; rel: 1.545e-14; norm: 6.434e-02
## It: 574; obj: 3.219e+00; abs: 1.021e-14; rel: 3.173e-15; norm: 6.434e-02
## It: 575; obj: 3.219e+00; abs: 7.239e-14; rel: 2.249e-14; norm: 6.434e-02
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## It: 576; obj: 3.219e+00; abs: 7.994e-14; rel: 2.483e-14; norm: 6.434e-02
## It: 577; obj: 3.219e+00; abs: 2.132e-14; rel: 6.623e-15; norm: 6.434e-02
## It: 578; obj: 3.219e+00; abs: 1.910e-14; rel: 5.933e-15; norm: 6.434e-02
## It: 579; obj: 3.219e+00; abs: 7.105e-15; rel: 2.208e-15; norm: 6.434e-02
## It: 580; obj: 3.219e+00; abs: 4.441e-15; rel: 1.380e-15; norm: 6.434e-02
## It: 581; obj: 3.219e+00; abs: 3.952e-14; rel: 1.228e-14; norm: 6.434e-02
## It: 582; obj: 3.219e+00; abs: 5.906e-14; rel: 1.835e-14; norm: 6.434e-02
## It: 583; obj: 3.219e+00; abs: 6.928e-14; rel: 2.152e-14; norm: 6.434e-02
## It: 584; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 585; obj: 3.219e+00; abs: 1.066e-14; rel: 3.311e-15; norm: 6.434e-02
## It: 586; obj: 3.219e+00; abs: 5.329e-14; rel: 1.656e-14; norm: 6.434e-02
## It: 587; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 588; obj: 3.219e+00; abs: 1.688e-14; rel: 5.243e-15; norm: 6.434e-02
## It: 589; obj: 3.219e+00; abs: 2.354e-14; rel: 7.312e-15; norm: 6.434e-02
## It: 590; obj: 3.219e+00; abs: 3.864e-14; rel: 1.200e-14; norm: 6.434e-02
## It: 591; obj: 3.219e+00; abs: 9.592e-14; rel: 2.980e-14; norm: 6.434e-02
## It: 592; obj: 3.219e+00; abs: 7.994e-15; rel: 2.483e-15; norm: 6.434e-02
## It: 593; obj: 3.219e+00; abs: 1.021e-14; rel: 3.173e-15; norm: 6.434e-02
## It: 594; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 595; obj: 3.219e+00; abs: 6.439e-14; rel: 2.001e-14; norm: 6.434e-02
## It: 596; obj: 3.219e+00; abs: 3.109e-14; rel: 9.658e-15; norm: 6.434e-02
## It: 597; obj: 3.219e+00; abs: 2.442e-14; rel: 7.588e-15; norm: 6.434e-02
## It: 598; obj: 3.219e+00; abs: 2.354e-14; rel: 7.312e-15; norm: 6.434e-02
## It: 599; obj: 3.219e+00; abs: 1.066e-14; rel: 3.311e-15; norm: 6.434e-02
## It: 600; obj: 3.219e+00; abs: 4.263e-14; rel: 1.325e-14; norm: 6.434e-02
## It: 601; obj: 3.219e+00; abs: 1.910e-14; rel: 5.933e-15; norm: 6.434e-02
## It: 602; obj: 3.219e+00; abs: 3.597e-14; rel: 1.118e-14; norm: 6.434e-02
## It: 603; obj: 3.219e+00; abs: 1.865e-14; rel: 5.795e-15; norm: 6.434e-02
## It: 604; obj: 3.219e+00; abs: 3.286e-14; rel: 1.021e-14; norm: 6.434e-02
## It: 605; obj: 3.219e+00; abs: 7.816e-14; rel: 2.428e-14; norm: 6.434e-02
## It: 606; obj: 3.219e+00; abs: 2.442e-14; rel: 7.588e-15; norm: 6.434e-02
## It: 607; obj: 3.219e+00; abs: 3.153e-14; rel: 9.796e-15; norm: 6.434e-02
## It: 608; obj: 3.219e+00; abs: 3.109e-14; rel: 9.658e-15; norm: 6.434e-02
## It: 609; obj: 3.219e+00; abs: 7.505e-14; rel: 2.332e-14; norm: 6.434e-02
## It: 610; obj: 3.219e+00; abs: 3.197e-14; rel: 9.934e-15; norm: 6.434e-02
## It: 611; obj: 3.219e+00; abs: 1.643e-14; rel: 5.105e-15; norm: 6.434e-02
## It: 612; obj: 3.219e+00; abs: 2.709e-14; rel: 8.416e-15; norm: 6.434e-02
## It: 613; obj: 3.219e+00; abs: 4.441e-15; rel: 1.380e-15; norm: 6.434e-02
## It: 614; obj: 3.219e+00; abs: 5.196e-14; rel: 1.614e-14; norm: 6.434e-02
## It: 615; obj: 3.219e+00; abs: 1.021e-14; rel: 3.173e-15; norm: 6.434e-02
## It: 616; obj: 3.219e+00; abs: 1.155e-14; rel: 3.587e-15; norm: 6.434e-02
## It: 617; obj: 3.219e+00; abs: 2.176e-14; rel: 6.761e-15; norm: 6.434e-02
## It: 618; obj: 3.219e+00; abs: 5.773e-15; rel: 1.794e-15; norm: 6.434e-02
## It: 619; obj: 3.219e+00; abs: 4.219e-14; rel: 1.311e-14; norm: 6.434e-02
## It: 620; obj: 3.219e+00; abs: 9.770e-15; rel: 3.035e-15; norm: 6.434e-02
## It: 621; obj: 3.219e+00; abs: 1.243e-14; rel: 3.863e-15; norm: 6.434e-02
## It: 622; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 623; obj: 3.219e+00; abs: 1.110e-14; rel: 3.449e-15; norm: 6.434e-02
## It: 624; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 625; obj: 3.219e+00; abs: 1.155e-14; rel: 3.587e-15; norm: 6.434e-02
## It: 626; obj: 3.219e+00; abs: 9.326e-15; rel: 2.897e-15; norm: 6.434e-02
## It: 627; obj: 3.219e+00; abs: 3.997e-15; rel: 1.242e-15; norm: 6.434e-02
## It: 628; obj: 3.219e+00; abs: 9.326e-15; rel: 2.897e-15; norm: 6.434e-02
## It: 629; obj: 3.219e+00; abs: 8.438e-15; rel: 2.621e-15; norm: 6.434e-02
```

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## It: 630; obj: 3.219e+00; abs: 2.087e-14; rel: 6.485e-15; norm: 6.434e-02
## It: 631; obj: 3.219e+00; abs: 1.776e-14; rel: 5.519e-15; norm: 6.434e-02
## It: 632; obj: 3.219e+00; abs: 7.994e-15; rel: 2.483e-15; norm: 6.434e-02
## It: 633; obj: 3.219e+00; abs: 1.155e-14; rel: 3.587e-15; norm: 6.434e-02
## It: 634; obj: 3.219e+00; abs: 1.510e-14; rel: 4.691e-15; norm: 6.434e-02
## It: 635; obj: 3.219e+00; abs: 8.438e-15; rel: 2.621e-15; norm: 6.434e-02
## It: 636; obj: 3.219e+00; abs: 4.219e-14; rel: 1.311e-14; norm: 6.434e-02
## It: 637; obj: 3.219e+00; abs: 2.709e-14; rel: 8.416e-15; norm: 6.434e-02
## It: 638; obj: 3.219e+00; abs: 5.329e-15; rel: 1.656e-15; norm: 6.434e-02
## It: 639; obj: 3.219e+00; abs: 1.066e-14; rel: 3.311e-15; norm: 6.434e-02
## It: 640; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 641; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 642; obj: 3.219e+00; abs: 1.510e-14; rel: 4.691e-15; norm: 6.434e-02
## It: 643; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 644; obj: 3.219e+00; abs: 7.994e-15; rel: 2.483e-15; norm: 6.434e-02
## It: 645; obj: 3.219e+00; abs: 2.975e-14; rel: 9.244e-15; norm: 6.434e-02
## It: 646; obj: 3.219e+00; abs: 1.243e-14; rel: 3.863e-15; norm: 6.434e-02
## It: 647; obj: 3.219e+00; abs: 8.438e-15; rel: 2.621e-15; norm: 6.434e-02
## It: 648; obj: 3.219e+00; abs: 2.087e-14; rel: 6.485e-15; norm: 6.434e-02
## It: 649; obj: 3.219e+00; abs: 9.326e-15; rel: 2.897e-15; norm: 6.434e-02
## It: 650; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 651; obj: 3.219e+00; abs: 7.105e-15; rel: 2.208e-15; norm: 6.434e-02
## It: 652; obj: 3.219e+00; abs: 3.553e-15; rel: 1.104e-15; norm: 6.434e-02
## It: 653; obj: 3.219e+00; abs: 1.155e-14; rel: 3.587e-15; norm: 6.434e-02
## It: 654; obj: 3.219e+00; abs: 3.109e-15; rel: 9.658e-16; norm: 6.434e-02
## It: 655; obj: 3.219e+00; abs: 8.882e-15; rel: 2.759e-15; norm: 6.434e-02
## It: 656; obj: 3.219e+00; abs: 6.661e-15; rel: 2.070e-15; norm: 6.434e-02
## It: 657; obj: 3.219e+00; abs: 7.105e-15; rel: 2.208e-15; norm: 6.434e-02
## It: 658; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 659; obj: 3.219e+00; abs: 8.882e-15; rel: 2.759e-15; norm: 6.434e-02
## It: 660; obj: 3.219e+00; abs: 7.550e-15; rel: 2.345e-15; norm: 6.434e-02
## It: 661; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 662; obj: 3.219e+00; abs: 6.661e-15; rel: 2.070e-15; norm: 6.434e-02
## It: 663; obj: 3.219e+00; abs: 6.661e-15; rel: 2.070e-15; norm: 6.434e-02
## It: 664; obj: 3.219e+00; abs: 3.997e-15; rel: 1.242e-15; norm: 6.434e-02
## It: 665; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 666; obj: 3.219e+00; abs: 5.773e-15; rel: 1.794e-15; norm: 6.434e-02
## It: 667; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 668; obj: 3.219e+00; abs: 1.421e-14; rel: 4.415e-15; norm: 6.434e-02
## It: 669; obj: 3.219e+00; abs: 1.155e-14; rel: 3.587e-15; norm: 6.434e-02
## It: 670; obj: 3.219e+00; abs: 9.326e-15; rel: 2.897e-15; norm: 6.434e-02
## It: 671; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 672; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 673; obj: 3.219e+00; abs: 1.643e-14; rel: 5.105e-15; norm: 6.434e-02
## It: 674; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 675; obj: 3.219e+00; abs: 9.326e-15; rel: 2.897e-15; norm: 6.434e-02
## It: 676; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 677; obj: 3.219e+00; abs: 9.770e-15; rel: 3.035e-15; norm: 6.434e-02
## It: 678; obj: 3.219e+00; abs: 5.773e-15; rel: 1.794e-15; norm: 6.434e-02
## It: 679; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 680; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 681; obj: 3.219e+00; abs: 1.110e-14; rel: 3.449e-15; norm: 6.434e-02
## It: 682; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 683; obj: 3.219e+00; abs: 7.550e-15; rel: 2.345e-15; norm: 6.434e-02
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## It: 684; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 685; obj: 3.219e+00; abs: 1.243e-14; rel: 3.863e-15; norm: 6.434e-02
## It: 686; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 687; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 688; obj: 3.219e+00; abs: 4.441e-15; rel: 1.380e-15; norm: 6.434e-02
## It: 689; obj: 3.219e+00; abs: 2.665e-15; rel: 8.278e-16; norm: 6.434e-02
## It: 690; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 691; obj: 3.219e+00; abs: 3.553e-15; rel: 1.104e-15; norm: 6.434e-02
## It: 692; obj: 3.219e+00; abs: 7.105e-15; rel: 2.208e-15; norm: 6.434e-02
## It: 693; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 694; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 695; obj: 3.219e+00; abs: 1.066e-14; rel: 3.311e-15; norm: 6.434e-02
## It: 696; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 697; obj: 3.219e+00; abs: 3.553e-15; rel: 1.104e-15; norm: 6.434e-02
## It: 698; obj: 3.219e+00; abs: 2.665e-15; rel: 8.278e-16; norm: 6.434e-02
## It: 699; obj: 3.219e+00; abs: 3.553e-15; rel: 1.104e-15; norm: 6.434e-02
## It: 700; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 701; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 702; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 703; obj: 3.219e+00; abs: 3.109e-15; rel: 9.658e-16; norm: 6.434e-02
## It: 704; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 705; obj: 3.219e+00; abs: 3.109e-15; rel: 9.658e-16; norm: 6.434e-02
## It: 706; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 707; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 708; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 709; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 710; obj: 3.219e+00; abs: 7.994e-15; rel: 2.483e-15; norm: 6.434e-02
## It: 711; obj: 3.219e+00; abs: 6.661e-15; rel: 2.070e-15; norm: 6.434e-02
## It: 712; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 713; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 714; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 715; obj: 3.219e+00; abs: 5.773e-15; rel: 1.794e-15; norm: 6.434e-02
## It: 716; obj: 3.219e+00; abs: 3.553e-15; rel: 1.104e-15; norm: 6.434e-02
## It: 717; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 718; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 719; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 720; obj: 3.219e+00; abs: 5.329e-15; rel: 1.656e-15; norm: 6.434e-02
## It: 721; obj: 3.219e+00; abs: 8.438e-15; rel: 2.621e-15; norm: 6.434e-02
## It: 722; obj: 3.219e+00; abs: 2.665e-15; rel: 8.278e-16; norm: 6.434e-02
## It: 723; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 724; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 725; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 726; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 727; obj: 3.219e+00; abs: 4.441e-15; rel: 1.380e-15; norm: 6.434e-02
## It: 728; obj: 3.219e+00; abs: 3.997e-15; rel: 1.242e-15; norm: 6.434e-02
## It: 729; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 730; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 731; obj: 3.219e+00; abs: 2.665e-15; rel: 8.278e-16; norm: 6.434e-02
## It: 732; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 733; obj: 3.219e+00; abs: 2.665e-15; rel: 8.278e-16; norm: 6.434e-02
## It: 734; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 735; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 736; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 737; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
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## It: 738; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 739; obj: 3.219e+00; abs: 2.665e-15; rel: 8.278e-16; norm: 6.434e-02
## It: 740; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 741; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 742; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 743; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 744; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 745; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 746; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 747; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 748; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 749; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 750; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 751; obj: 3.219e+00; abs: 2.220e-15; rel: 6.898e-16; norm: 6.434e-02
## It: 752; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 753; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 754; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 755; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 756; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 757; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 758; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 759; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 760; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 761; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 762; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 763; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 764; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 765; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 766; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 767; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 768; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 769; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 770; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 771; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 772; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 773; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 774; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 775; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 776; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 777; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 778; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 779; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
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## It: 781; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 782; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 783; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 784; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 785; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 786; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 787; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 788; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 789; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 790; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 791; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
```

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## It: 792; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 793; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 794; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 795; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 796; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 797; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 798; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 799; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 800; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 801; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 802; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 803; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 804; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 805; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 806; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 807; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 808; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 809; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 810; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 811; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 812; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 813; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 814; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 815; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 816; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 817; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 818; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 819; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 820; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 821; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 822; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 823; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 824; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 825; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 826; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 827; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 828; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 829; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 830; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 831; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 832; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 833; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 834; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 835; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 836; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 837; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 838; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 839; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 840; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 841; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 842; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 843; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 844; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 845; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
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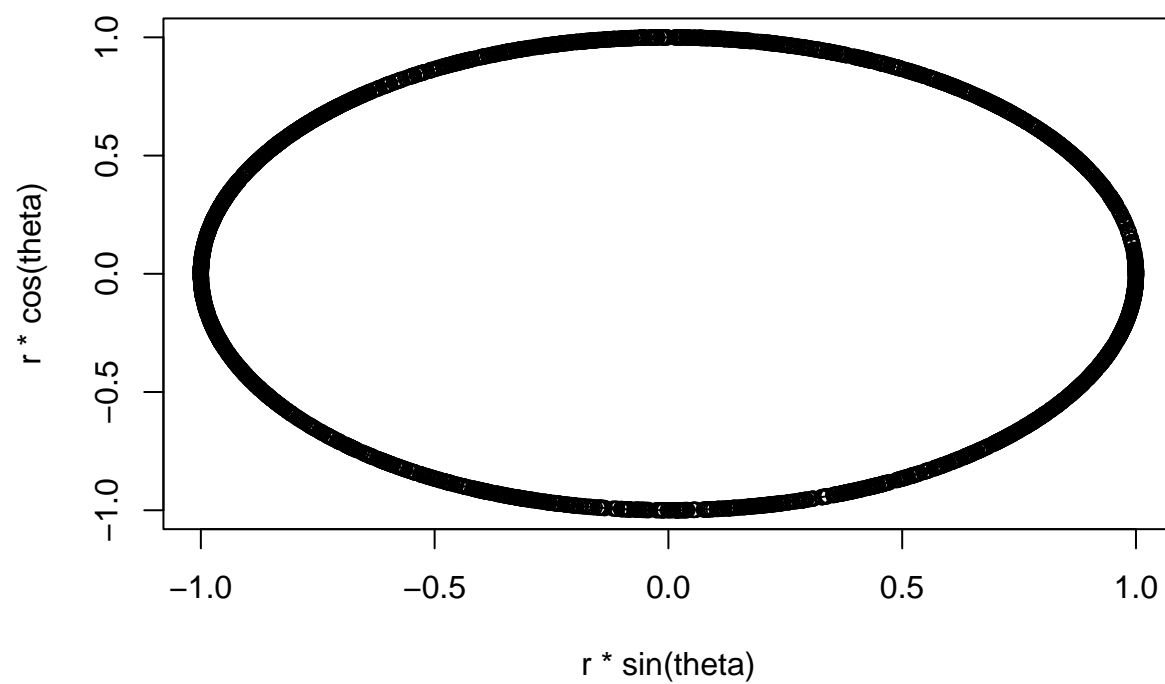
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## It: 847; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 848; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 849; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 850; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
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## It: 858; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
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## It: 860; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 861; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 862; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 863; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 864; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 865; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 866; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 867; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 868; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 869; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 870; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 871; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 872; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 873; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 874; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 875; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 876; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 877; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 878; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 879; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 880; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 881; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 882; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 883; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 884; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 885; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 886; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 887; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 888; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 889; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 890; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 891; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 892; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 893; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 894; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 895; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 896; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 897; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 898; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 899; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
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## It: 902; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 903; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 904; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 905; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 906; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 907; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 908; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 909; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 910; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 911; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 912; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 913; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 914; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 915; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 916; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 917; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 918; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 919; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 920; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 921; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 922; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 923; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 924; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 925; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 926; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 927; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 928; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 929; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 930; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 931; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 932; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 933; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 934; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 935; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 936; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 937; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 938; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 939; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 940; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 941; obj: 3.219e+00; abs: 8.882e-16; rel: 2.759e-16; norm: 6.434e-02
## It: 942; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 943; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 944; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 945; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 946; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 947; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 948; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 949; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 950; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 951; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 952; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 953; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
```

```
## It: 954; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 955; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 956; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 957; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 958; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 959; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 960; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 961; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 962; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 963; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 964; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 965; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 966; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 967; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 968; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 969; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 970; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 971; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 972; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 973; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 974; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 975; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 976; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 977; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 978; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 979; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 980; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 981; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 982; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 983; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 984; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 985; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 986; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 987; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 988; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 989; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 990; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 991; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 992; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 993; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 994; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 995; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 996; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 997; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 998; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 999; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
## It: 1000; obj: 3.219e+00; abs: 0.000e+00; rel: 0.000e+00; norm: 6.434e-02
```

Iteration 1000

And plot the results in a circumference:

```
Y_rad <- DirStats::to_rad(Y)
r <- 1
theta <<- Y_rad
plot(r*sin(theta),
     r*cos(theta),
     xlim=c(-max(r),max(r)),
     ylim=c(-max(r),max(r)))

polygon(max(r)*sin(seq(0,2*pi,length.out=100)),max(r)*cos(seq(0,2*pi,length.out=100)))
```

Let's do the same but initializing the resultant reduced dimension data with optimized evenly space points:

```
Y <- psc_sne(X=jdf_pscsne, d=1,
             rho_psc_list = rho_30,
             num_iteration=1000, init = "equispaced")
```

```
## It: 1; obj: 2.274e+01; abs: 0.000e+00; rel: 0.000e+00; norm: 1.092e-01
## It: 2; obj: 2.231e+01; abs: 4.376e-01; rel: 1.924e-02; norm: 1.380e-01
## It: 3; obj: 2.188e+01; abs: 4.271e-01; rel: 1.915e-02; norm: 1.723e-01
## It: 4; obj: 2.147e+01; abs: 4.103e-01; rel: 1.875e-02; norm: 2.013e-01
## It: 5; obj: 2.109e+01; abs: 3.786e-01; rel: 1.764e-02; norm: 2.279e-01
## It: 6; obj: 2.075e+01; abs: 3.372e-01; rel: 1.599e-02; norm: 2.517e-01
## It: 7; obj: 2.045e+01; abs: 2.988e-01; rel: 1.440e-02; norm: 2.717e-01
## It: 8; obj: 2.020e+01; abs: 2.508e-01; rel: 1.226e-02; norm: 2.889e-01
## It: 9; obj: 2.000e+01; abs: 2.026e-01; rel: 1.003e-02; norm: 3.025e-01
## It: 10; obj: 1.983e+01; abs: 1.682e-01; rel: 8.410e-03; norm: 3.133e-01
## It: 11; obj: 1.969e+01; abs: 1.413e-01; rel: 7.125e-03; norm: 3.220e-01
## It: 12; obj: 1.958e+01; abs: 1.146e-01; rel: 5.822e-03; norm: 3.290e-01
## It: 13; obj: 1.948e+01; abs: 9.337e-02; rel: 4.770e-03; norm: 3.343e-01
## It: 14; obj: 1.941e+01; abs: 7.509e-02; rel: 3.854e-03; norm: 3.387e-01
## It: 15; obj: 1.935e+01; abs: 6.098e-02; rel: 3.142e-03; norm: 3.423e-01
```

```
## It: 16; obj: 1.929e+01; abs: 5.222e-02; rel: 2.699e-03; norm: 3.451e-01
## It: 17; obj: 1.925e+01; abs: 4.291e-02; rel: 2.224e-03; norm: 3.477e-01
## It: 18; obj: 1.921e+01; abs: 3.652e-02; rel: 1.897e-03; norm: 3.499e-01
## It: 19; obj: 1.918e+01; abs: 3.225e-02; rel: 1.678e-03; norm: 3.518e-01
## It: 20; obj: 1.915e+01; abs: 2.905e-02; rel: 1.514e-03; norm: 3.535e-01
## It: 21; obj: 1.913e+01; abs: 2.628e-02; rel: 1.372e-03; norm: 3.550e-01
## It: 22; obj: 1.910e+01; abs: 2.467e-02; rel: 1.290e-03; norm: 3.563e-01
## It: 23; obj: 1.908e+01; abs: 2.262e-02; rel: 1.184e-03; norm: 3.577e-01
## It: 24; obj: 1.906e+01; abs: 2.080e-02; rel: 1.090e-03; norm: 3.591e-01
## It: 25; obj: 1.904e+01; abs: 1.809e-02; rel: 9.489e-04; norm: 3.607e-01
## It: 26; obj: 1.903e+01; abs: 1.589e-02; rel: 8.347e-04; norm: 3.624e-01
## It: 27; obj: 1.901e+01; abs: 1.432e-02; rel: 7.525e-04; norm: 3.641e-01
## It: 28; obj: 1.900e+01; abs: 1.283e-02; rel: 6.747e-04; norm: 3.658e-01
## It: 29; obj: 1.899e+01; abs: 1.171e-02; rel: 6.163e-04; norm: 3.675e-01
## It: 30; obj: 1.898e+01; abs: 1.113e-02; rel: 5.865e-04; norm: 3.692e-01
## It: 31; obj: 1.896e+01; abs: 1.098e-02; rel: 5.785e-04; norm: 3.709e-01
## It: 32; obj: 1.895e+01; abs: 1.110e-02; rel: 5.855e-04; norm: 3.725e-01
## It: 33; obj: 1.894e+01; abs: 1.128e-02; rel: 5.949e-04; norm: 3.742e-01
## It: 34; obj: 1.893e+01; abs: 1.121e-02; rel: 5.917e-04; norm: 3.759e-01
## It: 35; obj: 1.892e+01; abs: 1.100e-02; rel: 5.810e-04; norm: 3.775e-01
## It: 36; obj: 1.891e+01; abs: 1.068e-02; rel: 5.644e-04; norm: 3.792e-01
## It: 37; obj: 1.890e+01; abs: 1.031e-02; rel: 5.450e-04; norm: 3.808e-01
## It: 38; obj: 1.889e+01; abs: 1.002e-02; rel: 5.301e-04; norm: 3.824e-01
## It: 39; obj: 1.888e+01; abs: 9.770e-03; rel: 5.173e-04; norm: 3.839e-01
## It: 40; obj: 1.887e+01; abs: 9.443e-03; rel: 5.002e-04; norm: 3.854e-01
## It: 41; obj: 1.886e+01; abs: 9.001e-03; rel: 4.770e-04; norm: 3.868e-01
## It: 42; obj: 1.885e+01; abs: 8.532e-03; rel: 4.524e-04; norm: 3.883e-01
## It: 43; obj: 1.884e+01; abs: 8.206e-03; rel: 4.353e-04; norm: 3.897e-01
## It: 44; obj: 1.884e+01; abs: 8.124e-03; rel: 4.311e-04; norm: 3.912e-01
## It: 45; obj: 1.883e+01; abs: 7.795e-03; rel: 4.138e-04; norm: 3.926e-01
## It: 46; obj: 1.882e+01; abs: 7.204e-03; rel: 3.826e-04; norm: 3.941e-01
## It: 47; obj: 1.881e+01; abs: 6.710e-03; rel: 3.565e-04; norm: 3.955e-01
## It: 48; obj: 1.881e+01; abs: 6.485e-03; rel: 3.447e-04; norm: 3.969e-01
## It: 49; obj: 1.880e+01; abs: 6.325e-03; rel: 3.363e-04; norm: 3.982e-01
## It: 50; obj: 1.879e+01; abs: 6.069e-03; rel: 3.228e-04; norm: 3.996e-01
## It: 51; obj: 1.879e+01; abs: 5.786e-03; rel: 3.079e-04; norm: 4.009e-01
## It: 52; obj: 1.878e+01; abs: 5.515e-03; rel: 2.935e-04; norm: 4.022e-01
## It: 53; obj: 1.878e+01; abs: 5.151e-03; rel: 2.742e-04; norm: 4.034e-01
## It: 54; obj: 1.877e+01; abs: 4.709e-03; rel: 2.508e-04; norm: 4.045e-01
## It: 55; obj: 1.877e+01; abs: 4.331e-03; rel: 2.307e-04; norm: 4.055e-01
## It: 56; obj: 1.877e+01; abs: 4.071e-03; rel: 2.169e-04; norm: 4.064e-01
## It: 57; obj: 1.876e+01; abs: 3.870e-03; rel: 2.062e-04; norm: 4.071e-01
## It: 58; obj: 1.876e+01; abs: 3.685e-03; rel: 1.964e-04; norm: 4.078e-01
## It: 59; obj: 1.875e+01; abs: 3.502e-03; rel: 1.867e-04; norm: 4.084e-01
## It: 60; obj: 1.875e+01; abs: 3.315e-03; rel: 1.768e-04; norm: 4.089e-01
## It: 61; obj: 1.875e+01; abs: 3.125e-03; rel: 1.667e-04; norm: 4.093e-01
## It: 62; obj: 1.874e+01; abs: 2.940e-03; rel: 1.568e-04; norm: 4.097e-01
## It: 63; obj: 1.874e+01; abs: 2.768e-03; rel: 1.477e-04; norm: 4.101e-01
## It: 64; obj: 1.874e+01; abs: 2.612e-03; rel: 1.393e-04; norm: 4.104e-01
## It: 65; obj: 1.874e+01; abs: 2.471e-03; rel: 1.318e-04; norm: 4.108e-01
## It: 66; obj: 1.873e+01; abs: 2.345e-03; rel: 1.251e-04; norm: 4.110e-01
## It: 67; obj: 1.873e+01; abs: 2.233e-03; rel: 1.192e-04; norm: 4.113e-01
## It: 68; obj: 1.873e+01; abs: 2.133e-03; rel: 1.138e-04; norm: 4.116e-01
## It: 69; obj: 1.873e+01; abs: 2.044e-03; rel: 1.091e-04; norm: 4.118e-01
```

```
## It: 70; obj: 1.873e+01; abs: 1.965e-03; rel: 1.049e-04; norm: 4.120e-01
## It: 71; obj: 1.872e+01; abs: 1.897e-03; rel: 1.013e-04; norm: 4.122e-01
## It: 72; obj: 1.872e+01; abs: 1.838e-03; rel: 9.814e-05; norm: 4.125e-01
## It: 73; obj: 1.872e+01; abs: 1.783e-03; rel: 9.521e-05; norm: 4.127e-01
## It: 74; obj: 1.872e+01; abs: 1.725e-03; rel: 9.216e-05; norm: 4.129e-01
## It: 75; obj: 1.872e+01; abs: 1.659e-03; rel: 8.862e-05; norm: 4.131e-01
## It: 76; obj: 1.872e+01; abs: 1.583e-03; rel: 8.455e-05; norm: 4.133e-01
## It: 77; obj: 1.871e+01; abs: 1.503e-03; rel: 8.028e-05; norm: 4.135e-01
## It: 78; obj: 1.871e+01; abs: 1.426e-03; rel: 7.621e-05; norm: 4.138e-01
## It: 79; obj: 1.871e+01; abs: 1.364e-03; rel: 7.289e-05; norm: 4.140e-01
## It: 80; obj: 1.871e+01; abs: 1.343e-03; rel: 7.177e-05; norm: 4.142e-01
## It: 81; obj: 1.871e+01; abs: 1.392e-03; rel: 7.439e-05; norm: 4.145e-01
## It: 82; obj: 1.871e+01; abs: 1.380e-03; rel: 7.378e-05; norm: 4.148e-01
## It: 83; obj: 1.871e+01; abs: 1.161e-03; rel: 6.206e-05; norm: 4.150e-01
## It: 84; obj: 1.871e+01; abs: 9.852e-04; rel: 5.267e-05; norm: 4.153e-01
## It: 85; obj: 1.870e+01; abs: 8.924e-04; rel: 4.771e-05; norm: 4.156e-01
## It: 86; obj: 1.870e+01; abs: 8.195e-04; rel: 4.381e-05; norm: 4.159e-01
## It: 87; obj: 1.870e+01; abs: 7.555e-04; rel: 4.039e-05; norm: 4.162e-01
## It: 88; obj: 1.870e+01; abs: 6.986e-04; rel: 3.735e-05; norm: 4.164e-01
## It: 89; obj: 1.870e+01; abs: 6.456e-04; rel: 3.452e-05; norm: 4.167e-01
## It: 90; obj: 1.870e+01; abs: 5.944e-04; rel: 3.179e-05; norm: 4.171e-01
## It: 91; obj: 1.870e+01; abs: 5.446e-04; rel: 2.912e-05; norm: 4.174e-01
## It: 92; obj: 1.870e+01; abs: 4.959e-04; rel: 2.652e-05; norm: 4.177e-01
## It: 93; obj: 1.870e+01; abs: 4.483e-04; rel: 2.398e-05; norm: 4.180e-01
## It: 94; obj: 1.870e+01; abs: 4.014e-04; rel: 2.147e-05; norm: 4.184e-01
## It: 95; obj: 1.870e+01; abs: 3.545e-04; rel: 1.896e-05; norm: 4.187e-01
## It: 96; obj: 1.870e+01; abs: 3.064e-04; rel: 1.639e-05; norm: 4.191e-01
## It: 97; obj: 1.870e+01; abs: 2.558e-04; rel: 1.368e-05; norm: 4.194e-01
## It: 98; obj: 1.870e+01; abs: 2.012e-04; rel: 1.076e-05; norm: 4.198e-01
## It: 99; obj: 1.870e+01; abs: 1.417e-04; rel: 7.580e-06; norm: 4.201e-01
## It: 100; obj: 1.870e+01; abs: 7.791e-05; rel: 4.167e-06; norm: 4.205e-01
## It: 101; obj: 3.284e+00; abs: 1.541e+01; rel: 8.244e-01; norm: 6.188e-02
## It: 102; obj: 3.280e+00; abs: 4.452e-03; rel: 1.356e-03; norm: 6.210e-02
## It: 103; obj: 3.276e+00; abs: 3.584e-03; rel: 1.093e-03; norm: 6.235e-02
## It: 104; obj: 3.273e+00; abs: 2.563e-03; rel: 7.824e-04; norm: 6.257e-02
## It: 105; obj: 3.272e+00; abs: 1.761e-03; rel: 5.380e-04; norm: 6.273e-02
## It: 106; obj: 3.271e+00; abs: 1.208e-03; rel: 3.693e-04; norm: 6.285e-02
## It: 107; obj: 3.270e+00; abs: 8.453e-04; rel: 2.584e-04; norm: 6.293e-02
## It: 108; obj: 3.269e+00; abs: 6.106e-04; rel: 1.868e-04; norm: 6.298e-02
## It: 109; obj: 3.269e+00; abs: 4.587e-04; rel: 1.403e-04; norm: 6.301e-02
## It: 110; obj: 3.268e+00; abs: 3.590e-04; rel: 1.098e-04; norm: 6.303e-02
## It: 111; obj: 3.268e+00; abs: 2.922e-04; rel: 8.940e-05; norm: 6.304e-02
## It: 112; obj: 3.268e+00; abs: 2.464e-04; rel: 7.539e-05; norm: 6.305e-02
## It: 113; obj: 3.267e+00; abs: 2.142e-04; rel: 6.554e-05; norm: 6.305e-02
## It: 114; obj: 3.267e+00; abs: 1.911e-04; rel: 5.847e-05; norm: 6.305e-02
## It: 115; obj: 3.267e+00; abs: 1.743e-04; rel: 5.334e-05; norm: 6.305e-02
## It: 116; obj: 3.267e+00; abs: 1.620e-04; rel: 4.958e-05; norm: 6.305e-02
## It: 117; obj: 3.267e+00; abs: 1.530e-04; rel: 4.682e-05; norm: 6.304e-02
## It: 118; obj: 3.267e+00; abs: 1.464e-04; rel: 4.482e-05; norm: 6.304e-02
## It: 119; obj: 3.267e+00; abs: 1.418e-04; rel: 4.340e-05; norm: 6.304e-02
## It: 120; obj: 3.266e+00; abs: 1.386e-04; rel: 4.242e-05; norm: 6.303e-02
## It: 121; obj: 3.266e+00; abs: 1.365e-04; rel: 4.180e-05; norm: 6.303e-02
## It: 122; obj: 3.266e+00; abs: 1.354e-04; rel: 4.146e-05; norm: 6.303e-02
## It: 123; obj: 3.266e+00; abs: 1.350e-04; rel: 4.134e-05; norm: 6.303e-02
```

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## It: 124; obj: 3.266e+00; abs: 1.352e-04; rel: 4.140e-05; norm: 6.303e-02
## It: 125; obj: 3.266e+00; abs: 1.359e-04; rel: 4.161e-05; norm: 6.303e-02
## It: 126; obj: 3.266e+00; abs: 1.369e-04; rel: 4.191e-05; norm: 6.303e-02
## It: 127; obj: 3.265e+00; abs: 1.380e-04; rel: 4.227e-05; norm: 6.303e-02
## It: 128; obj: 3.265e+00; abs: 1.392e-04; rel: 4.264e-05; norm: 6.303e-02
## It: 129; obj: 3.265e+00; abs: 1.403e-04; rel: 4.297e-05; norm: 6.303e-02
## It: 130; obj: 3.265e+00; abs: 1.411e-04; rel: 4.323e-05; norm: 6.304e-02
## It: 131; obj: 3.265e+00; abs: 1.416e-04; rel: 4.338e-05; norm: 6.304e-02
## It: 132; obj: 3.265e+00; abs: 1.417e-04; rel: 4.341e-05; norm: 6.305e-02
## It: 133; obj: 3.265e+00; abs: 1.415e-04; rel: 4.333e-05; norm: 6.305e-02
## It: 134; obj: 3.264e+00; abs: 1.409e-04; rel: 4.315e-05; norm: 6.306e-02
## It: 135; obj: 3.264e+00; abs: 1.399e-04; rel: 4.285e-05; norm: 6.307e-02
## It: 136; obj: 3.264e+00; abs: 1.385e-04; rel: 4.243e-05; norm: 6.308e-02
## It: 137; obj: 3.264e+00; abs: 1.367e-04; rel: 4.189e-05; norm: 6.309e-02
## It: 138; obj: 3.264e+00; abs: 1.346e-04; rel: 4.124e-05; norm: 6.310e-02
## It: 139; obj: 3.264e+00; abs: 1.323e-04; rel: 4.053e-05; norm: 6.311e-02
## It: 140; obj: 3.264e+00; abs: 1.299e-04; rel: 3.980e-05; norm: 6.312e-02
## It: 141; obj: 3.264e+00; abs: 1.277e-04; rel: 3.913e-05; norm: 6.313e-02
## It: 142; obj: 3.263e+00; abs: 1.259e-04; rel: 3.858e-05; norm: 6.314e-02
## It: 143; obj: 3.263e+00; abs: 1.246e-04; rel: 3.818e-05; norm: 6.315e-02
## It: 144; obj: 3.263e+00; abs: 1.239e-04; rel: 3.796e-05; norm: 6.315e-02
## It: 145; obj: 3.263e+00; abs: 1.237e-04; rel: 3.790e-05; norm: 6.316e-02
## It: 146; obj: 3.263e+00; abs: 1.241e-04; rel: 3.803e-05; norm: 6.317e-02
## It: 147; obj: 3.263e+00; abs: 1.251e-04; rel: 3.834e-05; norm: 6.318e-02
## It: 148; obj: 3.263e+00; abs: 1.267e-04; rel: 3.883e-05; norm: 6.318e-02
## It: 149; obj: 3.263e+00; abs: 1.289e-04; rel: 3.951e-05; norm: 6.319e-02
## It: 150; obj: 3.262e+00; abs: 1.317e-04; rel: 4.038e-05; norm: 6.319e-02
## It: 151; obj: 3.262e+00; abs: 1.352e-04; rel: 4.144e-05; norm: 6.320e-02
## It: 152; obj: 3.262e+00; abs: 1.393e-04; rel: 4.269e-05; norm: 6.320e-02
## It: 153; obj: 3.262e+00; abs: 1.439e-04; rel: 4.410e-05; norm: 6.320e-02
## It: 154; obj: 3.262e+00; abs: 1.488e-04; rel: 4.561e-05; norm: 6.321e-02
## It: 155; obj: 3.262e+00; abs: 1.538e-04; rel: 4.714e-05; norm: 6.321e-02
## It: 156; obj: 3.261e+00; abs: 1.585e-04; rel: 4.858e-05; norm: 6.322e-02
## It: 157; obj: 3.261e+00; abs: 1.625e-04; rel: 4.982e-05; norm: 6.322e-02
## It: 158; obj: 3.261e+00; abs: 1.656e-04; rel: 5.077e-05; norm: 6.323e-02
## It: 159; obj: 3.261e+00; abs: 1.676e-04; rel: 5.141e-05; norm: 6.323e-02
## It: 160; obj: 3.261e+00; abs: 1.689e-04; rel: 5.179e-05; norm: 6.324e-02
## It: 161; obj: 3.261e+00; abs: 1.697e-04; rel: 5.203e-05; norm: 6.324e-02
## It: 162; obj: 3.260e+00; abs: 1.704e-04; rel: 5.227e-05; norm: 6.325e-02
## It: 163; obj: 3.260e+00; abs: 1.715e-04; rel: 5.260e-05; norm: 6.325e-02
## It: 164; obj: 3.260e+00; abs: 1.731e-04; rel: 5.311e-05; norm: 6.326e-02
## It: 165; obj: 3.260e+00; abs: 1.754e-04; rel: 5.379e-05; norm: 6.326e-02
## It: 166; obj: 3.260e+00; abs: 1.782e-04; rel: 5.465e-05; norm: 6.327e-02
## It: 167; obj: 3.260e+00; abs: 1.814e-04; rel: 5.565e-05; norm: 6.327e-02
## It: 168; obj: 3.259e+00; abs: 1.852e-04; rel: 5.680e-05; norm: 6.327e-02
## It: 169; obj: 3.259e+00; abs: 1.895e-04; rel: 5.812e-05; norm: 6.327e-02
## It: 170; obj: 3.259e+00; abs: 1.945e-04; rel: 5.967e-05; norm: 6.328e-02
## It: 171; obj: 3.259e+00; abs: 2.004e-04; rel: 6.150e-05; norm: 6.328e-02
## It: 172; obj: 3.259e+00; abs: 2.073e-04; rel: 6.362e-05; norm: 6.328e-02
## It: 173; obj: 3.258e+00; abs: 2.148e-04; rel: 6.592e-05; norm: 6.329e-02
## It: 174; obj: 3.258e+00; abs: 2.223e-04; rel: 6.821e-05; norm: 6.329e-02
## It: 175; obj: 3.258e+00; abs: 2.287e-04; rel: 7.020e-05; norm: 6.330e-02
## It: 176; obj: 3.258e+00; abs: 2.333e-04; rel: 7.161e-05; norm: 6.331e-02
## It: 177; obj: 3.258e+00; abs: 2.354e-04; rel: 7.227e-05; norm: 6.332e-02
```

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## It: 178; obj: 3.257e+00; abs: 2.347e-04; rel: 7.206e-05; norm: 6.333e-02
## It: 179; obj: 3.257e+00; abs: 2.310e-04; rel: 7.092e-05; norm: 6.335e-02
## It: 180; obj: 3.257e+00; abs: 2.244e-04; rel: 6.889e-05; norm: 6.336e-02
## It: 181; obj: 3.257e+00; abs: 2.153e-04; rel: 6.610e-05; norm: 6.338e-02
## It: 182; obj: 3.256e+00; abs: 2.044e-04; rel: 6.275e-05; norm: 6.340e-02
## It: 183; obj: 3.256e+00; abs: 1.926e-04; rel: 5.913e-05; norm: 6.341e-02
## It: 184; obj: 3.256e+00; abs: 1.808e-04; rel: 5.551e-05; norm: 6.343e-02
## It: 185; obj: 3.256e+00; abs: 1.697e-04; rel: 5.213e-05; norm: 6.344e-02
## It: 186; obj: 3.256e+00; abs: 1.601e-04; rel: 4.916e-05; norm: 6.345e-02
## It: 187; obj: 3.256e+00; abs: 1.520e-04; rel: 4.669e-05; norm: 6.346e-02
## It: 188; obj: 3.255e+00; abs: 1.457e-04; rel: 4.474e-05; norm: 6.347e-02
## It: 189; obj: 3.255e+00; abs: 1.411e-04; rel: 4.334e-05; norm: 6.348e-02
## It: 190; obj: 3.255e+00; abs: 1.382e-04; rel: 4.247e-05; norm: 6.349e-02
## It: 191; obj: 3.255e+00; abs: 1.372e-04; rel: 4.213e-05; norm: 6.349e-02
## It: 192; obj: 3.255e+00; abs: 1.376e-04; rel: 4.226e-05; norm: 6.350e-02
## It: 193; obj: 3.255e+00; abs: 1.388e-04; rel: 4.264e-05; norm: 6.350e-02
## It: 194; obj: 3.255e+00; abs: 1.395e-04; rel: 4.287e-05; norm: 6.351e-02
## It: 195; obj: 3.254e+00; abs: 1.383e-04; rel: 4.251e-05; norm: 6.351e-02
## It: 196; obj: 3.254e+00; abs: 1.341e-04; rel: 4.120e-05; norm: 6.351e-02
## It: 197; obj: 3.254e+00; abs: 1.271e-04; rel: 3.905e-05; norm: 6.352e-02
## It: 198; obj: 3.254e+00; abs: 1.192e-04; rel: 3.662e-05; norm: 6.352e-02
## It: 199; obj: 3.254e+00; abs: 1.123e-04; rel: 3.452e-05; norm: 6.352e-02
## It: 200; obj: 3.254e+00; abs: 1.073e-04; rel: 3.298e-05; norm: 6.353e-02
## It: 201; obj: 3.254e+00; abs: 1.039e-04; rel: 3.192e-05; norm: 6.353e-02
## It: 202; obj: 3.254e+00; abs: 1.014e-04; rel: 3.115e-05; norm: 6.353e-02
## It: 203; obj: 3.254e+00; abs: 9.944e-05; rel: 3.056e-05; norm: 6.352e-02
## It: 204; obj: 3.253e+00; abs: 9.787e-05; rel: 3.008e-05; norm: 6.352e-02
## It: 205; obj: 3.253e+00; abs: 9.658e-05; rel: 2.968e-05; norm: 6.352e-02
## It: 206; obj: 3.253e+00; abs: 9.552e-05; rel: 2.936e-05; norm: 6.352e-02
## It: 207; obj: 3.253e+00; abs: 9.470e-05; rel: 2.911e-05; norm: 6.351e-02
## It: 208; obj: 3.253e+00; abs: 9.409e-05; rel: 2.892e-05; norm: 6.351e-02
## It: 209; obj: 3.253e+00; abs: 9.371e-05; rel: 2.881e-05; norm: 6.350e-02
## It: 210; obj: 3.253e+00; abs: 9.353e-05; rel: 2.875e-05; norm: 6.350e-02
## It: 211; obj: 3.253e+00; abs: 9.357e-05; rel: 2.876e-05; norm: 6.349e-02
## It: 212; obj: 3.253e+00; abs: 9.380e-05; rel: 2.884e-05; norm: 6.348e-02
## It: 213; obj: 3.253e+00; abs: 9.424e-05; rel: 2.897e-05; norm: 6.348e-02
## It: 214; obj: 3.252e+00; abs: 9.488e-05; rel: 2.917e-05; norm: 6.347e-02
## It: 215; obj: 3.252e+00; abs: 9.570e-05; rel: 2.942e-05; norm: 6.346e-02
## It: 216; obj: 3.252e+00; abs: 9.672e-05; rel: 2.974e-05; norm: 6.346e-02
## It: 217; obj: 3.252e+00; abs: 9.791e-05; rel: 3.011e-05; norm: 6.345e-02
## It: 218; obj: 3.252e+00; abs: 9.928e-05; rel: 3.053e-05; norm: 6.344e-02
## It: 219; obj: 3.252e+00; abs: 1.008e-04; rel: 3.100e-05; norm: 6.343e-02
## It: 220; obj: 3.252e+00; abs: 1.025e-04; rel: 3.152e-05; norm: 6.343e-02
## It: 221; obj: 3.252e+00; abs: 1.043e-04; rel: 3.208e-05; norm: 6.342e-02
## It: 222; obj: 3.252e+00; abs: 1.063e-04; rel: 3.269e-05; norm: 6.341e-02
## It: 223; obj: 3.252e+00; abs: 1.084e-04; rel: 3.332e-05; norm: 6.340e-02
## It: 224; obj: 3.251e+00; abs: 1.105e-04; rel: 3.399e-05; norm: 6.339e-02
## It: 225; obj: 3.251e+00; abs: 1.128e-04; rel: 3.469e-05; norm: 6.339e-02
## It: 226; obj: 3.251e+00; abs: 1.151e-04; rel: 3.540e-05; norm: 6.338e-02
## It: 227; obj: 3.251e+00; abs: 1.175e-04; rel: 3.613e-05; norm: 6.337e-02
## It: 228; obj: 3.251e+00; abs: 1.199e-04; rel: 3.688e-05; norm: 6.336e-02
## It: 229; obj: 3.251e+00; abs: 1.223e-04; rel: 3.762e-05; norm: 6.335e-02
## It: 230; obj: 3.251e+00; abs: 1.247e-04; rel: 3.836e-05; norm: 6.334e-02
## It: 231; obj: 3.251e+00; abs: 1.271e-04; rel: 3.909e-05; norm: 6.333e-02
```

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## It: 232; obj: 3.250e+00; abs: 1.294e-04; rel: 3.981e-05; norm: 6.332e-02
## It: 233; obj: 3.250e+00; abs: 1.317e-04; rel: 4.051e-05; norm: 6.331e-02
## It: 234; obj: 3.250e+00; abs: 1.339e-04; rel: 4.118e-05; norm: 6.331e-02
## It: 235; obj: 3.250e+00; abs: 1.359e-04; rel: 4.182e-05; norm: 6.330e-02
## It: 236; obj: 3.250e+00; abs: 1.379e-04; rel: 4.243e-05; norm: 6.329e-02
## It: 237; obj: 3.250e+00; abs: 1.398e-04; rel: 4.301e-05; norm: 6.328e-02
## It: 238; obj: 3.250e+00; abs: 1.415e-04; rel: 4.355e-05; norm: 6.326e-02
## It: 239; obj: 3.250e+00; abs: 1.432e-04; rel: 4.407e-05; norm: 6.325e-02
## It: 240; obj: 3.249e+00; abs: 1.448e-04; rel: 4.455e-05; norm: 6.324e-02
## It: 241; obj: 3.249e+00; abs: 1.463e-04; rel: 4.502e-05; norm: 6.323e-02
## It: 242; obj: 3.249e+00; abs: 1.477e-04; rel: 4.546e-05; norm: 6.322e-02
## It: 243; obj: 3.249e+00; abs: 1.491e-04; rel: 4.588e-05; norm: 6.321e-02
## It: 244; obj: 3.249e+00; abs: 1.504e-04; rel: 4.629e-05; norm: 6.320e-02
## It: 245; obj: 3.249e+00; abs: 1.517e-04; rel: 4.670e-05; norm: 6.319e-02
## It: 246; obj: 3.248e+00; abs: 1.530e-04; rel: 4.711e-05; norm: 6.318e-02
## It: 247; obj: 3.248e+00; abs: 1.544e-04; rel: 4.754e-05; norm: 6.316e-02
## It: 248; obj: 3.248e+00; abs: 1.936e-04; rel: 5.961e-05; norm: 6.315e-02
## It: 249; obj: 3.248e+00; abs: 2.210e-04; rel: 6.803e-05; norm: 6.314e-02
## It: 250; obj: 3.248e+00; abs: 2.411e-04; rel: 7.422e-05; norm: 6.312e-02
## It: 251; obj: 3.247e+00; abs: 2.571e-04; rel: 7.916e-05; norm: 6.311e-02
## It: 252; obj: 3.247e+00; abs: 2.713e-04; rel: 8.353e-05; norm: 6.309e-02
## It: 253; obj: 3.247e+00; abs: 2.849e-04; rel: 8.773e-05; norm: 6.308e-02
## It: 254; obj: 3.247e+00; abs: 2.985e-04; rel: 9.192e-05; norm: 6.306e-02
## It: 255; obj: 3.246e+00; abs: 3.121e-04; rel: 9.614e-05; norm: 6.305e-02
## It: 256; obj: 3.246e+00; abs: 3.257e-04; rel: 1.003e-04; norm: 6.304e-02
## It: 257; obj: 3.246e+00; abs: 3.390e-04; rel: 1.044e-04; norm: 6.303e-02
## It: 258; obj: 3.245e+00; abs: 3.518e-04; rel: 1.084e-04; norm: 6.302e-02
## It: 259; obj: 3.245e+00; abs: 3.638e-04; rel: 1.121e-04; norm: 6.302e-02
## It: 260; obj: 3.244e+00; abs: 3.741e-04; rel: 1.153e-04; norm: 6.302e-02
## It: 261; obj: 3.244e+00; abs: 3.812e-04; rel: 1.175e-04; norm: 6.302e-02
## It: 262; obj: 3.244e+00; abs: 3.828e-04; rel: 1.180e-04; norm: 6.303e-02
## It: 263; obj: 3.243e+00; abs: 3.771e-04; rel: 1.162e-04; norm: 6.303e-02
## It: 264; obj: 3.243e+00; abs: 3.648e-04; rel: 1.125e-04; norm: 6.304e-02
## It: 265; obj: 3.243e+00; abs: 3.503e-04; rel: 1.080e-04; norm: 6.305e-02
## It: 266; obj: 3.242e+00; abs: 3.378e-04; rel: 1.042e-04; norm: 6.306e-02
## It: 267; obj: 3.242e+00; abs: 3.275e-04; rel: 1.010e-04; norm: 6.307e-02
## It: 268; obj: 3.242e+00; abs: 3.170e-04; rel: 9.778e-05; norm: 6.308e-02
## It: 269; obj: 3.241e+00; abs: 3.046e-04; rel: 9.396e-05; norm: 6.308e-02
## It: 270; obj: 3.241e+00; abs: 2.898e-04; rel: 8.941e-05; norm: 6.309e-02
## It: 271; obj: 3.241e+00; abs: 2.732e-04; rel: 8.430e-05; norm: 6.310e-02
## It: 272; obj: 3.241e+00; abs: 2.559e-04; rel: 7.897e-05; norm: 6.311e-02
## It: 273; obj: 3.240e+00; abs: 2.396e-04; rel: 7.394e-05; norm: 6.312e-02
## It: 274; obj: 3.240e+00; abs: 2.259e-04; rel: 6.970e-05; norm: 6.312e-02
## It: 275; obj: 3.240e+00; abs: 2.153e-04; rel: 6.646e-05; norm: 6.313e-02
## It: 276; obj: 3.240e+00; abs: 2.075e-04; rel: 6.404e-05; norm: 6.314e-02
## It: 277; obj: 3.239e+00; abs: 2.009e-04; rel: 6.200e-05; norm: 6.315e-02
## It: 278; obj: 3.239e+00; abs: 1.936e-04; rel: 5.977e-05; norm: 6.316e-02
## It: 279; obj: 3.239e+00; abs: 1.842e-04; rel: 5.687e-05; norm: 6.317e-02
## It: 280; obj: 3.239e+00; abs: 1.734e-04; rel: 5.352e-05; norm: 6.319e-02
## It: 281; obj: 3.239e+00; abs: 1.643e-04; rel: 5.071e-05; norm: 6.321e-02
## It: 282; obj: 3.239e+00; abs: 1.586e-04; rel: 4.897e-05; norm: 6.323e-02
## It: 283; obj: 3.238e+00; abs: 1.545e-04; rel: 4.770e-05; norm: 6.325e-02
## It: 284; obj: 3.238e+00; abs: 1.494e-04; rel: 4.613e-05; norm: 6.327e-02
## It: 285; obj: 3.238e+00; abs: 1.425e-04; rel: 4.402e-05; norm: 6.329e-02
```

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## It: 286; obj: 3.238e+00; abs: 1.349e-04; rel: 4.165e-05; norm: 6.331e-02
## It: 287; obj: 3.238e+00; abs: 1.273e-04; rel: 3.932e-05; norm: 6.333e-02
## It: 288; obj: 3.238e+00; abs: 1.198e-04; rel: 3.699e-05; norm: 6.336e-02
## It: 289; obj: 3.238e+00; abs: 1.118e-04; rel: 3.452e-05; norm: 6.338e-02
## It: 290; obj: 3.238e+00; abs: 1.033e-04; rel: 3.191e-05; norm: 6.339e-02
## It: 291; obj: 3.237e+00; abs: 9.504e-05; rel: 2.936e-05; norm: 6.341e-02
## It: 292; obj: 3.237e+00; abs: 8.773e-05; rel: 2.710e-05; norm: 6.343e-02
## It: 293; obj: 3.237e+00; abs: 8.157e-05; rel: 2.520e-05; norm: 6.344e-02
## It: 294; obj: 3.237e+00; abs: 7.625e-05; rel: 2.355e-05; norm: 6.345e-02
## It: 295; obj: 3.237e+00; abs: 7.129e-05; rel: 2.202e-05; norm: 6.347e-02
## It: 296; obj: 3.237e+00; abs: 6.647e-05; rel: 2.053e-05; norm: 6.348e-02
## It: 297; obj: 3.237e+00; abs: 6.180e-05; rel: 1.909e-05; norm: 6.349e-02
## It: 298; obj: 3.237e+00; abs: 5.742e-05; rel: 1.774e-05; norm: 6.349e-02
## It: 299; obj: 3.237e+00; abs: 5.341e-05; rel: 1.650e-05; norm: 6.350e-02
## It: 300; obj: 3.237e+00; abs: 4.976e-05; rel: 1.537e-05; norm: 6.351e-02
## It: 301; obj: 3.237e+00; abs: 4.640e-05; rel: 1.433e-05; norm: 6.351e-02
## It: 302; obj: 3.237e+00; abs: 4.329e-05; rel: 1.337e-05; norm: 6.352e-02
## It: 303; obj: 3.237e+00; abs: 4.042e-05; rel: 1.249e-05; norm: 6.352e-02
## It: 304; obj: 3.237e+00; abs: 3.779e-05; rel: 1.167e-05; norm: 6.353e-02
## It: 305; obj: 3.237e+00; abs: 3.538e-05; rel: 1.093e-05; norm: 6.353e-02
## It: 306; obj: 3.237e+00; abs: 3.317e-05; rel: 1.025e-05; norm: 6.353e-02
## It: 307; obj: 3.237e+00; abs: 3.114e-05; rel: 9.621e-06; norm: 6.353e-02
## It: 308; obj: 3.237e+00; abs: 2.927e-05; rel: 9.043e-06; norm: 6.353e-02
## It: 309; obj: 3.236e+00; abs: 2.754e-05; rel: 8.508e-06; norm: 6.353e-02
## It: 310; obj: 3.236e+00; abs: 2.594e-05; rel: 8.013e-06; norm: 6.354e-02
## It: 311; obj: 3.236e+00; abs: 2.445e-05; rel: 7.556e-06; norm: 6.354e-02
## It: 312; obj: 3.236e+00; abs: 2.308e-05; rel: 7.132e-06; norm: 6.353e-02
## It: 313; obj: 3.236e+00; abs: 2.181e-05; rel: 6.739e-06; norm: 6.353e-02
## It: 314; obj: 3.236e+00; abs: 2.063e-05; rel: 6.375e-06; norm: 6.353e-02
## It: 315; obj: 3.236e+00; abs: 1.954e-05; rel: 6.038e-06; norm: 6.353e-02
## It: 316; obj: 3.236e+00; abs: 1.854e-05; rel: 5.728e-06; norm: 6.353e-02
## It: 317; obj: 3.236e+00; abs: 1.761e-05; rel: 5.443e-06; norm: 6.353e-02
## It: 318; obj: 3.236e+00; abs: 1.677e-05; rel: 5.181e-06; norm: 6.353e-02
## It: 319; obj: 3.236e+00; abs: 1.599e-05; rel: 4.940e-06; norm: 6.353e-02
## It: 320; obj: 3.236e+00; abs: 1.528e-05; rel: 4.720e-06; norm: 6.352e-02
## It: 321; obj: 3.236e+00; abs: 1.462e-05; rel: 4.518e-06; norm: 6.352e-02
## It: 322; obj: 3.236e+00; abs: 1.402e-05; rel: 4.333e-06; norm: 6.352e-02
## It: 323; obj: 3.236e+00; abs: 1.348e-05; rel: 4.164e-06; norm: 6.352e-02
## It: 324; obj: 3.236e+00; abs: 1.298e-05; rel: 4.010e-06; norm: 6.352e-02
## It: 325; obj: 3.236e+00; abs: 1.252e-05; rel: 3.870e-06; norm: 6.352e-02
## It: 326; obj: 3.236e+00; abs: 1.211e-05; rel: 3.743e-06; norm: 6.351e-02
## It: 327; obj: 3.236e+00; abs: 1.174e-05; rel: 3.628e-06; norm: 6.351e-02
## It: 328; obj: 3.236e+00; abs: 1.141e-05; rel: 3.525e-06; norm: 6.351e-02
## It: 329; obj: 3.236e+00; abs: 1.111e-05; rel: 3.433e-06; norm: 6.351e-02
## It: 330; obj: 3.236e+00; abs: 1.084e-05; rel: 3.351e-06; norm: 6.351e-02
## It: 331; obj: 3.236e+00; abs: 1.061e-05; rel: 3.278e-06; norm: 6.350e-02
## It: 332; obj: 3.236e+00; abs: 1.040e-05; rel: 3.213e-06; norm: 6.350e-02
## It: 333; obj: 3.236e+00; abs: 1.021e-05; rel: 3.156e-06; norm: 6.350e-02
## It: 334; obj: 3.236e+00; abs: 1.005e-05; rel: 3.105e-06; norm: 6.350e-02
## It: 335; obj: 3.236e+00; abs: 9.900e-06; rel: 3.059e-06; norm: 6.350e-02
## It: 336; obj: 3.236e+00; abs: 9.769e-06; rel: 3.019e-06; norm: 6.350e-02
## It: 337; obj: 3.236e+00; abs: 9.652e-06; rel: 2.983e-06; norm: 6.349e-02
## It: 338; obj: 3.236e+00; abs: 9.548e-06; rel: 2.950e-06; norm: 6.349e-02
## It: 339; obj: 3.236e+00; abs: 9.455e-06; rel: 2.922e-06; norm: 6.349e-02
```

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## It: 340; obj: 3.236e+00; abs: 9.375e-06; rel: 2.897e-06; norm: 6.349e-02
## It: 341; obj: 3.236e+00; abs: 9.306e-06; rel: 2.876e-06; norm: 6.349e-02
## It: 342; obj: 3.236e+00; abs: 9.251e-06; rel: 2.859e-06; norm: 6.349e-02
## It: 343; obj: 3.236e+00; abs: 9.210e-06; rel: 2.846e-06; norm: 6.348e-02
## It: 344; obj: 3.236e+00; abs: 9.186e-06; rel: 2.839e-06; norm: 6.348e-02
## It: 345; obj: 3.236e+00; abs: 9.179e-06; rel: 2.837e-06; norm: 6.348e-02
## It: 346; obj: 3.236e+00; abs: 9.194e-06; rel: 2.841e-06; norm: 6.348e-02
## It: 347; obj: 3.236e+00; abs: 9.232e-06; rel: 2.853e-06; norm: 6.347e-02
## It: 348; obj: 3.236e+00; abs: 9.296e-06; rel: 2.873e-06; norm: 6.347e-02
## It: 349; obj: 3.236e+00; abs: 9.389e-06; rel: 2.901e-06; norm: 6.347e-02
## It: 350; obj: 3.236e+00; abs: 9.515e-06; rel: 2.940e-06; norm: 6.347e-02
## It: 351; obj: 3.236e+00; abs: 9.676e-06; rel: 2.990e-06; norm: 6.346e-02
## It: 352; obj: 3.236e+00; abs: 9.877e-06; rel: 3.052e-06; norm: 6.346e-02
## It: 353; obj: 3.236e+00; abs: 1.012e-05; rel: 3.127e-06; norm: 6.346e-02
## It: 354; obj: 3.236e+00; abs: 1.041e-05; rel: 3.217e-06; norm: 6.345e-02
## It: 355; obj: 3.236e+00; abs: 1.075e-05; rel: 3.322e-06; norm: 6.345e-02
## It: 356; obj: 3.236e+00; abs: 1.115e-05; rel: 3.445e-06; norm: 6.344e-02
## It: 357; obj: 3.236e+00; abs: 1.161e-05; rel: 3.587e-06; norm: 6.344e-02
## It: 358; obj: 3.236e+00; abs: 1.213e-05; rel: 3.750e-06; norm: 6.343e-02
## It: 359; obj: 3.236e+00; abs: 1.274e-05; rel: 3.936e-06; norm: 6.343e-02
## It: 360; obj: 3.236e+00; abs: 1.342e-05; rel: 4.148e-06; norm: 6.342e-02
## It: 361; obj: 3.236e+00; abs: 1.420e-05; rel: 4.388e-06; norm: 6.341e-02
## It: 362; obj: 3.236e+00; abs: 1.508e-05; rel: 4.659e-06; norm: 6.341e-02
## It: 363; obj: 3.236e+00; abs: 1.606e-05; rel: 4.964e-06; norm: 6.340e-02
## It: 364; obj: 3.236e+00; abs: 1.717e-05; rel: 5.306e-06; norm: 6.339e-02
## It: 365; obj: 3.236e+00; abs: 1.841e-05; rel: 5.689e-06; norm: 6.338e-02
## It: 366; obj: 3.236e+00; abs: 1.978e-05; rel: 6.114e-06; norm: 6.337e-02
## It: 367; obj: 3.236e+00; abs: 2.131e-05; rel: 6.586e-06; norm: 6.337e-02
## It: 368; obj: 3.236e+00; abs: 2.299e-05; rel: 7.107e-06; norm: 6.336e-02
## It: 369; obj: 3.236e+00; abs: 2.484e-05; rel: 7.677e-06; norm: 6.335e-02
## It: 370; obj: 3.236e+00; abs: 2.685e-05; rel: 8.297e-06; norm: 6.334e-02
## It: 371; obj: 3.236e+00; abs: 2.902e-05; rel: 8.968e-06; norm: 6.333e-02
## It: 372; obj: 3.236e+00; abs: 3.135e-05; rel: 9.688e-06; norm: 6.332e-02
## It: 373; obj: 3.236e+00; abs: 3.383e-05; rel: 1.046e-05; norm: 6.331e-02
## It: 374; obj: 3.236e+00; abs: 3.647e-05; rel: 1.127e-05; norm: 6.330e-02
## It: 375; obj: 3.235e+00; abs: 3.926e-05; rel: 1.213e-05; norm: 6.328e-02
## It: 376; obj: 3.235e+00; abs: 4.220e-05; rel: 1.304e-05; norm: 6.327e-02
## It: 377; obj: 3.235e+00; abs: 4.526e-05; rel: 1.399e-05; norm: 6.326e-02
## It: 378; obj: 3.235e+00; abs: 4.839e-05; rel: 1.496e-05; norm: 6.325e-02
## It: 379; obj: 3.235e+00; abs: 5.154e-05; rel: 1.593e-05; norm: 6.324e-02
## It: 380; obj: 3.235e+00; abs: 5.465e-05; rel: 1.689e-05; norm: 6.323e-02
## It: 381; obj: 3.235e+00; abs: 5.777e-05; rel: 1.786e-05; norm: 6.322e-02
## It: 382; obj: 3.235e+00; abs: 6.108e-05; rel: 1.888e-05; norm: 6.321e-02
## It: 383; obj: 3.235e+00; abs: 6.494e-05; rel: 2.007e-05; norm: 6.320e-02
## It: 384; obj: 3.235e+00; abs: 6.971e-05; rel: 2.155e-05; norm: 6.319e-02
## It: 385; obj: 3.235e+00; abs: 7.566e-05; rel: 2.339e-05; norm: 6.318e-02
## It: 386; obj: 3.235e+00; abs: 8.283e-05; rel: 2.561e-05; norm: 6.317e-02
## It: 387; obj: 3.235e+00; abs: 9.111e-05; rel: 2.817e-05; norm: 6.315e-02
## It: 388; obj: 3.235e+00; abs: 1.004e-04; rel: 3.103e-05; norm: 6.314e-02
## It: 389; obj: 3.235e+00; abs: 1.107e-04; rel: 3.422e-05; norm: 6.313e-02
## It: 390; obj: 3.234e+00; abs: 1.221e-04; rel: 3.776e-05; norm: 6.312e-02
## It: 391; obj: 3.234e+00; abs: 1.315e-04; rel: 4.067e-05; norm: 6.311e-02
## It: 392; obj: 3.234e+00; abs: 1.283e-04; rel: 3.966e-05; norm: 6.310e-02
## It: 393; obj: 3.234e+00; abs: 1.068e-04; rel: 3.301e-05; norm: 6.309e-02
```

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## It: 394; obj: 3.234e+00; abs: 8.839e-05; rel: 2.733e-05; norm: 6.308e-02
## It: 395; obj: 3.234e+00; abs: 9.434e-05; rel: 2.917e-05; norm: 6.307e-02
## It: 396; obj: 3.234e+00; abs: 1.138e-04; rel: 3.519e-05; norm: 6.305e-02
## It: 397; obj: 3.234e+00; abs: 1.294e-04; rel: 4.000e-05; norm: 6.304e-02
## It: 398; obj: 3.233e+00; abs: 1.378e-04; rel: 4.262e-05; norm: 6.303e-02
## It: 399; obj: 3.233e+00; abs: 1.452e-04; rel: 4.490e-05; norm: 6.301e-02
## It: 400; obj: 3.233e+00; abs: 1.558e-04; rel: 4.817e-05; norm: 6.300e-02
## It: 401; obj: 3.233e+00; abs: 1.700e-04; rel: 5.259e-05; norm: 6.299e-02
## It: 402; obj: 3.233e+00; abs: 1.868e-04; rel: 5.777e-05; norm: 6.298e-02
## It: 403; obj: 3.233e+00; abs: 2.042e-04; rel: 6.316e-05; norm: 6.298e-02
## It: 404; obj: 3.232e+00; abs: 2.199e-04; rel: 6.804e-05; norm: 6.298e-02
## It: 405; obj: 3.232e+00; abs: 2.315e-04; rel: 7.162e-05; norm: 6.298e-02
## It: 406; obj: 3.232e+00; abs: 2.367e-04; rel: 7.325e-05; norm: 6.300e-02
## It: 407; obj: 3.232e+00; abs: 2.353e-04; rel: 7.280e-05; norm: 6.301e-02
## It: 408; obj: 3.231e+00; abs: 2.288e-04; rel: 7.079e-05; norm: 6.304e-02
## It: 409; obj: 3.231e+00; abs: 2.202e-04; rel: 6.813e-05; norm: 6.306e-02
## It: 410; obj: 3.231e+00; abs: 2.121e-04; rel: 6.564e-05; norm: 6.309e-02
## It: 411; obj: 3.231e+00; abs: 2.055e-04; rel: 6.359e-05; norm: 6.312e-02
## It: 412; obj: 3.231e+00; abs: 1.983e-04; rel: 6.138e-05; norm: 6.315e-02
## It: 413; obj: 3.230e+00; abs: 1.880e-04; rel: 5.819e-05; norm: 6.318e-02
## It: 414; obj: 3.230e+00; abs: 1.754e-04; rel: 5.431e-05; norm: 6.321e-02
## It: 415; obj: 3.230e+00; abs: 1.637e-04; rel: 5.069e-05; norm: 6.325e-02
## It: 416; obj: 3.230e+00; abs: 1.542e-04; rel: 4.774e-05; norm: 6.328e-02
## It: 417; obj: 3.230e+00; abs: 1.460e-04; rel: 4.521e-05; norm: 6.331e-02
## It: 418; obj: 3.230e+00; abs: 1.382e-04; rel: 4.279e-05; norm: 6.334e-02
## It: 419; obj: 3.230e+00; abs: 1.308e-04; rel: 4.049e-05; norm: 6.337e-02
## It: 420; obj: 3.229e+00; abs: 1.248e-04; rel: 3.866e-05; norm: 6.340e-02
## It: 421; obj: 3.229e+00; abs: 1.219e-04; rel: 3.773e-05; norm: 6.342e-02
## It: 422; obj: 3.229e+00; abs: 1.217e-04; rel: 3.769e-05; norm: 6.345e-02
## It: 423; obj: 3.229e+00; abs: 1.213e-04; rel: 3.755e-05; norm: 6.347e-02
## It: 424; obj: 3.229e+00; abs: 1.161e-04; rel: 3.594e-05; norm: 6.349e-02
## It: 425; obj: 3.229e+00; abs: 1.065e-04; rel: 3.298e-05; norm: 6.351e-02
## It: 426; obj: 3.229e+00; abs: 9.795e-05; rel: 3.034e-05; norm: 6.353e-02
## It: 427; obj: 3.229e+00; abs: 9.321e-05; rel: 2.887e-05; norm: 6.355e-02
## It: 428; obj: 3.229e+00; abs: 9.059e-05; rel: 2.806e-05; norm: 6.357e-02
## It: 429; obj: 3.228e+00; abs: 8.799e-05; rel: 2.725e-05; norm: 6.358e-02
## It: 430; obj: 3.228e+00; abs: 8.587e-05; rel: 2.660e-05; norm: 6.360e-02
## It: 431; obj: 3.228e+00; abs: 8.675e-05; rel: 2.687e-05; norm: 6.361e-02
## It: 432; obj: 3.228e+00; abs: 9.083e-05; rel: 2.814e-05; norm: 6.362e-02
## It: 433; obj: 3.228e+00; abs: 9.122e-05; rel: 2.826e-05; norm: 6.363e-02
## It: 434; obj: 3.228e+00; abs: 7.821e-05; rel: 2.423e-05; norm: 6.364e-02
## It: 435; obj: 3.228e+00; abs: 5.644e-05; rel: 1.748e-05; norm: 6.365e-02
## It: 436; obj: 3.228e+00; abs: 4.218e-05; rel: 1.307e-05; norm: 6.366e-02
## It: 437; obj: 3.228e+00; abs: 4.141e-05; rel: 1.283e-05; norm: 6.367e-02
## It: 438; obj: 3.228e+00; abs: 4.919e-05; rel: 1.524e-05; norm: 6.367e-02
## It: 439; obj: 3.228e+00; abs: 5.782e-05; rel: 1.791e-05; norm: 6.368e-02
## It: 440; obj: 3.228e+00; abs: 6.231e-05; rel: 1.931e-05; norm: 6.368e-02
## It: 441; obj: 3.228e+00; abs: 6.287e-05; rel: 1.948e-05; norm: 6.368e-02
## It: 442; obj: 3.228e+00; abs: 6.334e-05; rel: 1.962e-05; norm: 6.367e-02
## It: 443; obj: 3.228e+00; abs: 6.781e-05; rel: 2.101e-05; norm: 6.367e-02
## It: 444; obj: 3.227e+00; abs: 7.815e-05; rel: 2.421e-05; norm: 6.367e-02
## It: 445; obj: 3.227e+00; abs: 8.996e-05; rel: 2.787e-05; norm: 6.366e-02
## It: 446; obj: 3.227e+00; abs: 8.918e-05; rel: 2.763e-05; norm: 6.366e-02
## It: 447; obj: 3.227e+00; abs: 6.847e-05; rel: 2.122e-05; norm: 6.365e-02
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## It: 448; obj: 3.227e+00; abs: 4.458e-05; rel: 1.381e-05; norm: 6.365e-02
## It: 449; obj: 3.227e+00; abs: 3.565e-05; rel: 1.105e-05; norm: 6.364e-02
## It: 450; obj: 3.227e+00; abs: 4.377e-05; rel: 1.356e-05; norm: 6.364e-02
## It: 451; obj: 3.227e+00; abs: 6.128e-05; rel: 1.899e-05; norm: 6.363e-02
## It: 452; obj: 3.227e+00; abs: 7.911e-05; rel: 2.452e-05; norm: 6.362e-02
## It: 453; obj: 3.227e+00; abs: 9.004e-05; rel: 2.790e-05; norm: 6.361e-02
## It: 454; obj: 3.227e+00; abs: 9.200e-05; rel: 2.851e-05; norm: 6.360e-02
## It: 455; obj: 3.227e+00; abs: 8.967e-05; rel: 2.779e-05; norm: 6.359e-02
## It: 456; obj: 3.227e+00; abs: 8.937e-05; rel: 2.770e-05; norm: 6.357e-02
## It: 457; obj: 3.226e+00; abs: 9.409e-05; rel: 2.916e-05; norm: 6.356e-02
## It: 458; obj: 3.226e+00; abs: 1.040e-04; rel: 3.223e-05; norm: 6.355e-02
## It: 459; obj: 3.226e+00; abs: 1.181e-04; rel: 3.661e-05; norm: 6.353e-02
## It: 460; obj: 3.226e+00; abs: 1.344e-04; rel: 4.167e-05; norm: 6.352e-02
## It: 461; obj: 3.226e+00; abs: 1.503e-04; rel: 4.658e-05; norm: 6.351e-02
## It: 462; obj: 3.226e+00; abs: 1.641e-04; rel: 5.086e-05; norm: 6.350e-02
## It: 463; obj: 3.226e+00; abs: 1.779e-04; rel: 5.515e-05; norm: 6.349e-02
## It: 464; obj: 3.225e+00; abs: 1.942e-04; rel: 6.021e-05; norm: 6.349e-02
## It: 465; obj: 3.225e+00; abs: 2.127e-04; rel: 6.594e-05; norm: 6.349e-02
## It: 466; obj: 3.225e+00; abs: 2.342e-04; rel: 7.263e-05; norm: 6.349e-02
## It: 467; obj: 3.225e+00; abs: 2.587e-04; rel: 8.023e-05; norm: 6.349e-02
## It: 468; obj: 3.224e+00; abs: 2.769e-04; rel: 8.586e-05; norm: 6.350e-02
## It: 469; obj: 3.224e+00; abs: 2.831e-04; rel: 8.780e-05; norm: 6.351e-02
## It: 470; obj: 3.224e+00; abs: 2.877e-04; rel: 8.924e-05; norm: 6.353e-02
## It: 471; obj: 3.224e+00; abs: 2.940e-04; rel: 9.118e-05; norm: 6.354e-02
## It: 472; obj: 3.223e+00; abs: 2.943e-04; rel: 9.130e-05; norm: 6.356e-02
## It: 473; obj: 3.223e+00; abs: 2.725e-04; rel: 8.453e-05; norm: 6.358e-02
## It: 474; obj: 3.223e+00; abs: 2.330e-04; rel: 7.229e-05; norm: 6.361e-02
## It: 475; obj: 3.223e+00; abs: 2.096e-04; rel: 6.504e-05; norm: 6.363e-02
## It: 476; obj: 3.222e+00; abs: 2.005e-04; rel: 6.223e-05; norm: 6.365e-02
## It: 477; obj: 3.222e+00; abs: 1.819e-04; rel: 5.644e-05; norm: 6.368e-02
## It: 478; obj: 3.222e+00; abs: 1.542e-04; rel: 4.784e-05; norm: 6.370e-02
## It: 479; obj: 3.222e+00; abs: 1.332e-04; rel: 4.135e-05; norm: 6.372e-02
## It: 480; obj: 3.222e+00; abs: 1.251e-04; rel: 3.884e-05; norm: 6.374e-02
## It: 481; obj: 3.222e+00; abs: 1.239e-04; rel: 3.845e-05; norm: 6.376e-02
## It: 482; obj: 3.222e+00; abs: 1.209e-04; rel: 3.752e-05; norm: 6.377e-02
## It: 483; obj: 3.221e+00; abs: 1.124e-04; rel: 3.488e-05; norm: 6.379e-02
## It: 484; obj: 3.221e+00; abs: 9.982e-05; rel: 3.099e-05; norm: 6.380e-02
## It: 485; obj: 3.221e+00; abs: 8.718e-05; rel: 2.706e-05; norm: 6.382e-02
## It: 486; obj: 3.221e+00; abs: 7.721e-05; rel: 2.397e-05; norm: 6.383e-02
## It: 487; obj: 3.221e+00; abs: 6.999e-05; rel: 2.173e-05; norm: 6.384e-02
## It: 488; obj: 3.221e+00; abs: 6.401e-05; rel: 1.987e-05; norm: 6.386e-02
## It: 489; obj: 3.221e+00; abs: 5.809e-05; rel: 1.804e-05; norm: 6.387e-02
## It: 490; obj: 3.221e+00; abs: 5.209e-05; rel: 1.617e-05; norm: 6.388e-02
## It: 491; obj: 3.221e+00; abs: 4.649e-05; rel: 1.443e-05; norm: 6.389e-02
## It: 492; obj: 3.221e+00; abs: 4.163e-05; rel: 1.292e-05; norm: 6.390e-02
## It: 493; obj: 3.221e+00; abs: 3.750e-05; rel: 1.164e-05; norm: 6.390e-02
## It: 494; obj: 3.221e+00; abs: 3.393e-05; rel: 1.053e-05; norm: 6.391e-02
## It: 495; obj: 3.221e+00; abs: 3.078e-05; rel: 9.556e-06; norm: 6.392e-02
## It: 496; obj: 3.221e+00; abs: 2.806e-05; rel: 8.712e-06; norm: 6.392e-02
## It: 497; obj: 3.221e+00; abs: 2.579e-05; rel: 8.007e-06; norm: 6.392e-02
## It: 498; obj: 3.221e+00; abs: 2.391e-05; rel: 7.425e-06; norm: 6.393e-02
## It: 499; obj: 3.221e+00; abs: 2.235e-05; rel: 6.940e-06; norm: 6.393e-02
## It: 500; obj: 3.221e+00; abs: 2.105e-05; rel: 6.536e-06; norm: 6.393e-02
## It: 501; obj: 3.221e+00; abs: 2.000e-05; rel: 6.211e-06; norm: 6.393e-02
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## It: 502; obj: 3.221e+00; abs: 1.921e-05; rel: 5.964e-06; norm: 6.393e-02
## It: 503; obj: 3.221e+00; abs: 1.866e-05; rel: 5.793e-06; norm: 6.393e-02
## It: 504; obj: 3.221e+00; abs: 1.833e-05; rel: 5.691e-06; norm: 6.393e-02
## It: 505; obj: 3.220e+00; abs: 1.820e-05; rel: 5.651e-06; norm: 6.393e-02
## It: 506; obj: 3.220e+00; abs: 1.826e-05; rel: 5.671e-06; norm: 6.393e-02
## It: 507; obj: 3.220e+00; abs: 1.851e-05; rel: 5.748e-06; norm: 6.393e-02
## It: 508; obj: 3.220e+00; abs: 1.894e-05; rel: 5.881e-06; norm: 6.392e-02
## It: 509; obj: 3.220e+00; abs: 1.955e-05; rel: 6.072e-06; norm: 6.392e-02
## It: 510; obj: 3.220e+00; abs: 2.035e-05; rel: 6.319e-06; norm: 6.392e-02
## It: 511; obj: 3.220e+00; abs: 2.132e-05; rel: 6.621e-06; norm: 6.392e-02
## It: 512; obj: 3.220e+00; abs: 2.248e-05; rel: 6.979e-06; norm: 6.392e-02
## It: 513; obj: 3.220e+00; abs: 2.380e-05; rel: 7.389e-06; norm: 6.391e-02
## It: 514; obj: 3.220e+00; abs: 2.527e-05; rel: 7.847e-06; norm: 6.391e-02
## It: 515; obj: 3.220e+00; abs: 2.687e-05; rel: 8.344e-06; norm: 6.391e-02
## It: 516; obj: 3.220e+00; abs: 2.856e-05; rel: 8.869e-06; norm: 6.391e-02
## It: 517; obj: 3.220e+00; abs: 3.031e-05; rel: 9.412e-06; norm: 6.391e-02
## It: 518; obj: 3.220e+00; abs: 3.207e-05; rel: 9.960e-06; norm: 6.391e-02
## It: 519; obj: 3.220e+00; abs: 3.381e-05; rel: 1.050e-05; norm: 6.391e-02
## It: 520; obj: 3.220e+00; abs: 3.545e-05; rel: 1.101e-05; norm: 6.392e-02
## It: 521; obj: 3.220e+00; abs: 3.692e-05; rel: 1.147e-05; norm: 6.392e-02
## It: 522; obj: 3.220e+00; abs: 3.816e-05; rel: 1.185e-05; norm: 6.393e-02
## It: 523; obj: 3.220e+00; abs: 3.912e-05; rel: 1.215e-05; norm: 6.393e-02
## It: 524; obj: 3.220e+00; abs: 3.976e-05; rel: 1.235e-05; norm: 6.394e-02
## It: 525; obj: 3.220e+00; abs: 3.989e-05; rel: 1.239e-05; norm: 6.395e-02
## It: 526; obj: 3.220e+00; abs: 3.919e-05; rel: 1.217e-05; norm: 6.395e-02
## It: 527; obj: 3.220e+00; abs: 3.767e-05; rel: 1.170e-05; norm: 6.396e-02
## It: 528; obj: 3.220e+00; abs: 3.594e-05; rel: 1.116e-05; norm: 6.397e-02
## It: 529; obj: 3.220e+00; abs: 3.471e-05; rel: 1.078e-05; norm: 6.398e-02
## It: 530; obj: 3.220e+00; abs: 3.401e-05; rel: 1.056e-05; norm: 6.399e-02
## It: 531; obj: 3.220e+00; abs: 3.334e-05; rel: 1.036e-05; norm: 6.400e-02
## It: 532; obj: 3.220e+00; abs: 3.218e-05; rel: 9.995e-06; norm: 6.401e-02
## It: 533; obj: 3.220e+00; abs: 3.035e-05; rel: 9.426e-06; norm: 6.402e-02
## It: 534; obj: 3.220e+00; abs: 2.796e-05; rel: 8.685e-06; norm: 6.403e-02
## It: 535; obj: 3.220e+00; abs: 2.528e-05; rel: 7.853e-06; norm: 6.404e-02
## It: 536; obj: 3.220e+00; abs: 2.258e-05; rel: 7.012e-06; norm: 6.404e-02
## It: 537; obj: 3.220e+00; abs: 2.004e-05; rel: 6.226e-06; norm: 6.405e-02
## It: 538; obj: 3.220e+00; abs: 1.783e-05; rel: 5.537e-06; norm: 6.406e-02
## It: 539; obj: 3.220e+00; abs: 1.600e-05; rel: 4.970e-06; norm: 6.407e-02
## It: 540; obj: 3.220e+00; abs: 1.459e-05; rel: 4.530e-06; norm: 6.407e-02
## It: 541; obj: 3.219e+00; abs: 1.352e-05; rel: 4.199e-06; norm: 6.408e-02
## It: 542; obj: 3.219e+00; abs: 1.270e-05; rel: 3.944e-06; norm: 6.408e-02
## It: 543; obj: 3.219e+00; abs: 1.202e-05; rel: 3.733e-06; norm: 6.409e-02
## It: 544; obj: 3.219e+00; abs: 1.141e-05; rel: 3.544e-06; norm: 6.409e-02
## It: 545; obj: 3.219e+00; abs: 1.085e-05; rel: 3.371e-06; norm: 6.410e-02
## It: 546; obj: 3.219e+00; abs: 1.037e-05; rel: 3.222e-06; norm: 6.410e-02
## It: 547; obj: 3.219e+00; abs: 9.999e-06; rel: 3.106e-06; norm: 6.411e-02
## It: 548; obj: 3.219e+00; abs: 9.758e-06; rel: 3.031e-06; norm: 6.411e-02
## It: 549; obj: 3.219e+00; abs: 9.643e-06; rel: 2.995e-06; norm: 6.412e-02
## It: 550; obj: 3.219e+00; abs: 9.620e-06; rel: 2.988e-06; norm: 6.412e-02
## It: 551; obj: 3.219e+00; abs: 9.631e-06; rel: 2.992e-06; norm: 6.412e-02
## It: 552; obj: 3.219e+00; abs: 9.616e-06; rel: 2.987e-06; norm: 6.413e-02
## It: 553; obj: 3.219e+00; abs: 9.522e-06; rel: 2.958e-06; norm: 6.413e-02
## It: 554; obj: 3.219e+00; abs: 9.318e-06; rel: 2.895e-06; norm: 6.414e-02
## It: 555; obj: 3.219e+00; abs: 8.997e-06; rel: 2.795e-06; norm: 6.414e-02
```

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## It: 556; obj: 3.219e+00; abs: 8.569e-06; rel: 2.662e-06; norm: 6.414e-02
## It: 557; obj: 3.219e+00; abs: 8.059e-06; rel: 2.503e-06; norm: 6.415e-02
## It: 558; obj: 3.219e+00; abs: 7.496e-06; rel: 2.328e-06; norm: 6.415e-02
## It: 559; obj: 3.219e+00; abs: 6.904e-06; rel: 2.144e-06; norm: 6.416e-02
## It: 560; obj: 3.219e+00; abs: 6.304e-06; rel: 1.958e-06; norm: 6.416e-02
## It: 561; obj: 3.219e+00; abs: 5.714e-06; rel: 1.775e-06; norm: 6.417e-02
## It: 562; obj: 3.219e+00; abs: 5.145e-06; rel: 1.598e-06; norm: 6.417e-02
## It: 563; obj: 3.219e+00; abs: 4.609e-06; rel: 1.432e-06; norm: 6.418e-02
## It: 564; obj: 3.219e+00; abs: 4.114e-06; rel: 1.278e-06; norm: 6.418e-02
## It: 565; obj: 3.219e+00; abs: 3.668e-06; rel: 1.140e-06; norm: 6.419e-02
## It: 566; obj: 3.219e+00; abs: 3.278e-06; rel: 1.018e-06; norm: 6.419e-02
## It: 567; obj: 3.219e+00; abs: 2.944e-06; rel: 9.144e-07; norm: 6.419e-02
## It: 568; obj: 3.219e+00; abs: 2.664e-06; rel: 8.274e-07; norm: 6.420e-02
## It: 569; obj: 3.219e+00; abs: 2.431e-06; rel: 7.552e-07; norm: 6.420e-02
## It: 570; obj: 3.219e+00; abs: 2.236e-06; rel: 6.945e-07; norm: 6.420e-02
## It: 571; obj: 3.219e+00; abs: 2.067e-06; rel: 6.420e-07; norm: 6.420e-02
## It: 572; obj: 3.219e+00; abs: 1.914e-06; rel: 5.947e-07; norm: 6.420e-02
## It: 573; obj: 3.219e+00; abs: 1.772e-06; rel: 5.504e-07; norm: 6.421e-02
## It: 574; obj: 3.219e+00; abs: 1.635e-06; rel: 5.080e-07; norm: 6.421e-02
## It: 575; obj: 3.219e+00; abs: 1.505e-06; rel: 4.676e-07; norm: 6.421e-02
## It: 576; obj: 3.219e+00; abs: 1.383e-06; rel: 4.295e-07; norm: 6.421e-02
## It: 577; obj: 3.219e+00; abs: 1.270e-06; rel: 3.946e-07; norm: 6.421e-02
## It: 578; obj: 3.219e+00; abs: 1.169e-06; rel: 3.632e-07; norm: 6.421e-02
## It: 579; obj: 3.219e+00; abs: 1.080e-06; rel: 3.354e-07; norm: 6.421e-02
## It: 580; obj: 3.219e+00; abs: 1.001e-06; rel: 3.109e-07; norm: 6.421e-02
## It: 581; obj: 3.219e+00; abs: 9.311e-07; rel: 2.892e-07; norm: 6.421e-02
## It: 582; obj: 3.219e+00; abs: 8.681e-07; rel: 2.697e-07; norm: 6.421e-02
## It: 583; obj: 3.219e+00; abs: 8.103e-07; rel: 2.517e-07; norm: 6.421e-02
## It: 584; obj: 3.219e+00; abs: 7.568e-07; rel: 2.351e-07; norm: 6.421e-02
## It: 585; obj: 3.219e+00; abs: 7.073e-07; rel: 2.197e-07; norm: 6.421e-02
## It: 586; obj: 3.219e+00; abs: 6.620e-07; rel: 2.056e-07; norm: 6.421e-02
## It: 587; obj: 3.219e+00; abs: 6.212e-07; rel: 1.930e-07; norm: 6.421e-02
## It: 588; obj: 3.219e+00; abs: 5.850e-07; rel: 1.817e-07; norm: 6.421e-02
## It: 589; obj: 3.219e+00; abs: 5.531e-07; rel: 1.718e-07; norm: 6.421e-02
## It: 590; obj: 3.219e+00; abs: 5.247e-07; rel: 1.630e-07; norm: 6.421e-02
## It: 591; obj: 3.219e+00; abs: 4.990e-07; rel: 1.550e-07; norm: 6.421e-02
## It: 592; obj: 3.219e+00; abs: 4.752e-07; rel: 1.476e-07; norm: 6.421e-02
## It: 593; obj: 3.219e+00; abs: 4.526e-07; rel: 1.406e-07; norm: 6.421e-02
## It: 594; obj: 3.219e+00; abs: 4.311e-07; rel: 1.339e-07; norm: 6.421e-02
## It: 595; obj: 3.219e+00; abs: 4.106e-07; rel: 1.275e-07; norm: 6.421e-02
## It: 596; obj: 3.219e+00; abs: 3.913e-07; rel: 1.215e-07; norm: 6.421e-02
## It: 597; obj: 3.219e+00; abs: 3.736e-07; rel: 1.160e-07; norm: 6.421e-02
## It: 598; obj: 3.219e+00; abs: 3.577e-07; rel: 1.111e-07; norm: 6.421e-02
## It: 599; obj: 3.219e+00; abs: 3.437e-07; rel: 1.068e-07; norm: 6.421e-02
## It: 600; obj: 3.219e+00; abs: 3.316e-07; rel: 1.030e-07; norm: 6.421e-02
## It: 601; obj: 3.219e+00; abs: 3.212e-07; rel: 9.976e-08; norm: 6.421e-02
## It: 602; obj: 3.219e+00; abs: 3.121e-07; rel: 9.695e-08; norm: 6.421e-02
## It: 603; obj: 3.219e+00; abs: 3.043e-07; rel: 9.452e-08; norm: 6.421e-02
## It: 604; obj: 3.219e+00; abs: 2.975e-07; rel: 9.241e-08; norm: 6.421e-02
## It: 605; obj: 3.219e+00; abs: 2.917e-07; rel: 9.061e-08; norm: 6.421e-02
## It: 606; obj: 3.219e+00; abs: 2.869e-07; rel: 8.913e-08; norm: 6.421e-02
## It: 607; obj: 3.219e+00; abs: 2.832e-07; rel: 8.798e-08; norm: 6.420e-02
## It: 608; obj: 3.219e+00; abs: 2.806e-07; rel: 8.718e-08; norm: 6.420e-02
## It: 609; obj: 3.219e+00; abs: 2.792e-07; rel: 8.674e-08; norm: 6.420e-02
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## It: 610; obj: 3.219e+00; abs: 2.790e-07; rel: 8.665e-08; norm: 6.420e-02
## It: 611; obj: 3.219e+00; abs: 2.797e-07; rel: 8.689e-08; norm: 6.420e-02
## It: 612; obj: 3.219e+00; abs: 2.815e-07; rel: 8.744e-08; norm: 6.420e-02
## It: 613; obj: 3.219e+00; abs: 2.842e-07; rel: 8.827e-08; norm: 6.420e-02
## It: 614; obj: 3.219e+00; abs: 2.878e-07; rel: 8.940e-08; norm: 6.420e-02
## It: 615; obj: 3.219e+00; abs: 2.925e-07; rel: 9.086e-08; norm: 6.420e-02
## It: 616; obj: 3.219e+00; abs: 2.984e-07; rel: 9.269e-08; norm: 6.420e-02
## It: 617; obj: 3.219e+00; abs: 3.057e-07; rel: 9.496e-08; norm: 6.420e-02
## It: 618; obj: 3.219e+00; abs: 3.147e-07; rel: 9.777e-08; norm: 6.419e-02
## It: 619; obj: 3.219e+00; abs: 3.258e-07; rel: 1.012e-07; norm: 6.419e-02
## It: 620; obj: 3.219e+00; abs: 3.392e-07; rel: 1.054e-07; norm: 6.419e-02
## It: 621; obj: 3.219e+00; abs: 3.553e-07; rel: 1.104e-07; norm: 6.419e-02
## It: 622; obj: 3.219e+00; abs: 3.747e-07; rel: 1.164e-07; norm: 6.419e-02
## It: 623; obj: 3.219e+00; abs: 3.978e-07; rel: 1.236e-07; norm: 6.419e-02
## It: 624; obj: 3.219e+00; abs: 4.254e-07; rel: 1.321e-07; norm: 6.419e-02
## It: 625; obj: 3.219e+00; abs: 4.585e-07; rel: 1.424e-07; norm: 6.419e-02
## It: 626; obj: 3.219e+00; abs: 4.985e-07; rel: 1.548e-07; norm: 6.418e-02
## It: 627; obj: 3.219e+00; abs: 5.469e-07; rel: 1.699e-07; norm: 6.418e-02
## It: 628; obj: 3.219e+00; abs: 6.063e-07; rel: 1.883e-07; norm: 6.418e-02
## It: 629; obj: 3.219e+00; abs: 6.798e-07; rel: 2.112e-07; norm: 6.418e-02
## It: 630; obj: 3.219e+00; abs: 7.718e-07; rel: 2.398e-07; norm: 6.418e-02
## It: 631; obj: 3.219e+00; abs: 8.887e-07; rel: 2.760e-07; norm: 6.418e-02
## It: 632; obj: 3.219e+00; abs: 1.039e-06; rel: 3.228e-07; norm: 6.417e-02
## It: 633; obj: 3.219e+00; abs: 1.237e-06; rel: 3.842e-07; norm: 6.417e-02
## It: 634; obj: 3.219e+00; abs: 1.501e-06; rel: 4.664e-07; norm: 6.417e-02
## It: 635; obj: 3.219e+00; abs: 1.863e-06; rel: 5.786e-07; norm: 6.417e-02
## It: 636; obj: 3.219e+00; abs: 2.367e-06; rel: 7.352e-07; norm: 6.416e-02
## It: 637; obj: 3.219e+00; abs: 3.085e-06; rel: 9.583e-07; norm: 6.416e-02
## It: 638; obj: 3.219e+00; abs: 4.126e-06; rel: 1.282e-06; norm: 6.416e-02
## It: 639; obj: 3.219e+00; abs: 5.648e-06; rel: 1.754e-06; norm: 6.415e-02
## It: 640; obj: 3.219e+00; abs: 7.874e-06; rel: 2.446e-06; norm: 6.415e-02
## It: 641; obj: 3.219e+00; abs: 1.110e-05; rel: 3.449e-06; norm: 6.415e-02
## It: 642; obj: 3.219e+00; abs: 1.577e-05; rel: 4.898e-06; norm: 6.414e-02
## It: 643; obj: 3.219e+00; abs: 2.264e-05; rel: 7.034e-06; norm: 6.414e-02
## It: 644; obj: 3.219e+00; abs: 3.245e-05; rel: 1.008e-05; norm: 6.413e-02
## It: 645; obj: 3.219e+00; abs: 4.207e-05; rel: 1.307e-05; norm: 6.413e-02
## It: 646; obj: 3.219e+00; abs: 4.189e-05; rel: 1.301e-05; norm: 6.413e-02
## It: 647; obj: 3.219e+00; abs: 3.273e-05; rel: 1.017e-05; norm: 6.413e-02
## It: 648; obj: 3.219e+00; abs: 2.591e-05; rel: 8.049e-06; norm: 6.413e-02
## It: 649; obj: 3.219e+00; abs: 2.127e-05; rel: 6.607e-06; norm: 6.413e-02
## It: 650; obj: 3.219e+00; abs: 1.555e-05; rel: 4.830e-06; norm: 6.414e-02
## It: 651; obj: 3.219e+00; abs: 8.238e-06; rel: 2.559e-06; norm: 6.414e-02
## It: 652; obj: 3.219e+00; abs: 2.500e-06; rel: 7.766e-07; norm: 6.414e-02
## It: 653; obj: 3.219e+00; abs: 2.244e-06; rel: 6.973e-07; norm: 6.414e-02
## It: 654; obj: 3.219e+00; abs: 7.545e-06; rel: 2.344e-06; norm: 6.415e-02
## It: 655; obj: 3.219e+00; abs: 1.541e-05; rel: 4.786e-06; norm: 6.415e-02
## It: 656; obj: 3.219e+00; abs: 2.151e-05; rel: 6.681e-06; norm: 6.416e-02
## It: 657; obj: 3.219e+00; abs: 2.214e-05; rel: 6.878e-06; norm: 6.417e-02
## It: 658; obj: 3.219e+00; abs: 1.827e-05; rel: 5.675e-06; norm: 6.418e-02
## It: 659; obj: 3.219e+00; abs: 1.344e-05; rel: 4.175e-06; norm: 6.419e-02
## It: 660; obj: 3.219e+00; abs: 7.863e-06; rel: 2.443e-06; norm: 6.420e-02
## It: 661; obj: 3.219e+00; abs: 3.546e-07; rel: 1.102e-07; norm: 6.420e-02
## It: 662; obj: 3.219e+00; abs: 6.413e-06; rel: 1.992e-06; norm: 6.421e-02
## It: 663; obj: 3.219e+00; abs: 7.835e-06; rel: 2.434e-06; norm: 6.422e-02
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## It: 664; obj: 3.219e+00; abs: 3.246e-06; rel: 1.009e-06; norm: 6.423e-02
## It: 665; obj: 3.219e+00; abs: 4.077e-06; rel: 1.267e-06; norm: 6.423e-02
## It: 666; obj: 3.219e+00; abs: 1.045e-05; rel: 3.246e-06; norm: 6.424e-02
## It: 667; obj: 3.219e+00; abs: 1.389e-05; rel: 4.316e-06; norm: 6.425e-02
## It: 668; obj: 3.219e+00; abs: 1.393e-05; rel: 4.329e-06; norm: 6.425e-02
## It: 669; obj: 3.219e+00; abs: 1.104e-05; rel: 3.430e-06; norm: 6.426e-02
## It: 670; obj: 3.219e+00; abs: 6.608e-06; rel: 2.053e-06; norm: 6.427e-02
## It: 671; obj: 3.219e+00; abs: 2.358e-06; rel: 7.326e-07; norm: 6.427e-02
## It: 672; obj: 3.219e+00; abs: 5.967e-07; rel: 1.854e-07; norm: 6.427e-02
## It: 673; obj: 3.219e+00; abs: 1.841e-06; rel: 5.720e-07; norm: 6.428e-02
## It: 674; obj: 3.219e+00; abs: 1.613e-06; rel: 5.012e-07; norm: 6.428e-02
## It: 675; obj: 3.219e+00; abs: 5.983e-07; rel: 1.859e-07; norm: 6.428e-02
## It: 676; obj: 3.219e+00; abs: 5.645e-07; rel: 1.754e-07; norm: 6.428e-02
## It: 677; obj: 3.219e+00; abs: 1.547e-06; rel: 4.806e-07; norm: 6.429e-02
## It: 678; obj: 3.219e+00; abs: 2.242e-06; rel: 6.966e-07; norm: 6.429e-02
## It: 679; obj: 3.219e+00; abs: 2.617e-06; rel: 8.129e-07; norm: 6.429e-02
## It: 680; obj: 3.219e+00; abs: 2.662e-06; rel: 8.270e-07; norm: 6.429e-02
## It: 681; obj: 3.219e+00; abs: 2.401e-06; rel: 7.458e-07; norm: 6.429e-02
## It: 682; obj: 3.219e+00; abs: 1.896e-06; rel: 5.889e-07; norm: 6.430e-02
## It: 683; obj: 3.219e+00; abs: 1.255e-06; rel: 3.900e-07; norm: 6.430e-02
## It: 684; obj: 3.219e+00; abs: 6.215e-07; rel: 1.931e-07; norm: 6.430e-02
## It: 685; obj: 3.219e+00; abs: 1.351e-07; rel: 4.198e-08; norm: 6.430e-02
## It: 686; obj: 3.219e+00; abs: 1.092e-07; rel: 3.391e-08; norm: 6.430e-02
## It: 687; obj: 3.219e+00; abs: 9.744e-08; rel: 3.027e-08; norm: 6.431e-02
## It: 688; obj: 3.219e+00; abs: 1.063e-07; rel: 3.303e-08; norm: 6.431e-02
## It: 689; obj: 3.219e+00; abs: 3.989e-07; rel: 1.239e-07; norm: 6.431e-02
## It: 690; obj: 3.219e+00; abs: 6.808e-07; rel: 2.115e-07; norm: 6.431e-02
## It: 691; obj: 3.219e+00; abs: 8.800e-07; rel: 2.734e-07; norm: 6.431e-02
## It: 692; obj: 3.219e+00; abs: 9.559e-07; rel: 2.970e-07; norm: 6.432e-02
## It: 693; obj: 3.219e+00; abs: 8.997e-07; rel: 2.795e-07; norm: 6.432e-02
## It: 694; obj: 3.219e+00; abs: 7.329e-07; rel: 2.277e-07; norm: 6.432e-02
## It: 695; obj: 3.219e+00; abs: 5.018e-07; rel: 1.559e-07; norm: 6.432e-02
## It: 696; obj: 3.219e+00; abs: 2.643e-07; rel: 8.211e-08; norm: 6.432e-02
## It: 697; obj: 3.219e+00; abs: 7.211e-08; rel: 2.240e-08; norm: 6.432e-02
## It: 698; obj: 3.219e+00; abs: 4.261e-08; rel: 1.324e-08; norm: 6.432e-02
## It: 699; obj: 3.219e+00; abs: 7.292e-08; rel: 2.266e-08; norm: 6.432e-02
## It: 700; obj: 3.219e+00; abs: 3.417e-08; rel: 1.061e-08; norm: 6.432e-02
## It: 701; obj: 3.219e+00; abs: 4.444e-08; rel: 1.381e-08; norm: 6.432e-02
## It: 702; obj: 3.219e+00; abs: 1.299e-07; rel: 4.037e-08; norm: 6.432e-02
## It: 703; obj: 3.219e+00; abs: 1.946e-07; rel: 6.047e-08; norm: 6.432e-02
## It: 704; obj: 3.219e+00; abs: 2.221e-07; rel: 6.900e-08; norm: 6.432e-02
## It: 705; obj: 3.219e+00; abs: 2.092e-07; rel: 6.500e-08; norm: 6.433e-02
## It: 706; obj: 3.219e+00; abs: 1.645e-07; rel: 5.111e-08; norm: 6.433e-02
## It: 707; obj: 3.219e+00; abs: 1.037e-07; rel: 3.223e-08; norm: 6.433e-02
## It: 708; obj: 3.219e+00; abs: 4.433e-08; rel: 1.377e-08; norm: 6.433e-02
## It: 709; obj: 3.219e+00; abs: 2.259e-10; rel: 7.019e-11; norm: 6.433e-02
## It: 710; obj: 3.219e+00; abs: 2.111e-08; rel: 6.558e-09; norm: 6.433e-02
## It: 711; obj: 3.219e+00; abs: 1.954e-08; rel: 6.071e-09; norm: 6.433e-02
## It: 712; obj: 3.219e+00; abs: 8.654e-10; rel: 2.689e-10; norm: 6.433e-02
## It: 713; obj: 3.219e+00; abs: 2.582e-08; rel: 8.022e-09; norm: 6.433e-02
## It: 714; obj: 3.219e+00; abs: 5.111e-08; rel: 1.588e-08; norm: 6.433e-02
## It: 715; obj: 3.219e+00; abs: 6.777e-08; rel: 2.106e-08; norm: 6.433e-02
## It: 716; obj: 3.219e+00; abs: 7.221e-08; rel: 2.243e-08; norm: 6.433e-02
## It: 717; obj: 3.219e+00; abs: 6.473e-08; rel: 2.011e-08; norm: 6.433e-02
```

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## It: 718; obj: 3.219e+00; abs: 4.876e-08; rel: 1.515e-08; norm: 6.433e-02
## It: 719; obj: 3.219e+00; abs: 2.940e-08; rel: 9.135e-09; norm: 6.433e-02
## It: 720; obj: 3.219e+00; abs: 1.172e-08; rel: 3.640e-09; norm: 6.433e-02
## It: 721; obj: 3.219e+00; abs: 6.216e-10; rel: 1.931e-10; norm: 6.433e-02
## It: 722; obj: 3.219e+00; abs: 6.039e-09; rel: 1.876e-09; norm: 6.433e-02
## It: 723; obj: 3.219e+00; abs: 5.074e-09; rel: 1.576e-09; norm: 6.433e-02
## It: 724; obj: 3.219e+00; abs: 2.222e-10; rel: 6.903e-11; norm: 6.433e-02
## It: 725; obj: 3.219e+00; abs: 7.147e-09; rel: 2.220e-09; norm: 6.433e-02
## It: 726; obj: 3.219e+00; abs: 1.321e-08; rel: 4.104e-09; norm: 6.433e-02
## It: 727; obj: 3.219e+00; abs: 1.673e-08; rel: 5.197e-09; norm: 6.433e-02
## It: 728; obj: 3.219e+00; abs: 1.707e-08; rel: 5.303e-09; norm: 6.433e-02
## It: 729; obj: 3.219e+00; abs: 1.460e-08; rel: 4.536e-09; norm: 6.433e-02
## It: 730; obj: 3.219e+00; abs: 1.037e-08; rel: 3.221e-09; norm: 6.433e-02
## It: 731; obj: 3.219e+00; abs: 5.686e-09; rel: 1.767e-09; norm: 6.433e-02
## It: 732; obj: 3.219e+00; abs: 1.750e-09; rel: 5.436e-10; norm: 6.433e-02
## It: 733; obj: 3.219e+00; abs: 6.568e-10; rel: 2.040e-10; norm: 6.433e-02
## It: 734; obj: 3.219e+00; abs: 1.288e-09; rel: 4.001e-10; norm: 6.433e-02
## It: 735; obj: 3.219e+00; abs: 4.001e-10; rel: 1.243e-10; norm: 6.433e-02
## It: 736; obj: 3.219e+00; abs: 1.404e-09; rel: 4.362e-10; norm: 6.433e-02
## It: 737; obj: 3.219e+00; abs: 3.397e-09; rel: 1.055e-09; norm: 6.433e-02
## It: 738; obj: 3.219e+00; abs: 4.943e-09; rel: 1.536e-09; norm: 6.433e-02
## It: 739; obj: 3.219e+00; abs: 5.648e-09; rel: 1.755e-09; norm: 6.433e-02
## It: 740; obj: 3.219e+00; abs: 5.416e-09; rel: 1.682e-09; norm: 6.434e-02
## It: 741; obj: 3.219e+00; abs: 4.422e-09; rel: 1.374e-09; norm: 6.434e-02
## It: 742; obj: 3.219e+00; abs: 3.012e-09; rel: 9.359e-10; norm: 6.434e-02
## It: 743; obj: 3.219e+00; abs: 1.578e-09; rel: 4.901e-10; norm: 6.434e-02
## It: 744; obj: 3.219e+00; abs: 4.440e-10; rel: 1.380e-10; norm: 6.434e-02
## It: 745; obj: 3.219e+00; abs: 2.030e-10; rel: 6.305e-11; norm: 6.434e-02
## It: 746; obj: 3.219e+00; abs: 3.380e-10; rel: 1.050e-10; norm: 6.434e-02
## It: 747; obj: 3.219e+00; abs: 7.136e-11; rel: 2.217e-11; norm: 6.434e-02
## It: 748; obj: 3.219e+00; abs: 4.093e-10; rel: 1.271e-10; norm: 6.434e-02
## It: 749; obj: 3.219e+00; abs: 9.027e-10; rel: 2.805e-10; norm: 6.434e-02
## It: 750; obj: 3.219e+00; abs: 1.248e-09; rel: 3.876e-10; norm: 6.434e-02
## It: 751; obj: 3.219e+00; abs: 1.363e-09; rel: 4.234e-10; norm: 6.434e-02
## It: 752; obj: 3.219e+00; abs: 1.245e-09; rel: 3.867e-10; norm: 6.434e-02
## It: 753; obj: 3.219e+00; abs: 9.578e-10; rel: 2.976e-10; norm: 6.434e-02
## It: 754; obj: 3.219e+00; abs: 5.981e-10; rel: 1.858e-10; norm: 6.434e-02
## It: 755; obj: 3.219e+00; abs: 2.662e-10; rel: 8.270e-11; norm: 6.434e-02
## It: 756; obj: 3.219e+00; abs: 3.537e-11; rel: 1.099e-11; norm: 6.434e-02
## It: 757; obj: 3.219e+00; abs: 6.153e-11; rel: 1.911e-11; norm: 6.434e-02
## It: 758; obj: 3.219e+00; abs: 3.285e-11; rel: 1.021e-11; norm: 6.434e-02
## It: 759; obj: 3.219e+00; abs: 8.318e-11; rel: 2.584e-11; norm: 6.434e-02
## It: 760; obj: 3.219e+00; abs: 2.312e-10; rel: 7.183e-11; norm: 6.434e-02
## It: 761; obj: 3.219e+00; abs: 3.607e-10; rel: 1.121e-10; norm: 6.434e-02
## It: 762; obj: 3.219e+00; abs: 4.335e-10; rel: 1.347e-10; norm: 6.434e-02
## It: 763; obj: 3.219e+00; abs: 4.371e-10; rel: 1.358e-10; norm: 6.434e-02
## It: 764; obj: 3.219e+00; abs: 3.772e-10; rel: 1.172e-10; norm: 6.434e-02
## It: 765; obj: 3.219e+00; abs: 2.785e-10; rel: 8.653e-11; norm: 6.434e-02
## It: 766; obj: 3.219e+00; abs: 1.677e-10; rel: 5.209e-11; norm: 6.434e-02
## It: 767; obj: 3.219e+00; abs: 7.247e-11; rel: 2.252e-11; norm: 6.434e-02
## It: 768; obj: 3.219e+00; abs: 1.076e-11; rel: 3.344e-12; norm: 6.434e-02
## It: 769; obj: 3.219e+00; abs: 1.234e-11; rel: 3.834e-12; norm: 6.434e-02
## It: 770; obj: 3.219e+00; abs: 3.076e-12; rel: 9.556e-13; norm: 6.434e-02
## It: 771; obj: 3.219e+00; abs: 2.837e-11; rel: 8.815e-12; norm: 6.434e-02
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## It: 772; obj: 3.219e+00; abs: 6.582e-11; rel: 2.045e-11; norm: 6.434e-02
## It: 773; obj: 3.219e+00; abs: 9.365e-11; rel: 2.910e-11; norm: 6.434e-02
## It: 774; obj: 3.219e+00; abs: 1.077e-10; rel: 3.347e-11; norm: 6.434e-02
## It: 775; obj: 3.219e+00; abs: 1.036e-10; rel: 3.220e-11; norm: 6.434e-02
## It: 776; obj: 3.219e+00; abs: 8.502e-11; rel: 2.641e-11; norm: 6.434e-02
## It: 777; obj: 3.219e+00; abs: 5.931e-11; rel: 1.843e-11; norm: 6.434e-02
## It: 778; obj: 3.219e+00; abs: 3.260e-11; rel: 1.013e-11; norm: 6.434e-02
## It: 779; obj: 3.219e+00; abs: 1.228e-11; rel: 3.815e-12; norm: 6.434e-02
## It: 780; obj: 3.219e+00; abs: 1.320e-12; rel: 4.102e-13; norm: 6.434e-02
## It: 781; obj: 3.219e+00; abs: 3.211e-13; rel: 9.975e-14; norm: 6.434e-02
## It: 782; obj: 3.219e+00; abs: 7.055e-12; rel: 2.192e-12; norm: 6.434e-02
## It: 783; obj: 3.219e+00; abs: 1.762e-11; rel: 5.475e-12; norm: 6.434e-02
## It: 784; obj: 3.219e+00; abs: 2.727e-11; rel: 8.473e-12; norm: 6.434e-02
## It: 785; obj: 3.219e+00; abs: 3.460e-11; rel: 1.075e-11; norm: 6.434e-02
## It: 786; obj: 3.219e+00; abs: 3.555e-11; rel: 1.105e-11; norm: 6.434e-02
## It: 787; obj: 3.219e+00; abs: 3.277e-11; rel: 1.018e-11; norm: 6.434e-02
## It: 788; obj: 3.219e+00; abs: 2.551e-11; rel: 7.925e-12; norm: 6.434e-02
## It: 789; obj: 3.219e+00; abs: 1.734e-11; rel: 5.388e-12; norm: 6.434e-02
## It: 790; obj: 3.219e+00; abs: 9.550e-12; rel: 2.967e-12; norm: 6.434e-02
## It: 791; obj: 3.219e+00; abs: 3.659e-12; rel: 1.137e-12; norm: 6.434e-02
## It: 792; obj: 3.219e+00; abs: 1.120e-12; rel: 3.480e-13; norm: 6.434e-02
## It: 793; obj: 3.219e+00; abs: 3.313e-13; rel: 1.029e-13; norm: 6.434e-02
## It: 794; obj: 3.219e+00; abs: 2.587e-12; rel: 8.037e-13; norm: 6.434e-02
## It: 795; obj: 3.219e+00; abs: 4.993e-12; rel: 1.551e-12; norm: 6.434e-02
## It: 796; obj: 3.219e+00; abs: 7.297e-12; rel: 2.267e-12; norm: 6.434e-02
## It: 797; obj: 3.219e+00; abs: 8.309e-12; rel: 2.582e-12; norm: 6.434e-02
## It: 798; obj: 3.219e+00; abs: 9.327e-12; rel: 2.898e-12; norm: 6.434e-02
## It: 799; obj: 3.219e+00; abs: 7.133e-12; rel: 2.216e-12; norm: 6.434e-02
## It: 800; obj: 3.219e+00; abs: 5.625e-12; rel: 1.748e-12; norm: 6.434e-02
## It: 801; obj: 3.219e+00; abs: 3.472e-12; rel: 1.079e-12; norm: 6.434e-02
## It: 802; obj: 3.219e+00; abs: 2.052e-12; rel: 6.376e-13; norm: 6.434e-02
## It: 803; obj: 3.219e+00; abs: 8.540e-13; rel: 2.653e-13; norm: 6.434e-02
## It: 804; obj: 3.219e+00; abs: 1.532e-13; rel: 4.760e-14; norm: 6.434e-02
## It: 805; obj: 3.219e+00; abs: 1.149e-12; rel: 3.571e-13; norm: 6.434e-02
## It: 806; obj: 3.219e+00; abs: 1.702e-12; rel: 5.287e-13; norm: 6.434e-02
## It: 807; obj: 3.219e+00; abs: 2.102e-12; rel: 6.531e-13; norm: 6.434e-02
## It: 808; obj: 3.219e+00; abs: 2.378e-12; rel: 7.387e-13; norm: 6.434e-02
## It: 809; obj: 3.219e+00; abs: 3.079e-12; rel: 9.565e-13; norm: 6.434e-02
## It: 810; obj: 3.219e+00; abs: 2.816e-12; rel: 8.747e-13; norm: 6.434e-02
## It: 811; obj: 3.219e+00; abs: 2.358e-12; rel: 7.325e-13; norm: 6.434e-02
## It: 812; obj: 3.219e+00; abs: 2.018e-12; rel: 6.271e-13; norm: 6.434e-02
## It: 813; obj: 3.219e+00; abs: 9.752e-13; rel: 3.030e-13; norm: 6.434e-02
## It: 814; obj: 3.219e+00; abs: 6.182e-13; rel: 1.921e-13; norm: 6.434e-02
## It: 815; obj: 3.219e+00; abs: 1.066e-13; rel: 3.311e-14; norm: 6.434e-02
## It: 816; obj: 3.219e+00; abs: 1.887e-13; rel: 5.864e-14; norm: 6.434e-02
## It: 817; obj: 3.219e+00; abs: 3.446e-13; rel: 1.071e-13; norm: 6.434e-02
## It: 818; obj: 3.219e+00; abs: 3.997e-13; rel: 1.242e-13; norm: 6.434e-02
## It: 819; obj: 3.219e+00; abs: 1.696e-13; rel: 5.270e-14; norm: 6.434e-02
## It: 820; obj: 3.219e+00; abs: 1.017e-12; rel: 3.158e-13; norm: 6.434e-02
## It: 821; obj: 3.219e+00; abs: 9.099e-13; rel: 2.827e-13; norm: 6.434e-02
## It: 822; obj: 3.219e+00; abs: 4.792e-13; rel: 1.489e-13; norm: 6.434e-02
## It: 823; obj: 3.219e+00; abs: 4.245e-13; rel: 1.319e-13; norm: 6.434e-02
## It: 824; obj: 3.219e+00; abs: 2.438e-13; rel: 7.574e-14; norm: 6.434e-02
## It: 825; obj: 3.219e+00; abs: 3.544e-13; rel: 1.101e-13; norm: 6.434e-02
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## It: 826; obj: 3.219e+00; abs: 2.855e-13; rel: 8.871e-14; norm: 6.434e-02
## It: 827; obj: 3.219e+00; abs: 2.709e-14; rel: 8.416e-15; norm: 6.434e-02
## It: 828; obj: 3.219e+00; abs: 1.554e-14; rel: 4.829e-15; norm: 6.434e-02
## It: 829; obj: 3.219e+00; abs: 3.522e-13; rel: 1.094e-13; norm: 6.434e-02
## It: 830; obj: 3.219e+00; abs: 1.061e-13; rel: 3.297e-14; norm: 6.434e-02
## It: 831; obj: 3.219e+00; abs: 2.434e-13; rel: 7.561e-14; norm: 6.434e-02
## It: 832; obj: 3.219e+00; abs: 2.522e-13; rel: 7.837e-14; norm: 6.434e-02
## It: 833; obj: 3.219e+00; abs: 3.344e-13; rel: 1.039e-13; norm: 6.434e-02
## It: 834; obj: 3.219e+00; abs: 5.689e-13; rel: 1.767e-13; norm: 6.434e-02
## It: 835; obj: 3.219e+00; abs: 3.779e-13; rel: 1.174e-13; norm: 6.434e-02
## It: 836; obj: 3.219e+00; abs: 1.497e-13; rel: 4.650e-14; norm: 6.434e-02
## It: 837; obj: 3.219e+00; abs: 2.833e-13; rel: 8.802e-14; norm: 6.434e-02
## It: 838; obj: 3.219e+00; abs: 3.286e-14; rel: 1.021e-14; norm: 6.434e-02
## It: 839; obj: 3.219e+00; abs: 1.039e-13; rel: 3.228e-14; norm: 6.434e-02
## It: 840; obj: 3.219e+00; abs: 1.199e-13; rel: 3.725e-14; norm: 6.434e-02
## It: 841; obj: 3.219e+00; abs: 2.580e-13; rel: 8.016e-14; norm: 6.434e-02
## It: 842; obj: 3.219e+00; abs: 3.140e-13; rel: 9.754e-14; norm: 6.434e-02
## It: 843; obj: 3.219e+00; abs: 1.017e-13; rel: 3.159e-14; norm: 6.434e-02
## It: 844; obj: 3.219e+00; abs: 2.536e-13; rel: 7.878e-14; norm: 6.434e-02
## It: 845; obj: 3.219e+00; abs: 4.134e-13; rel: 1.284e-13; norm: 6.434e-02
## It: 846; obj: 3.219e+00; abs: 1.483e-13; rel: 4.608e-14; norm: 6.434e-02
## It: 847; obj: 3.219e+00; abs: 1.532e-13; rel: 4.760e-14; norm: 6.434e-02
## It: 848; obj: 3.219e+00; abs: 1.075e-13; rel: 3.339e-14; norm: 6.434e-02
## It: 849; obj: 3.219e+00; abs: 7.194e-14; rel: 2.235e-14; norm: 6.434e-02
## It: 850; obj: 3.219e+00; abs: 1.212e-13; rel: 3.767e-14; norm: 6.434e-02
## It: 851; obj: 3.219e+00; abs: 2.331e-13; rel: 7.243e-14; norm: 6.434e-02
## It: 852; obj: 3.219e+00; abs: 2.087e-14; rel: 6.485e-15; norm: 6.434e-02
## It: 853; obj: 3.219e+00; abs: 3.366e-13; rel: 1.046e-13; norm: 6.434e-02
## It: 854; obj: 3.219e+00; abs: 6.661e-15; rel: 2.070e-15; norm: 6.434e-02
## It: 855; obj: 3.219e+00; abs: 2.807e-13; rel: 8.720e-14; norm: 6.434e-02
## It: 856; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 857; obj: 3.219e+00; abs: 1.199e-13; rel: 3.725e-14; norm: 6.434e-02
## It: 858; obj: 3.219e+00; abs: 1.714e-13; rel: 5.326e-14; norm: 6.434e-02
## It: 859; obj: 3.219e+00; abs: 1.319e-13; rel: 4.098e-14; norm: 6.434e-02
## It: 860; obj: 3.219e+00; abs: 2.629e-13; rel: 8.168e-14; norm: 6.434e-02
## It: 861; obj: 3.219e+00; abs: 2.167e-13; rel: 6.733e-14; norm: 6.434e-02
## It: 862; obj: 3.219e+00; abs: 2.354e-14; rel: 7.312e-15; norm: 6.434e-02
## It: 863; obj: 3.219e+00; abs: 1.683e-13; rel: 5.229e-14; norm: 6.434e-02
## It: 864; obj: 3.219e+00; abs: 8.482e-14; rel: 2.635e-14; norm: 6.434e-02
## It: 865; obj: 3.219e+00; abs: 1.288e-13; rel: 4.001e-14; norm: 6.434e-02
## It: 866; obj: 3.219e+00; abs: 5.063e-14; rel: 1.573e-14; norm: 6.434e-02
## It: 867; obj: 3.219e+00; abs: 8.260e-14; rel: 2.566e-14; norm: 6.434e-02
## It: 868; obj: 3.219e+00; abs: 2.576e-13; rel: 8.002e-14; norm: 6.434e-02
## It: 869; obj: 3.219e+00; abs: 1.732e-14; rel: 5.381e-15; norm: 6.434e-02
## It: 870; obj: 3.219e+00; abs: 8.171e-14; rel: 2.539e-14; norm: 6.434e-02
## It: 871; obj: 3.219e+00; abs: 3.597e-14; rel: 1.118e-14; norm: 6.434e-02
## It: 872; obj: 3.219e+00; abs: 7.105e-14; rel: 2.208e-14; norm: 6.434e-02
## It: 873; obj: 3.219e+00; abs: 2.158e-13; rel: 6.705e-14; norm: 6.434e-02
## It: 874; obj: 3.219e+00; abs: 2.021e-13; rel: 6.278e-14; norm: 6.434e-02
## It: 875; obj: 3.219e+00; abs: 3.144e-13; rel: 9.768e-14; norm: 6.434e-02
## It: 876; obj: 3.219e+00; abs: 2.811e-13; rel: 8.733e-14; norm: 6.434e-02
## It: 877; obj: 3.219e+00; abs: 1.199e-13; rel: 3.725e-14; norm: 6.434e-02
## It: 878; obj: 3.219e+00; abs: 4.441e-16; rel: 1.380e-16; norm: 6.434e-02
## It: 879; obj: 3.219e+00; abs: 1.159e-13; rel: 3.601e-14; norm: 6.434e-02
```
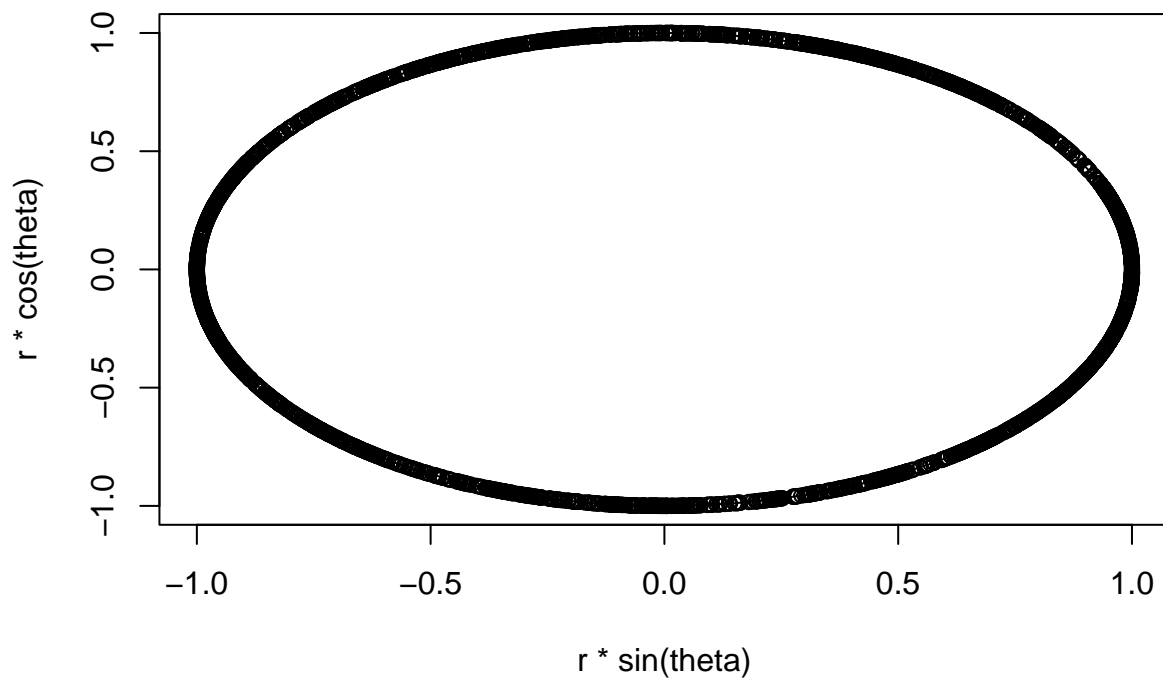
```
## It: 880; obj: 3.219e+00; abs: 9.726e-14; rel: 3.022e-14; norm: 6.434e-02
## It: 881; obj: 3.219e+00; abs: 1.408e-13; rel: 4.374e-14; norm: 6.434e-02
## It: 882; obj: 3.219e+00; abs: 1.608e-13; rel: 4.994e-14; norm: 6.434e-02
## It: 883; obj: 3.219e+00; abs: 6.484e-14; rel: 2.014e-14; norm: 6.434e-02
## It: 884; obj: 3.219e+00; abs: 2.349e-13; rel: 7.299e-14; norm: 6.434e-02
## It: 885; obj: 3.219e+00; abs: 2.793e-13; rel: 8.678e-14; norm: 6.434e-02
## It: 886; obj: 3.219e+00; abs: 1.963e-13; rel: 6.098e-14; norm: 6.434e-02
## It: 887; obj: 3.219e+00; abs: 1.790e-13; rel: 5.560e-14; norm: 6.434e-02
## It: 888; obj: 3.219e+00; abs: 2.216e-13; rel: 6.885e-14; norm: 6.434e-02
## It: 889; obj: 3.219e+00; abs: 2.163e-13; rel: 6.719e-14; norm: 6.434e-02
## It: 890; obj: 3.219e+00; abs: 1.377e-14; rel: 4.277e-15; norm: 6.434e-02
## It: 891; obj: 3.219e+00; abs: 1.084e-13; rel: 3.366e-14; norm: 6.434e-02
## It: 892; obj: 3.219e+00; abs: 1.554e-13; rel: 4.829e-14; norm: 6.434e-02
## It: 893; obj: 3.219e+00; abs: 2.740e-13; rel: 8.513e-14; norm: 6.434e-02
## It: 894; obj: 3.219e+00; abs: 4.530e-14; rel: 1.407e-14; norm: 6.434e-02
## It: 895; obj: 3.219e+00; abs: 2.354e-13; rel: 7.312e-14; norm: 6.434e-02
## It: 896; obj: 3.219e+00; abs: 1.226e-13; rel: 3.808e-14; norm: 6.434e-02
## It: 897; obj: 3.219e+00; abs: 3.997e-15; rel: 1.242e-15; norm: 6.434e-02
## It: 898; obj: 3.219e+00; abs: 7.061e-14; rel: 2.194e-14; norm: 6.434e-02
## It: 899; obj: 3.219e+00; abs: 2.127e-13; rel: 6.609e-14; norm: 6.434e-02
## It: 900; obj: 3.219e+00; abs: 1.079e-13; rel: 3.353e-14; norm: 6.434e-02
## It: 901; obj: 3.219e+00; abs: 1.612e-13; rel: 5.008e-14; norm: 6.434e-02
## It: 902; obj: 3.219e+00; abs: 2.620e-14; rel: 8.140e-15; norm: 6.434e-02
## It: 903; obj: 3.219e+00; abs: 4.685e-13; rel: 1.456e-13; norm: 6.434e-02
## It: 904; obj: 3.219e+00; abs: 3.149e-13; rel: 9.782e-14; norm: 6.434e-02
## It: 905; obj: 3.219e+00; abs: 5.240e-14; rel: 1.628e-14; norm: 6.434e-02
## It: 906; obj: 3.219e+00; abs: 1.665e-13; rel: 5.174e-14; norm: 6.434e-02
## It: 907; obj: 3.219e+00; abs: 3.508e-14; rel: 1.090e-14; norm: 6.434e-02
## It: 908; obj: 3.219e+00; abs: 1.150e-13; rel: 3.573e-14; norm: 6.434e-02
## It: 909; obj: 3.219e+00; abs: 2.629e-13; rel: 8.168e-14; norm: 6.434e-02
## It: 910; obj: 3.219e+00; abs: 4.130e-14; rel: 1.283e-14; norm: 6.434e-02
## It: 911; obj: 3.219e+00; abs: 1.230e-13; rel: 3.822e-14; norm: 6.434e-02
## It: 912; obj: 3.219e+00; abs: 1.110e-13; rel: 3.449e-14; norm: 6.434e-02
## It: 913; obj: 3.219e+00; abs: 3.064e-14; rel: 9.520e-15; norm: 6.434e-02
## It: 914; obj: 3.219e+00; abs: 2.007e-13; rel: 6.236e-14; norm: 6.434e-02
## It: 915; obj: 3.219e+00; abs: 9.504e-14; rel: 2.953e-14; norm: 6.434e-02
## It: 916; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 917; obj: 3.219e+00; abs: 6.350e-14; rel: 1.973e-14; norm: 6.434e-02
## It: 918; obj: 3.219e+00; abs: 2.136e-13; rel: 6.636e-14; norm: 6.434e-02
## It: 919; obj: 3.219e+00; abs: 2.127e-13; rel: 6.609e-14; norm: 6.434e-02
## It: 920; obj: 3.219e+00; abs: 5.107e-14; rel: 1.587e-14; norm: 6.434e-02
## It: 921; obj: 3.219e+00; abs: 5.951e-14; rel: 1.849e-14; norm: 6.434e-02
## It: 922; obj: 3.219e+00; abs: 2.087e-14; rel: 6.485e-15; norm: 6.434e-02
## It: 923; obj: 3.219e+00; abs: 7.994e-14; rel: 2.483e-14; norm: 6.434e-02
## It: 924; obj: 3.219e+00; abs: 8.793e-14; rel: 2.732e-14; norm: 6.434e-02
## It: 925; obj: 3.219e+00; abs: 1.332e-15; rel: 4.139e-16; norm: 6.434e-02
## It: 926; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 927; obj: 3.219e+00; abs: 1.825e-13; rel: 5.671e-14; norm: 6.434e-02
## It: 928; obj: 3.219e+00; abs: 1.115e-13; rel: 3.463e-14; norm: 6.434e-02
## It: 929; obj: 3.219e+00; abs: 2.029e-13; rel: 6.305e-14; norm: 6.434e-02
## It: 930; obj: 3.219e+00; abs: 2.123e-13; rel: 6.595e-14; norm: 6.434e-02
## It: 931; obj: 3.219e+00; abs: 2.265e-14; rel: 7.036e-15; norm: 6.434e-02
## It: 932; obj: 3.219e+00; abs: 1.070e-13; rel: 3.325e-14; norm: 6.434e-02
## It: 933; obj: 3.219e+00; abs: 1.954e-14; rel: 6.071e-15; norm: 6.434e-02
```

```
## It: 934; obj: 3.219e+00; abs: 1.075e-13; rel: 3.339e-14; norm: 6.434e-02
## It: 935; obj: 3.219e+00; abs: 1.026e-13; rel: 3.187e-14; norm: 6.434e-02
## It: 936; obj: 3.219e+00; abs: 2.709e-14; rel: 8.416e-15; norm: 6.434e-02
## It: 937; obj: 3.219e+00; abs: 1.017e-13; rel: 3.159e-14; norm: 6.434e-02
## It: 938; obj: 3.219e+00; abs: 1.434e-13; rel: 4.456e-14; norm: 6.434e-02
## It: 939; obj: 3.219e+00; abs: 1.186e-13; rel: 3.684e-14; norm: 6.434e-02
## It: 940; obj: 3.219e+00; abs: 9.326e-14; rel: 2.897e-14; norm: 6.434e-02
## It: 941; obj: 3.219e+00; abs: 4.530e-14; rel: 1.407e-14; norm: 6.434e-02
## It: 942; obj: 3.219e+00; abs: 8.971e-14; rel: 2.787e-14; norm: 6.434e-02
## It: 943; obj: 3.219e+00; abs: 1.439e-13; rel: 4.470e-14; norm: 6.434e-02
## It: 944; obj: 3.219e+00; abs: 1.865e-14; rel: 5.795e-15; norm: 6.434e-02
## It: 945; obj: 3.219e+00; abs: 1.776e-15; rel: 5.519e-16; norm: 6.434e-02
## It: 946; obj: 3.219e+00; abs: 2.753e-14; rel: 8.554e-15; norm: 6.434e-02
## It: 947; obj: 3.219e+00; abs: 5.107e-14; rel: 1.587e-14; norm: 6.434e-02
## It: 948; obj: 3.219e+00; abs: 3.908e-14; rel: 1.214e-14; norm: 6.434e-02
## It: 949; obj: 3.219e+00; abs: 4.707e-14; rel: 1.462e-14; norm: 6.434e-02
## It: 950; obj: 3.219e+00; abs: 6.661e-15; rel: 2.070e-15; norm: 6.434e-02
## It: 951; obj: 3.219e+00; abs: 5.551e-14; rel: 1.725e-14; norm: 6.434e-02
## It: 952; obj: 3.219e+00; abs: 6.617e-14; rel: 2.056e-14; norm: 6.434e-02
## It: 953; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 954; obj: 3.219e+00; abs: 1.137e-13; rel: 3.532e-14; norm: 6.434e-02
## It: 955; obj: 3.219e+00; abs: 6.217e-15; rel: 1.932e-15; norm: 6.434e-02
## It: 956; obj: 3.219e+00; abs: 3.109e-15; rel: 9.658e-16; norm: 6.434e-02
## It: 957; obj: 3.219e+00; abs: 1.901e-13; rel: 5.905e-14; norm: 6.434e-02
## It: 958; obj: 3.219e+00; abs: 8.482e-14; rel: 2.635e-14; norm: 6.434e-02
## It: 959; obj: 3.219e+00; abs: 1.115e-13; rel: 3.463e-14; norm: 6.434e-02
## It: 960; obj: 3.219e+00; abs: 4.530e-14; rel: 1.407e-14; norm: 6.434e-02
## It: 961; obj: 3.219e+00; abs: 1.070e-13; rel: 3.325e-14; norm: 6.434e-02
## It: 962; obj: 3.219e+00; abs: 9.592e-14; rel: 2.980e-14; norm: 6.434e-02
## It: 963; obj: 3.219e+00; abs: 4.041e-14; rel: 1.256e-14; norm: 6.434e-02
## It: 964; obj: 3.219e+00; abs: 3.419e-14; rel: 1.062e-14; norm: 6.434e-02
## It: 965; obj: 3.219e+00; abs: 1.141e-13; rel: 3.546e-14; norm: 6.434e-02
## It: 966; obj: 3.219e+00; abs: 3.109e-14; rel: 9.658e-15; norm: 6.434e-02
## It: 967; obj: 3.219e+00; abs: 1.661e-13; rel: 5.160e-14; norm: 6.434e-02
## It: 968; obj: 3.219e+00; abs: 4.752e-14; rel: 1.476e-14; norm: 6.434e-02
## It: 969; obj: 3.219e+00; abs: 1.390e-13; rel: 4.318e-14; norm: 6.434e-02
## It: 970; obj: 3.219e+00; abs: 2.713e-13; rel: 8.430e-14; norm: 6.434e-02
## It: 971; obj: 3.219e+00; abs: 4.485e-14; rel: 1.393e-14; norm: 6.434e-02
## It: 972; obj: 3.219e+00; abs: 5.196e-14; rel: 1.614e-14; norm: 6.434e-02
## It: 973; obj: 3.219e+00; abs: 1.195e-13; rel: 3.711e-14; norm: 6.434e-02
## It: 974; obj: 3.219e+00; abs: 5.373e-14; rel: 1.669e-14; norm: 6.434e-02
## It: 975; obj: 3.219e+00; abs: 7.239e-14; rel: 2.249e-14; norm: 6.434e-02
## It: 976; obj: 3.219e+00; abs: 1.266e-13; rel: 3.932e-14; norm: 6.434e-02
## It: 977; obj: 3.219e+00; abs: 3.952e-14; rel: 1.228e-14; norm: 6.434e-02
## It: 978; obj: 3.219e+00; abs: 3.286e-14; rel: 1.021e-14; norm: 6.434e-02
## It: 979; obj: 3.219e+00; abs: 8.304e-14; rel: 2.580e-14; norm: 6.434e-02
## It: 980; obj: 3.219e+00; abs: 9.415e-14; rel: 2.925e-14; norm: 6.434e-02
## It: 981; obj: 3.219e+00; abs: 5.018e-14; rel: 1.559e-14; norm: 6.434e-02
## It: 982; obj: 3.219e+00; abs: 1.021e-14; rel: 3.173e-15; norm: 6.434e-02
## It: 983; obj: 3.219e+00; abs: 4.885e-15; rel: 1.518e-15; norm: 6.434e-02
## It: 984; obj: 3.219e+00; abs: 4.974e-14; rel: 1.545e-14; norm: 6.434e-02
## It: 985; obj: 3.219e+00; abs: 7.594e-14; rel: 2.359e-14; norm: 6.434e-02
## It: 986; obj: 3.219e+00; abs: 1.554e-14; rel: 4.829e-15; norm: 6.434e-02
## It: 987; obj: 3.219e+00; abs: 4.796e-14; rel: 1.490e-14; norm: 6.434e-02
```

```
## It: 988; obj: 3.219e+00; abs: 3.508e-14; rel: 1.090e-14; norm: 6.434e-02
## It: 989; obj: 3.219e+00; abs: 2.531e-14; rel: 7.864e-15; norm: 6.434e-02
## It: 990; obj: 3.219e+00; abs: 9.459e-14; rel: 2.939e-14; norm: 6.434e-02
## It: 991; obj: 3.219e+00; abs: 1.319e-13; rel: 4.098e-14; norm: 6.434e-02
## It: 992; obj: 3.219e+00; abs: 3.730e-14; rel: 1.159e-14; norm: 6.434e-02
## It: 993; obj: 3.219e+00; abs: 1.465e-14; rel: 4.553e-15; norm: 6.434e-02
## It: 994; obj: 3.219e+00; abs: 9.459e-14; rel: 2.939e-14; norm: 6.434e-02
## It: 995; obj: 3.219e+00; abs: 1.159e-13; rel: 3.601e-14; norm: 6.434e-02
## It: 996; obj: 3.219e+00; abs: 6.173e-14; rel: 1.918e-14; norm: 6.434e-02
## It: 997; obj: 3.219e+00; abs: 1.159e-13; rel: 3.601e-14; norm: 6.434e-02
## It: 998; obj: 3.219e+00; abs: 7.550e-15; rel: 2.345e-15; norm: 6.434e-02
## It: 999; obj: 3.219e+00; abs: 6.439e-14; rel: 2.001e-14; norm: 6.434e-02
## It: 1000; obj: 3.219e+00; abs: 2.842e-14; rel: 8.830e-15; norm: 6.434e-02
```

Iteration 1000


```
Y_rad <- DirStats::to_rad(Y)
r <- 1
theta <<- Y_rad
plot(r*sin(theta),
     r*cos(theta),
     xlim=c(-max(r),max(r)),
     ylim=c(-max(r),max(r)))

polygon(max(r)*sin(seq(0,2*pi,length.out=100)),max(r)*cos(seq(0,2*pi,length.out=100)))
```

Let's now reduced the dimension onto the sphere, $d = 2$, of radius 1, with an optimized rho based on a perplexity of 30 and initialize the resultant reduced dimension data with random uniformed points:

```r
Y <- psc_sne(X=jdf_pscsne, d=2,
             rho_psc_list = rho_30,
             num_iteration=1000, init = "random")
```

```
## It: 1; obj: 2.449e+01; abs: 0.000e+00; rel: 0.000e+00; norm: 6.476e-02
## It: 2; obj: 2.296e+01; abs: 1.530e+00; rel: 6.249e-02; norm: 1.022e-01
## It: 3; obj: 2.149e+01; abs: 1.468e+00; rel: 6.393e-02; norm: 1.702e-01
## It: 4; obj: 2.027e+01; abs: 1.213e+00; rel: 5.646e-02; norm: 2.453e-01
## It: 5; obj: 1.936e+01; abs: 9.133e-01; rel: 4.504e-02; norm: 3.130e-01
## It: 6; obj: 1.870e+01; abs: 6.574e-01; rel: 3.395e-02; norm: 3.677e-01
## It: 7; obj: 1.820e+01; abs: 4.996e-01; rel: 2.671e-02; norm: 4.086e-01
## It: 8; obj: 1.779e+01; abs: 4.110e-01; rel: 2.258e-02; norm: 4.397e-01
## It: 9; obj: 1.745e+01; abs: 3.477e-01; rel: 1.954e-02; norm: 4.649e-01
## It: 10; obj: 1.716e+01; abs: 2.842e-01; rel: 1.629e-02; norm: 4.853e-01
## It: 11; obj: 1.693e+01; abs: 2.286e-01; rel: 1.332e-02; norm: 5.016e-01
## It: 12; obj: 1.675e+01; abs: 1.820e-01; rel: 1.075e-02; norm: 5.144e-01
## It: 13; obj: 1.661e+01; abs: 1.408e-01; rel: 8.406e-03; norm: 5.251e-01
## It: 14; obj: 1.650e+01; abs: 1.127e-01; rel: 6.785e-03; norm: 5.346e-01
```

```
## It: 15; obj: 1.641e+01; abs: 9.228e-02; rel: 5.594e-03; norm: 5.437e-01
## It: 16; obj: 1.633e+01; abs: 7.365e-02; rel: 4.490e-03; norm: 5.528e-01
## It: 17; obj: 1.628e+01; abs: 5.663e-02; rel: 3.468e-03; norm: 5.617e-01
## It: 18; obj: 1.623e+01; abs: 4.396e-02; rel: 2.701e-03; norm: 5.704e-01
## It: 19; obj: 1.619e+01; abs: 3.612e-02; rel: 2.225e-03; norm: 5.786e-01
## It: 20; obj: 1.616e+01; abs: 3.147e-02; rel: 1.943e-03; norm: 5.865e-01
## It: 21; obj: 1.613e+01; abs: 3.012e-02; rel: 1.863e-03; norm: 5.942e-01
## It: 22; obj: 1.610e+01; abs: 3.040e-02; rel: 1.884e-03; norm: 6.018e-01
## It: 23; obj: 1.607e+01; abs: 3.056e-02; rel: 1.898e-03; norm: 6.094e-01
## It: 24; obj: 1.604e+01; abs: 3.024e-02; rel: 1.882e-03; norm: 6.168e-01
## It: 25; obj: 1.601e+01; abs: 2.924e-02; rel: 1.823e-03; norm: 6.241e-01
## It: 26; obj: 1.598e+01; abs: 2.869e-02; rel: 1.792e-03; norm: 6.311e-01
## It: 27; obj: 1.596e+01; abs: 2.825e-02; rel: 1.768e-03; norm: 6.380e-01
## It: 28; obj: 1.593e+01; abs: 2.792e-02; rel: 1.750e-03; norm: 6.448e-01
## It: 29; obj: 1.590e+01; abs: 2.773e-02; rel: 1.741e-03; norm: 6.515e-01
## It: 30; obj: 1.587e+01; abs: 2.684e-02; rel: 1.688e-03; norm: 6.583e-01
## It: 31; obj: 1.585e+01; abs: 2.478e-02; rel: 1.561e-03; norm: 6.651e-01
## It: 32; obj: 1.583e+01; abs: 2.177e-02; rel: 1.373e-03; norm: 6.718e-01
## It: 33; obj: 1.581e+01; abs: 1.831e-02; rel: 1.157e-03; norm: 6.785e-01
## It: 34; obj: 1.579e+01; abs: 1.497e-02; rel: 9.468e-04; norm: 6.850e-01
## It: 35; obj: 1.578e+01; abs: 1.203e-02; rel: 7.619e-04; norm: 6.912e-01
## It: 36; obj: 1.577e+01; abs: 9.559e-03; rel: 6.057e-04; norm: 6.971e-01
## It: 37; obj: 1.576e+01; abs: 7.528e-03; rel: 4.773e-04; norm: 7.026e-01
## It: 38; obj: 1.576e+01; abs: 5.878e-03; rel: 3.729e-04; norm: 7.078e-01
## It: 39; obj: 1.575e+01; abs: 4.535e-03; rel: 2.878e-04; norm: 7.125e-01
## It: 40; obj: 1.575e+01; abs: 3.474e-03; rel: 2.205e-04; norm: 7.169e-01
## It: 41; obj: 1.575e+01; abs: 2.721e-03; rel: 1.727e-04; norm: 7.209e-01
## It: 42; obj: 1.575e+01; abs: 2.263e-03; rel: 1.437e-04; norm: 7.245e-01
## It: 43; obj: 1.574e+01; abs: 2.019e-03; rel: 1.282e-04; norm: 7.277e-01
## It: 44; obj: 1.574e+01; abs: 1.883e-03; rel: 1.196e-04; norm: 7.307e-01
## It: 45; obj: 1.574e+01; abs: 1.761e-03; rel: 1.119e-04; norm: 7.333e-01
## It: 46; obj: 1.574e+01; abs: 1.615e-03; rel: 1.026e-04; norm: 7.357e-01
## It: 47; obj: 1.574e+01; abs: 1.478e-03; rel: 9.393e-05; norm: 7.379e-01
## It: 48; obj: 1.574e+01; abs: 1.382e-03; rel: 8.779e-05; norm: 7.399e-01
## It: 49; obj: 1.573e+01; abs: 1.325e-03; rel: 8.418e-05; norm: 7.417e-01
## It: 50; obj: 1.573e+01; abs: 1.296e-03; rel: 8.238e-05; norm: 7.433e-01
## It: 51; obj: 1.573e+01; abs: 1.287e-03; rel: 8.181e-05; norm: 7.448e-01
## It: 52; obj: 1.573e+01; abs: 1.292e-03; rel: 8.210e-05; norm: 7.461e-01
## It: 53; obj: 1.573e+01; abs: 1.308e-03; rel: 8.316e-05; norm: 7.474e-01
## It: 54; obj: 1.573e+01; abs: 1.339e-03; rel: 8.516e-05; norm: 7.485e-01
## It: 55; obj: 1.573e+01; abs: 1.393e-03; rel: 8.857e-05; norm: 7.496e-01
## It: 56; obj: 1.572e+01; abs: 1.485e-03; rel: 9.440e-05; norm: 7.506e-01
## It: 57; obj: 1.572e+01; abs: 1.638e-03; rel: 1.042e-04; norm: 7.515e-01
## It: 58; obj: 1.572e+01; abs: 1.867e-03; rel: 1.188e-04; norm: 7.523e-01
## It: 59; obj: 1.572e+01; abs: 2.151e-03; rel: 1.368e-04; norm: 7.530e-01
## It: 60; obj: 1.572e+01; abs: 2.419e-03; rel: 1.539e-04; norm: 7.538e-01
## It: 61; obj: 1.571e+01; abs: 2.550e-03; rel: 1.622e-04; norm: 7.544e-01
## It: 62; obj: 1.571e+01; abs: 2.568e-03; rel: 1.634e-04; norm: 7.550e-01
## It: 63; obj: 1.571e+01; abs: 2.595e-03; rel: 1.651e-04; norm: 7.556e-01
## It: 64; obj: 1.571e+01; abs: 2.660e-03; rel: 1.693e-04; norm: 7.561e-01
## It: 65; obj: 1.570e+01; abs: 2.752e-03; rel: 1.752e-04; norm: 7.565e-01
## It: 66; obj: 1.570e+01; abs: 2.862e-03; rel: 1.822e-04; norm: 7.569e-01
## It: 67; obj: 1.570e+01; abs: 2.986e-03; rel: 1.902e-04; norm: 7.572e-01
## It: 68; obj: 1.569e+01; abs: 3.122e-03; rel: 1.989e-04; norm: 7.575e-01
```

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## It: 69; obj: 1.569e+01; abs: 3.267e-03; rel: 2.082e-04; norm: 7.578e-01
## It: 70; obj: 1.569e+01; abs: 3.419e-03; rel: 2.179e-04; norm: 7.581e-01
## It: 71; obj: 1.568e+01; abs: 3.574e-03; rel: 2.278e-04; norm: 7.583e-01
## It: 72; obj: 1.568e+01; abs: 3.730e-03; rel: 2.378e-04; norm: 7.584e-01
## It: 73; obj: 1.568e+01; abs: 3.884e-03; rel: 2.477e-04; norm: 7.586e-01
## It: 74; obj: 1.567e+01; abs: 4.039e-03; rel: 2.576e-04; norm: 7.587e-01
## It: 75; obj: 1.567e+01; abs: 4.193e-03; rel: 2.676e-04; norm: 7.588e-01
## It: 76; obj: 1.566e+01; abs: 4.351e-03; rel: 2.777e-04; norm: 7.588e-01
## It: 77; obj: 1.566e+01; abs: 4.512e-03; rel: 2.881e-04; norm: 7.589e-01
## It: 78; obj: 1.566e+01; abs: 4.680e-03; rel: 2.989e-04; norm: 7.589e-01
## It: 79; obj: 1.565e+01; abs: 4.856e-03; rel: 3.102e-04; norm: 7.589e-01
## It: 80; obj: 1.565e+01; abs: 5.042e-03; rel: 3.222e-04; norm: 7.589e-01
## It: 81; obj: 1.564e+01; abs: 5.237e-03; rel: 3.347e-04; norm: 7.588e-01
## It: 82; obj: 1.563e+01; abs: 5.438e-03; rel: 3.477e-04; norm: 7.587e-01
## It: 83; obj: 1.563e+01; abs: 5.642e-03; rel: 3.609e-04; norm: 7.586e-01
## It: 84; obj: 1.562e+01; abs: 5.845e-03; rel: 3.740e-04; norm: 7.585e-01
## It: 85; obj: 1.562e+01; abs: 6.041e-03; rel: 3.867e-04; norm: 7.584e-01
## It: 86; obj: 1.561e+01; abs: 6.230e-03; rel: 3.989e-04; norm: 7.583e-01
## It: 87; obj: 1.560e+01; abs: 6.409e-03; rel: 4.105e-04; norm: 7.581e-01
## It: 88; obj: 1.560e+01; abs: 6.580e-03; rel: 4.217e-04; norm: 7.579e-01
## It: 89; obj: 1.559e+01; abs: 6.746e-03; rel: 4.325e-04; norm: 7.577e-01
## It: 90; obj: 1.558e+01; abs: 6.910e-03; rel: 4.432e-04; norm: 7.575e-01
## It: 91; obj: 1.558e+01; abs: 7.078e-03; rel: 4.542e-04; norm: 7.573e-01
## It: 92; obj: 1.557e+01; abs: 7.255e-03; rel: 4.658e-04; norm: 7.571e-01
## It: 93; obj: 1.556e+01; abs: 7.449e-03; rel: 4.784e-04; norm: 7.569e-01
## It: 94; obj: 1.555e+01; abs: 7.661e-03; rel: 4.923e-04; norm: 7.566e-01
## It: 95; obj: 1.555e+01; abs: 7.890e-03; rel: 5.073e-04; norm: 7.564e-01
## It: 96; obj: 1.554e+01; abs: 8.128e-03; rel: 5.228e-04; norm: 7.561e-01
## It: 97; obj: 1.553e+01; abs: 8.358e-03; rel: 5.379e-04; norm: 7.559e-01
## It: 98; obj: 1.552e+01; abs: 8.557e-03; rel: 5.510e-04; norm: 7.557e-01
## It: 99; obj: 1.551e+01; abs: 8.695e-03; rel: 5.602e-04; norm: 7.554e-01
## It: 100; obj: 1.550e+01; abs: 8.737e-03; rel: 5.632e-04; norm: 7.551e-01
## It: 101; obj: 2.441e+00; abs: 1.306e+01; rel: 8.425e-01; norm: 9.323e-02
## It: 102; obj: 2.400e+00; abs: 4.150e-02; rel: 1.700e-02; norm: 9.271e-02
## It: 103; obj: 2.375e+00; abs: 2.475e-02; rel: 1.031e-02; norm: 9.287e-02
## It: 104; obj: 2.362e+00; abs: 1.342e-02; rel: 5.649e-03; norm: 9.335e-02
## It: 105; obj: 2.354e+00; abs: 7.197e-03; rel: 3.048e-03; norm: 9.369e-02
## It: 106; obj: 2.350e+00; abs: 3.942e-03; rel: 1.674e-03; norm: 9.381e-02
## It: 107; obj: 2.348e+00; abs: 2.294e-03; rel: 9.761e-04; norm: 9.378e-02
## It: 108; obj: 2.347e+00; abs: 1.472e-03; rel: 6.270e-04; norm: 9.369e-02
## It: 109; obj: 2.346e+00; abs: 1.043e-03; rel: 4.446e-04; norm: 9.360e-02
## It: 110; obj: 2.345e+00; abs: 7.989e-04; rel: 3.406e-04; norm: 9.353e-02
## It: 111; obj: 2.344e+00; abs: 6.457e-04; rel: 2.754e-04; norm: 9.347e-02
## It: 112; obj: 2.344e+00; abs: 5.434e-04; rel: 2.318e-04; norm: 9.343e-02
## It: 113; obj: 2.343e+00; abs: 4.734e-04; rel: 2.020e-04; norm: 9.340e-02
## It: 114; obj: 2.343e+00; abs: 4.247e-04; rel: 1.813e-04; norm: 9.337e-02
## It: 115; obj: 2.342e+00; abs: 3.897e-04; rel: 1.664e-04; norm: 9.334e-02
## It: 116; obj: 2.342e+00; abs: 3.634e-04; rel: 1.552e-04; norm: 9.332e-02
## It: 117; obj: 2.342e+00; abs: 3.430e-04; rel: 1.465e-04; norm: 9.331e-02
## It: 118; obj: 2.341e+00; abs: 3.269e-04; rel: 1.396e-04; norm: 9.330e-02
## It: 119; obj: 2.341e+00; abs: 3.136e-04; rel: 1.340e-04; norm: 9.329e-02
## It: 120; obj: 2.341e+00; abs: 3.022e-04; rel: 1.291e-04; norm: 9.328e-02
## It: 121; obj: 2.340e+00; abs: 2.913e-04; rel: 1.244e-04; norm: 9.328e-02
## It: 122; obj: 2.340e+00; abs: 2.799e-04; rel: 1.196e-04; norm: 9.327e-02
```

```
## It: 123; obj: 2.340e+00; abs: 2.674e-04; rel: 1.142e-04; norm: 9.327e-02
## It: 124; obj: 2.340e+00; abs: 2.535e-04; rel: 1.083e-04; norm: 9.327e-02
## It: 125; obj: 2.339e+00; abs: 2.389e-04; rel: 1.021e-04; norm: 9.327e-02
## It: 126; obj: 2.339e+00; abs: 2.244e-04; rel: 9.595e-05; norm: 9.327e-02
## It: 127; obj: 2.339e+00; abs: 2.111e-04; rel: 9.024e-05; norm: 9.327e-02
## It: 128; obj: 2.339e+00; abs: 1.994e-04; rel: 8.524e-05; norm: 9.327e-02
## It: 129; obj: 2.339e+00; abs: 1.894e-04; rel: 8.100e-05; norm: 9.327e-02
## It: 130; obj: 2.338e+00; abs: 1.811e-04; rel: 7.744e-05; norm: 9.327e-02
## It: 131; obj: 2.338e+00; abs: 1.741e-04; rel: 7.443e-05; norm: 9.327e-02
## It: 132; obj: 2.338e+00; abs: 1.681e-04; rel: 7.188e-05; norm: 9.326e-02
## It: 133; obj: 2.338e+00; abs: 1.629e-04; rel: 6.968e-05; norm: 9.326e-02
## It: 134; obj: 2.338e+00; abs: 1.584e-04; rel: 6.776e-05; norm: 9.326e-02
## It: 135; obj: 2.338e+00; abs: 1.545e-04; rel: 6.607e-05; norm: 9.326e-02
## It: 136; obj: 2.337e+00; abs: 1.509e-04; rel: 6.456e-05; norm: 9.325e-02
## It: 137; obj: 2.337e+00; abs: 1.477e-04; rel: 6.319e-05; norm: 9.325e-02
## It: 138; obj: 2.337e+00; abs: 1.448e-04; rel: 6.195e-05; norm: 9.324e-02
## It: 139; obj: 2.337e+00; abs: 1.421e-04; rel: 6.079e-05; norm: 9.324e-02
## It: 140; obj: 2.337e+00; abs: 1.396e-04; rel: 5.972e-05; norm: 9.323e-02
## It: 141; obj: 2.337e+00; abs: 1.372e-04; rel: 5.872e-05; norm: 9.323e-02
## It: 142; obj: 2.337e+00; abs: 1.350e-04; rel: 5.777e-05; norm: 9.322e-02
## It: 143; obj: 2.336e+00; abs: 1.329e-04; rel: 5.687e-05; norm: 9.322e-02
## It: 144; obj: 2.336e+00; abs: 1.309e-04; rel: 5.601e-05; norm: 9.321e-02
## It: 145; obj: 2.336e+00; abs: 1.289e-04; rel: 5.519e-05; norm: 9.321e-02
## It: 146; obj: 2.336e+00; abs: 1.271e-04; rel: 5.440e-05; norm: 9.320e-02
## It: 147; obj: 2.336e+00; abs: 1.253e-04; rel: 5.364e-05; norm: 9.319e-02
## It: 148; obj: 2.336e+00; abs: 1.236e-04; rel: 5.290e-05; norm: 9.319e-02
## It: 149; obj: 2.336e+00; abs: 1.219e-04; rel: 5.217e-05; norm: 9.318e-02
## It: 150; obj: 2.335e+00; abs: 1.202e-04; rel: 5.146e-05; norm: 9.317e-02
## It: 151; obj: 2.335e+00; abs: 1.185e-04; rel: 5.075e-05; norm: 9.317e-02
## It: 152; obj: 2.335e+00; abs: 1.169e-04; rel: 5.005e-05; norm: 9.316e-02
## It: 153; obj: 2.335e+00; abs: 1.153e-04; rel: 4.935e-05; norm: 9.315e-02
## It: 154; obj: 2.335e+00; abs: 1.136e-04; rel: 4.865e-05; norm: 9.315e-02
## It: 155; obj: 2.335e+00; abs: 1.120e-04; rel: 4.795e-05; norm: 9.314e-02
## It: 156; obj: 2.335e+00; abs: 1.103e-04; rel: 4.724e-05; norm: 9.313e-02
## It: 157; obj: 2.335e+00; abs: 1.086e-04; rel: 4.653e-05; norm: 9.313e-02
## It: 158; obj: 2.335e+00; abs: 1.069e-04; rel: 4.581e-05; norm: 9.312e-02
## It: 159; obj: 2.334e+00; abs: 1.052e-04; rel: 4.508e-05; norm: 9.311e-02
## It: 160; obj: 2.334e+00; abs: 1.035e-04; rel: 4.434e-05; norm: 9.311e-02
## It: 161; obj: 2.334e+00; abs: 1.018e-04; rel: 4.359e-05; norm: 9.310e-02
## It: 162; obj: 2.334e+00; abs: 1.000e-04; rel: 4.284e-05; norm: 9.310e-02
## It: 163; obj: 2.334e+00; abs: 9.823e-05; rel: 4.208e-05; norm: 9.309e-02
## It: 164; obj: 2.334e+00; abs: 9.645e-05; rel: 4.132e-05; norm: 9.308e-02
## It: 165; obj: 2.334e+00; abs: 9.468e-05; rel: 4.056e-05; norm: 9.308e-02
## It: 166; obj: 2.334e+00; abs: 9.292e-05; rel: 3.981e-05; norm: 9.307e-02
## It: 167; obj: 2.334e+00; abs: 9.117e-05; rel: 3.907e-05; norm: 9.307e-02
## It: 168; obj: 2.334e+00; abs: 8.947e-05; rel: 3.834e-05; norm: 9.306e-02
## It: 169; obj: 2.334e+00; abs: 8.780e-05; rel: 3.763e-05; norm: 9.305e-02
## It: 170; obj: 2.333e+00; abs: 8.620e-05; rel: 3.694e-05; norm: 9.305e-02
## It: 171; obj: 2.333e+00; abs: 8.468e-05; rel: 3.629e-05; norm: 9.304e-02
## It: 172; obj: 2.333e+00; abs: 8.327e-05; rel: 3.569e-05; norm: 9.304e-02
## It: 173; obj: 2.333e+00; abs: 8.198e-05; rel: 3.513e-05; norm: 9.303e-02
## It: 174; obj: 2.333e+00; abs: 8.085e-05; rel: 3.465e-05; norm: 9.303e-02
## It: 175; obj: 2.333e+00; abs: 7.990e-05; rel: 3.424e-05; norm: 9.302e-02
## It: 176; obj: 2.333e+00; abs: 7.915e-05; rel: 3.393e-05; norm: 9.302e-02
```

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## It: 177; obj: 2.333e+00; abs: 7.862e-05; rel: 3.370e-05; norm: 9.301e-02
## It: 178; obj: 2.333e+00; abs: 7.829e-05; rel: 3.356e-05; norm: 9.301e-02
## It: 179; obj: 2.333e+00; abs: 7.814e-05; rel: 3.349e-05; norm: 9.300e-02
## It: 180; obj: 2.333e+00; abs: 7.814e-05; rel: 3.350e-05; norm: 9.300e-02
## It: 181; obj: 2.333e+00; abs: 7.831e-05; rel: 3.357e-05; norm: 9.299e-02
## It: 182; obj: 2.332e+00; abs: 7.869e-05; rel: 3.373e-05; norm: 9.299e-02
## It: 183; obj: 2.332e+00; abs: 7.935e-05; rel: 3.402e-05; norm: 9.298e-02
## It: 184; obj: 2.332e+00; abs: 8.038e-05; rel: 3.446e-05; norm: 9.298e-02
## It: 185; obj: 2.332e+00; abs: 8.186e-05; rel: 3.510e-05; norm: 9.297e-02
## It: 186; obj: 2.332e+00; abs: 8.399e-05; rel: 3.601e-05; norm: 9.297e-02
## It: 187; obj: 2.332e+00; abs: 8.709e-05; rel: 3.734e-05; norm: 9.296e-02
## It: 188; obj: 2.332e+00; abs: 9.169e-05; rel: 3.932e-05; norm: 9.296e-02
## It: 189; obj: 2.332e+00; abs: 9.817e-05; rel: 4.210e-05; norm: 9.295e-02
## It: 190; obj: 2.332e+00; abs: 1.052e-04; rel: 4.511e-05; norm: 9.295e-02
## It: 191; obj: 2.332e+00; abs: 1.067e-04; rel: 4.577e-05; norm: 9.294e-02
## It: 192; obj: 2.332e+00; abs: 9.412e-05; rel: 4.037e-05; norm: 9.294e-02
## It: 193; obj: 2.332e+00; abs: 7.265e-05; rel: 3.116e-05; norm: 9.293e-02
## It: 194; obj: 2.331e+00; abs: 6.057e-05; rel: 2.598e-05; norm: 9.293e-02
## It: 195; obj: 2.331e+00; abs: 5.911e-05; rel: 2.535e-05; norm: 9.292e-02
## It: 196; obj: 2.331e+00; abs: 5.878e-05; rel: 2.521e-05; norm: 9.292e-02
## It: 197; obj: 2.331e+00; abs: 5.680e-05; rel: 2.436e-05; norm: 9.291e-02
## It: 198; obj: 2.331e+00; abs: 5.465e-05; rel: 2.344e-05; norm: 9.291e-02
## It: 199; obj: 2.331e+00; abs: 5.309e-05; rel: 2.278e-05; norm: 9.291e-02
## It: 200; obj: 2.331e+00; abs: 5.191e-05; rel: 2.227e-05; norm: 9.290e-02
## It: 201; obj: 2.331e+00; abs: 5.081e-05; rel: 2.180e-05; norm: 9.290e-02
## It: 202; obj: 2.331e+00; abs: 4.973e-05; rel: 2.133e-05; norm: 9.289e-02
## It: 203; obj: 2.331e+00; abs: 4.870e-05; rel: 2.089e-05; norm: 9.289e-02
## It: 204; obj: 2.331e+00; abs: 4.774e-05; rel: 2.048e-05; norm: 9.289e-02
## It: 205; obj: 2.331e+00; abs: 4.684e-05; rel: 2.009e-05; norm: 9.288e-02
## It: 206; obj: 2.331e+00; abs: 4.599e-05; rel: 1.973e-05; norm: 9.288e-02
## It: 207; obj: 2.331e+00; abs: 4.518e-05; rel: 1.939e-05; norm: 9.288e-02
## It: 208; obj: 2.331e+00; abs: 4.442e-05; rel: 1.906e-05; norm: 9.288e-02
## It: 209; obj: 2.331e+00; abs: 4.369e-05; rel: 1.875e-05; norm: 9.287e-02
## It: 210; obj: 2.331e+00; abs: 4.300e-05; rel: 1.845e-05; norm: 9.287e-02
## It: 211; obj: 2.331e+00; abs: 4.234e-05; rel: 1.817e-05; norm: 9.287e-02
## It: 212; obj: 2.331e+00; abs: 4.171e-05; rel: 1.790e-05; norm: 9.287e-02
## It: 213; obj: 2.331e+00; abs: 4.111e-05; rel: 1.764e-05; norm: 9.287e-02
## It: 214; obj: 2.330e+00; abs: 4.053e-05; rel: 1.739e-05; norm: 9.286e-02
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## It: 216; obj: 2.330e+00; abs: 3.944e-05; rel: 1.692e-05; norm: 9.286e-02
## It: 217; obj: 2.330e+00; abs: 3.892e-05; rel: 1.670e-05; norm: 9.286e-02
## It: 218; obj: 2.330e+00; abs: 3.842e-05; rel: 1.649e-05; norm: 9.286e-02
## It: 219; obj: 2.330e+00; abs: 3.794e-05; rel: 1.628e-05; norm: 9.286e-02
## It: 220; obj: 2.330e+00; abs: 3.747e-05; rel: 1.608e-05; norm: 9.285e-02
## It: 221; obj: 2.330e+00; abs: 3.702e-05; rel: 1.589e-05; norm: 9.285e-02
## It: 222; obj: 2.330e+00; abs: 3.658e-05; rel: 1.570e-05; norm: 9.285e-02
## It: 223; obj: 2.330e+00; abs: 3.615e-05; rel: 1.551e-05; norm: 9.285e-02
## It: 224; obj: 2.330e+00; abs: 3.574e-05; rel: 1.534e-05; norm: 9.285e-02
## It: 225; obj: 2.330e+00; abs: 3.533e-05; rel: 1.516e-05; norm: 9.285e-02
## It: 226; obj: 2.330e+00; abs: 3.494e-05; rel: 1.500e-05; norm: 9.285e-02
## It: 227; obj: 2.330e+00; abs: 3.457e-05; rel: 1.484e-05; norm: 9.285e-02
## It: 228; obj: 2.330e+00; abs: 3.420e-05; rel: 1.468e-05; norm: 9.285e-02
## It: 229; obj: 2.330e+00; abs: 3.384e-05; rel: 1.453e-05; norm: 9.285e-02
## It: 230; obj: 2.330e+00; abs: 3.350e-05; rel: 1.438e-05; norm: 9.285e-02
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## It: 231; obj: 2.330e+00; abs: 3.317e-05; rel: 1.423e-05; norm: 9.285e-02
## It: 232; obj: 2.330e+00; abs: 3.284e-05; rel: 1.410e-05; norm: 9.285e-02
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## It: 235; obj: 2.330e+00; abs: 3.193e-05; rel: 1.371e-05; norm: 9.285e-02
## It: 236; obj: 2.330e+00; abs: 3.165e-05; rel: 1.359e-05; norm: 9.285e-02
## It: 237; obj: 2.330e+00; abs: 3.138e-05; rel: 1.347e-05; norm: 9.285e-02
## It: 238; obj: 2.330e+00; abs: 3.111e-05; rel: 1.335e-05; norm: 9.285e-02
## It: 239; obj: 2.330e+00; abs: 3.086e-05; rel: 1.325e-05; norm: 9.285e-02
## It: 240; obj: 2.330e+00; abs: 3.061e-05; rel: 1.314e-05; norm: 9.285e-02
## It: 241; obj: 2.330e+00; abs: 3.037e-05; rel: 1.304e-05; norm: 9.285e-02
## It: 242; obj: 2.330e+00; abs: 3.015e-05; rel: 1.294e-05; norm: 9.285e-02
## It: 243; obj: 2.329e+00; abs: 2.993e-05; rel: 1.285e-05; norm: 9.285e-02
## It: 244; obj: 2.329e+00; abs: 2.971e-05; rel: 1.276e-05; norm: 9.285e-02
## It: 245; obj: 2.329e+00; abs: 2.951e-05; rel: 1.267e-05; norm: 9.285e-02
## It: 246; obj: 2.329e+00; abs: 2.932e-05; rel: 1.259e-05; norm: 9.285e-02
## It: 247; obj: 2.329e+00; abs: 2.913e-05; rel: 1.250e-05; norm: 9.286e-02
## It: 248; obj: 2.329e+00; abs: 3.468e-05; rel: 1.489e-05; norm: 9.286e-02
## It: 249; obj: 2.329e+00; abs: 3.757e-05; rel: 1.613e-05; norm: 9.286e-02
## It: 250; obj: 2.329e+00; abs: 3.910e-05; rel: 1.679e-05; norm: 9.286e-02
## It: 251; obj: 2.329e+00; abs: 3.992e-05; rel: 1.714e-05; norm: 9.286e-02
## It: 252; obj: 2.329e+00; abs: 4.031e-05; rel: 1.730e-05; norm: 9.286e-02
## It: 253; obj: 2.329e+00; abs: 4.041e-05; rel: 1.735e-05; norm: 9.286e-02
## It: 254; obj: 2.329e+00; abs: 4.033e-05; rel: 1.731e-05; norm: 9.287e-02
## It: 255; obj: 2.329e+00; abs: 4.017e-05; rel: 1.725e-05; norm: 9.287e-02
## It: 256; obj: 2.329e+00; abs: 4.000e-05; rel: 1.717e-05; norm: 9.287e-02
## It: 257; obj: 2.329e+00; abs: 3.984e-05; rel: 1.711e-05; norm: 9.287e-02
## It: 258; obj: 2.329e+00; abs: 3.972e-05; rel: 1.705e-05; norm: 9.288e-02
## It: 259; obj: 2.329e+00; abs: 3.961e-05; rel: 1.701e-05; norm: 9.288e-02
## It: 260; obj: 2.329e+00; abs: 3.952e-05; rel: 1.697e-05; norm: 9.288e-02
## It: 261; obj: 2.329e+00; abs: 3.945e-05; rel: 1.694e-05; norm: 9.288e-02
## It: 262; obj: 2.329e+00; abs: 3.938e-05; rel: 1.691e-05; norm: 9.289e-02
## It: 263; obj: 2.329e+00; abs: 3.930e-05; rel: 1.687e-05; norm: 9.289e-02
## It: 264; obj: 2.329e+00; abs: 3.919e-05; rel: 1.683e-05; norm: 9.289e-02
## It: 265; obj: 2.329e+00; abs: 3.904e-05; rel: 1.677e-05; norm: 9.289e-02
## It: 266; obj: 2.329e+00; abs: 3.886e-05; rel: 1.669e-05; norm: 9.290e-02
## It: 267; obj: 2.329e+00; abs: 3.865e-05; rel: 1.660e-05; norm: 9.290e-02
## It: 268; obj: 2.329e+00; abs: 3.843e-05; rel: 1.650e-05; norm: 9.290e-02
## It: 269; obj: 2.329e+00; abs: 3.822e-05; rel: 1.641e-05; norm: 9.291e-02
## It: 270; obj: 2.328e+00; abs: 3.804e-05; rel: 1.634e-05; norm: 9.291e-02
## It: 271; obj: 2.328e+00; abs: 3.788e-05; rel: 1.627e-05; norm: 9.291e-02
## It: 272; obj: 2.328e+00; abs: 3.775e-05; rel: 1.621e-05; norm: 9.292e-02
## It: 273; obj: 2.328e+00; abs: 3.762e-05; rel: 1.616e-05; norm: 9.292e-02
## It: 274; obj: 2.328e+00; abs: 3.748e-05; rel: 1.610e-05; norm: 9.292e-02
## It: 275; obj: 2.328e+00; abs: 3.733e-05; rel: 1.603e-05; norm: 9.293e-02
## It: 276; obj: 2.328e+00; abs: 3.717e-05; rel: 1.596e-05; norm: 9.293e-02
## It: 277; obj: 2.328e+00; abs: 3.699e-05; rel: 1.589e-05; norm: 9.294e-02
## It: 278; obj: 2.328e+00; abs: 3.681e-05; rel: 1.581e-05; norm: 9.294e-02
## It: 279; obj: 2.328e+00; abs: 3.662e-05; rel: 1.573e-05; norm: 9.294e-02
## It: 280; obj: 2.328e+00; abs: 3.642e-05; rel: 1.564e-05; norm: 9.295e-02
## It: 281; obj: 2.328e+00; abs: 3.621e-05; rel: 1.555e-05; norm: 9.295e-02
## It: 282; obj: 2.328e+00; abs: 3.598e-05; rel: 1.545e-05; norm: 9.296e-02
## It: 283; obj: 2.328e+00; abs: 3.575e-05; rel: 1.535e-05; norm: 9.296e-02
## It: 284; obj: 2.328e+00; abs: 3.552e-05; rel: 1.526e-05; norm: 9.297e-02
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## It: 286; obj: 2.328e+00; abs: 3.507e-05; rel: 1.507e-05; norm: 9.298e-02
## It: 287; obj: 2.328e+00; abs: 3.483e-05; rel: 1.496e-05; norm: 9.298e-02
## It: 288; obj: 2.328e+00; abs: 3.456e-05; rel: 1.485e-05; norm: 9.299e-02
## It: 289; obj: 2.328e+00; abs: 3.426e-05; rel: 1.472e-05; norm: 9.299e-02
## It: 290; obj: 2.328e+00; abs: 3.393e-05; rel: 1.458e-05; norm: 9.300e-02
## It: 291; obj: 2.328e+00; abs: 3.359e-05; rel: 1.443e-05; norm: 9.300e-02
## It: 292; obj: 2.328e+00; abs: 3.327e-05; rel: 1.429e-05; norm: 9.301e-02
## It: 293; obj: 2.328e+00; abs: 3.297e-05; rel: 1.416e-05; norm: 9.301e-02
## It: 294; obj: 2.328e+00; abs: 3.267e-05; rel: 1.404e-05; norm: 9.302e-02
## It: 295; obj: 2.328e+00; abs: 3.236e-05; rel: 1.390e-05; norm: 9.303e-02
## It: 296; obj: 2.328e+00; abs: 3.200e-05; rel: 1.375e-05; norm: 9.303e-02
## It: 297; obj: 2.328e+00; abs: 3.159e-05; rel: 1.357e-05; norm: 9.304e-02
## It: 298; obj: 2.327e+00; abs: 3.116e-05; rel: 1.339e-05; norm: 9.304e-02
## It: 299; obj: 2.327e+00; abs: 3.074e-05; rel: 1.321e-05; norm: 9.305e-02
## It: 300; obj: 2.327e+00; abs: 3.038e-05; rel: 1.305e-05; norm: 9.306e-02
## It: 301; obj: 2.327e+00; abs: 3.008e-05; rel: 1.292e-05; norm: 9.306e-02
## It: 302; obj: 2.327e+00; abs: 2.979e-05; rel: 1.280e-05; norm: 9.307e-02
## It: 303; obj: 2.327e+00; abs: 2.947e-05; rel: 1.266e-05; norm: 9.307e-02
## It: 304; obj: 2.327e+00; abs: 2.906e-05; rel: 1.249e-05; norm: 9.308e-02
## It: 305; obj: 2.327e+00; abs: 2.858e-05; rel: 1.228e-05; norm: 9.309e-02
## It: 306; obj: 2.327e+00; abs: 2.808e-05; rel: 1.206e-05; norm: 9.309e-02
## It: 307; obj: 2.327e+00; abs: 2.762e-05; rel: 1.187e-05; norm: 9.310e-02
## It: 308; obj: 2.327e+00; abs: 2.726e-05; rel: 1.171e-05; norm: 9.310e-02
## It: 309; obj: 2.327e+00; abs: 2.698e-05; rel: 1.159e-05; norm: 9.311e-02
## It: 310; obj: 2.327e+00; abs: 2.673e-05; rel: 1.149e-05; norm: 9.311e-02
## It: 311; obj: 2.327e+00; abs: 2.643e-05; rel: 1.136e-05; norm: 9.312e-02
## It: 312; obj: 2.327e+00; abs: 2.602e-05; rel: 1.118e-05; norm: 9.313e-02
## It: 313; obj: 2.327e+00; abs: 2.550e-05; rel: 1.096e-05; norm: 9.313e-02
## It: 314; obj: 2.327e+00; abs: 2.497e-05; rel: 1.073e-05; norm: 9.314e-02
## It: 315; obj: 2.327e+00; abs: 2.453e-05; rel: 1.054e-05; norm: 9.315e-02
## It: 316; obj: 2.327e+00; abs: 2.426e-05; rel: 1.043e-05; norm: 9.315e-02
## It: 317; obj: 2.327e+00; abs: 2.410e-05; rel: 1.036e-05; norm: 9.316e-02
## It: 318; obj: 2.327e+00; abs: 2.393e-05; rel: 1.028e-05; norm: 9.317e-02
## It: 319; obj: 2.327e+00; abs: 2.360e-05; rel: 1.014e-05; norm: 9.317e-02
## It: 320; obj: 2.327e+00; abs: 2.309e-05; rel: 9.921e-06; norm: 9.318e-02
## It: 321; obj: 2.327e+00; abs: 2.247e-05; rel: 9.659e-06; norm: 9.319e-02
## It: 322; obj: 2.327e+00; abs: 2.192e-05; rel: 9.421e-06; norm: 9.319e-02
## It: 323; obj: 2.327e+00; abs: 2.156e-05; rel: 9.265e-06; norm: 9.320e-02
## It: 324; obj: 2.327e+00; abs: 2.142e-05; rel: 9.204e-06; norm: 9.320e-02
## It: 325; obj: 2.327e+00; abs: 2.140e-05; rel: 9.198e-06; norm: 9.321e-02
## It: 326; obj: 2.327e+00; abs: 2.132e-05; rel: 9.162e-06; norm: 9.321e-02
## It: 327; obj: 2.327e+00; abs: 2.098e-05; rel: 9.015e-06; norm: 9.322e-02
## It: 328; obj: 2.327e+00; abs: 2.035e-05; rel: 8.745e-06; norm: 9.323e-02
## It: 329; obj: 2.327e+00; abs: 1.962e-05; rel: 8.434e-06; norm: 9.323e-02
## It: 330; obj: 2.327e+00; abs: 1.913e-05; rel: 8.221e-06; norm: 9.324e-02
## It: 331; obj: 2.327e+00; abs: 1.907e-05; rel: 8.195e-06; norm: 9.325e-02
## It: 332; obj: 2.327e+00; abs: 1.934e-05; rel: 8.314e-06; norm: 9.325e-02
## It: 333; obj: 2.327e+00; abs: 1.959e-05; rel: 8.419e-06; norm: 9.326e-02
## It: 334; obj: 2.327e+00; abs: 1.940e-05; rel: 8.340e-06; norm: 9.327e-02
## It: 335; obj: 2.327e+00; abs: 1.867e-05; rel: 8.023e-06; norm: 9.327e-02
## It: 336; obj: 2.327e+00; abs: 1.760e-05; rel: 7.565e-06; norm: 9.328e-02
## It: 337; obj: 2.327e+00; abs: 1.664e-05; rel: 7.153e-06; norm: 9.328e-02
## It: 338; obj: 2.327e+00; abs: 1.619e-05; rel: 6.960e-06; norm: 9.329e-02
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## It: 340; obj: 2.327e+00; abs: 1.714e-05; rel: 7.366e-06; norm: 9.330e-02
## It: 341; obj: 2.326e+00; abs: 1.781e-05; rel: 7.655e-06; norm: 9.330e-02
## It: 342; obj: 2.326e+00; abs: 1.774e-05; rel: 7.623e-06; norm: 9.331e-02
## It: 343; obj: 2.326e+00; abs: 1.651e-05; rel: 7.097e-06; norm: 9.332e-02
## It: 344; obj: 2.326e+00; abs: 1.458e-05; rel: 6.267e-06; norm: 9.332e-02
## It: 345; obj: 2.326e+00; abs: 1.316e-05; rel: 5.657e-06; norm: 9.333e-02
## It: 346; obj: 2.326e+00; abs: 1.331e-05; rel: 5.722e-06; norm: 9.333e-02
## It: 347; obj: 2.326e+00; abs: 1.496e-05; rel: 6.431e-06; norm: 9.334e-02
## It: 348; obj: 2.326e+00; abs: 1.685e-05; rel: 7.244e-06; norm: 9.335e-02
## It: 349; obj: 2.326e+00; abs: 1.751e-05; rel: 7.525e-06; norm: 9.335e-02
## It: 350; obj: 2.326e+00; abs: 1.631e-05; rel: 7.012e-06; norm: 9.336e-02
## It: 351; obj: 2.326e+00; abs: 1.380e-05; rel: 5.930e-06; norm: 9.336e-02
## It: 352; obj: 2.326e+00; abs: 1.114e-05; rel: 4.790e-06; norm: 9.337e-02
## It: 353; obj: 2.326e+00; abs: 9.595e-06; rel: 4.124e-06; norm: 9.337e-02
## It: 354; obj: 2.326e+00; abs: 9.902e-06; rel: 4.257e-06; norm: 9.338e-02
## It: 355; obj: 2.326e+00; abs: 1.202e-05; rel: 5.166e-06; norm: 9.338e-02
## It: 356; obj: 2.326e+00; abs: 1.509e-05; rel: 6.488e-06; norm: 9.339e-02
## It: 357; obj: 2.326e+00; abs: 1.743e-05; rel: 7.494e-06; norm: 9.339e-02
## It: 358; obj: 2.326e+00; abs: 1.669e-05; rel: 7.174e-06; norm: 9.340e-02
## It: 359; obj: 2.326e+00; abs: 1.177e-05; rel: 5.060e-06; norm: 9.340e-02
## It: 360; obj: 2.326e+00; abs: 5.674e-06; rel: 2.439e-06; norm: 9.341e-02
## It: 361; obj: 2.326e+00; abs: 3.945e-06; rel: 1.696e-06; norm: 9.342e-02
## It: 362; obj: 2.326e+00; abs: 8.465e-06; rel: 3.639e-06; norm: 9.342e-02
## It: 363; obj: 2.326e+00; abs: 1.516e-05; rel: 6.515e-06; norm: 9.343e-02
## It: 364; obj: 2.326e+00; abs: 1.867e-05; rel: 8.025e-06; norm: 9.343e-02
## It: 365; obj: 2.326e+00; abs: 1.710e-05; rel: 7.353e-06; norm: 9.343e-02
## It: 366; obj: 2.326e+00; abs: 1.178e-05; rel: 5.066e-06; norm: 9.344e-02
## It: 367; obj: 2.326e+00; abs: 5.384e-06; rel: 2.315e-06; norm: 9.344e-02
## It: 368; obj: 2.326e+00; abs: 1.082e-06; rel: 4.650e-07; norm: 9.344e-02
## It: 369; obj: 2.326e+00; abs: 7.190e-07; rel: 3.091e-07; norm: 9.345e-02
## It: 370; obj: 2.326e+00; abs: 3.619e-06; rel: 1.556e-06; norm: 9.345e-02
## It: 371; obj: 2.326e+00; abs: 8.289e-06; rel: 3.563e-06; norm: 9.346e-02
## It: 372; obj: 2.326e+00; abs: 1.380e-05; rel: 5.933e-06; norm: 9.347e-02
## It: 373; obj: 2.326e+00; abs: 1.833e-05; rel: 7.882e-06; norm: 9.348e-02
## It: 374; obj: 2.326e+00; abs: 1.582e-05; rel: 6.802e-06; norm: 9.348e-02
## It: 375; obj: 2.326e+00; abs: 1.241e-06; rel: 5.336e-07; norm: 9.349e-02
## It: 376; obj: 2.326e+00; abs: 8.270e-06; rel: 3.555e-06; norm: 9.350e-02
## It: 377; obj: 2.326e+00; abs: 5.177e-06; rel: 2.226e-06; norm: 9.350e-02
## It: 378; obj: 2.326e+00; abs: 2.145e-05; rel: 9.221e-06; norm: 9.350e-02
## It: 379; obj: 2.326e+00; abs: 2.214e-05; rel: 9.517e-06; norm: 9.350e-02
## It: 380; obj: 2.326e+00; abs: 1.422e-05; rel: 6.113e-06; norm: 9.350e-02
## It: 381; obj: 2.326e+00; abs: 1.712e-06; rel: 7.360e-07; norm: 9.350e-02
## It: 382; obj: 2.326e+00; abs: 9.168e-06; rel: 3.941e-06; norm: 9.350e-02
## It: 383; obj: 2.326e+00; abs: 7.300e-06; rel: 3.138e-06; norm: 9.350e-02
## It: 384; obj: 2.326e+00; abs: 5.106e-06; rel: 2.195e-06; norm: 9.350e-02
## It: 385; obj: 2.326e+00; abs: 1.272e-05; rel: 5.467e-06; norm: 9.351e-02
## It: 386; obj: 2.326e+00; abs: 7.226e-06; rel: 3.107e-06; norm: 9.352e-02
## It: 387; obj: 2.326e+00; abs: 1.478e-06; rel: 6.353e-07; norm: 9.354e-02
## It: 388; obj: 2.326e+00; abs: 2.227e-05; rel: 9.574e-06; norm: 9.355e-02
## It: 389; obj: 2.326e+00; abs: 6.472e-05; rel: 2.782e-05; norm: 9.356e-02
## It: 390; obj: 2.326e+00; abs: 6.137e-05; rel: 2.638e-05; norm: 9.356e-02
## It: 391; obj: 2.326e+00; abs: 3.207e-05; rel: 1.379e-05; norm: 9.357e-02
## It: 392; obj: 2.326e+00; abs: 1.203e-04; rel: 5.171e-05; norm: 9.357e-02
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## It: 394; obj: 2.326e+00; abs: 1.495e-05; rel: 6.427e-06; norm: 9.356e-02
## It: 395; obj: 2.326e+00; abs: 4.502e-05; rel: 1.936e-05; norm: 9.355e-02
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## It: 410; obj: 2.326e+00; abs: 5.375e-05; rel: 2.311e-05; norm: 9.363e-02
## It: 411; obj: 2.326e+00; abs: 1.197e-04; rel: 5.145e-05; norm: 9.363e-02
## It: 412; obj: 2.326e+00; abs: 7.676e-05; rel: 3.300e-05; norm: 9.363e-02
## It: 413; obj: 2.326e+00; abs: 5.685e-06; rel: 2.444e-06; norm: 9.363e-02
## It: 414; obj: 2.326e+00; abs: 4.941e-05; rel: 2.124e-05; norm: 9.364e-02
## It: 415; obj: 2.326e+00; abs: 7.067e-05; rel: 3.038e-05; norm: 9.363e-02
## It: 416; obj: 2.326e+00; abs: 1.380e-04; rel: 5.931e-05; norm: 9.361e-02
## It: 417; obj: 2.326e+00; abs: 1.354e-04; rel: 5.823e-05; norm: 9.360e-02
## It: 418; obj: 2.326e+00; abs: 5.064e-05; rel: 2.177e-05; norm: 9.363e-02
## It: 419; obj: 2.326e+00; abs: 1.688e-04; rel: 7.259e-05; norm: 9.365e-02
## It: 420; obj: 2.326e+00; abs: 1.350e-04; rel: 5.805e-05; norm: 9.367e-02
## It: 421; obj: 2.326e+00; abs: 3.904e-05; rel: 1.678e-05; norm: 9.368e-02
## It: 422; obj: 2.326e+00; abs: 1.327e-04; rel: 5.707e-05; norm: 9.367e-02
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## It: 425; obj: 2.326e+00; abs: 2.100e-05; rel: 9.029e-06; norm: 9.367e-02
## It: 426; obj: 2.326e+00; abs: 8.114e-05; rel: 3.488e-05; norm: 9.366e-02
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## It: 428; obj: 2.326e+00; abs: 1.465e-04; rel: 6.298e-05; norm: 9.366e-02
## It: 429; obj: 2.326e+00; abs: 1.069e-04; rel: 4.596e-05; norm: 9.368e-02
## It: 430; obj: 2.326e+00; abs: 4.891e-05; rel: 2.102e-05; norm: 9.369e-02
## It: 431; obj: 2.326e+00; abs: 1.882e-05; rel: 8.089e-06; norm: 9.369e-02
## It: 432; obj: 2.326e+00; abs: 2.290e-05; rel: 9.844e-06; norm: 9.369e-02
## It: 433; obj: 2.326e+00; abs: 1.188e-04; rel: 5.106e-05; norm: 9.369e-02
## It: 434; obj: 2.326e+00; abs: 3.021e-04; rel: 1.299e-04; norm: 9.370e-02
## It: 435; obj: 2.326e+00; abs: 1.370e-04; rel: 5.892e-05; norm: 9.370e-02
## It: 436; obj: 2.326e+00; abs: 9.219e-06; rel: 3.964e-06; norm: 9.369e-02
## It: 437; obj: 2.326e+00; abs: 2.430e-05; rel: 1.045e-05; norm: 9.369e-02
## It: 438; obj: 2.326e+00; abs: 7.806e-05; rel: 3.356e-05; norm: 9.369e-02
## It: 439; obj: 2.326e+00; abs: 1.541e-04; rel: 6.627e-05; norm: 9.369e-02
## It: 440; obj: 2.326e+00; abs: 1.351e-04; rel: 5.810e-05; norm: 9.370e-02
## It: 441; obj: 2.326e+00; abs: 8.996e-05; rel: 3.867e-05; norm: 9.371e-02
## It: 442; obj: 2.326e+00; abs: 5.435e-05; rel: 2.336e-05; norm: 9.372e-02
## It: 443; obj: 2.326e+00; abs: 2.562e-05; rel: 1.101e-05; norm: 9.372e-02
## It: 444; obj: 2.326e+00; abs: 1.107e-06; rel: 4.758e-07; norm: 9.372e-02
## It: 445; obj: 2.326e+00; abs: 4.011e-05; rel: 1.724e-05; norm: 9.372e-02
## It: 446; obj: 2.326e+00; abs: 1.903e-04; rel: 8.181e-05; norm: 9.372e-02
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## It: 447; obj: 2.326e+00; abs: 3.088e-04; rel: 1.327e-04; norm: 9.371e-02
## It: 448; obj: 2.326e+00; abs: 1.484e-04; rel: 6.378e-05; norm: 9.370e-02
## It: 449; obj: 2.326e+00; abs: 9.856e-06; rel: 4.238e-06; norm: 9.371e-02
## It: 450; obj: 2.326e+00; abs: 2.684e-05; rel: 1.154e-05; norm: 9.372e-02
## It: 451; obj: 2.326e+00; abs: 5.055e-05; rel: 2.174e-05; norm: 9.373e-02
## It: 452; obj: 2.326e+00; abs: 3.415e-05; rel: 1.468e-05; norm: 9.374e-02
## It: 453; obj: 2.326e+00; abs: 1.180e-05; rel: 5.072e-06; norm: 9.374e-02
## It: 454; obj: 2.326e+00; abs: 3.029e-05; rel: 1.302e-05; norm: 9.374e-02
## It: 455; obj: 2.326e+00; abs: 3.955e-05; rel: 1.700e-05; norm: 9.374e-02
## It: 456; obj: 2.326e+00; abs: 2.638e-06; rel: 1.134e-06; norm: 9.374e-02
## It: 457; obj: 2.326e+00; abs: 3.014e-05; rel: 1.296e-05; norm: 9.374e-02
## It: 458; obj: 2.326e+00; abs: 3.359e-05; rel: 1.444e-05; norm: 9.374e-02
## It: 459; obj: 2.326e+00; abs: 1.851e-05; rel: 7.959e-06; norm: 9.373e-02
## It: 460; obj: 2.326e+00; abs: 1.095e-04; rel: 4.710e-05; norm: 9.371e-02
## It: 461; obj: 2.326e+00; abs: 1.053e-04; rel: 4.526e-05; norm: 9.371e-02
## It: 462; obj: 2.326e+00; abs: 1.154e-04; rel: 4.961e-05; norm: 9.373e-02
## It: 463; obj: 2.326e+00; abs: 1.660e-04; rel: 7.139e-05; norm: 9.376e-02
## It: 464; obj: 2.326e+00; abs: 9.091e-05; rel: 3.909e-05; norm: 9.377e-02
## It: 465; obj: 2.326e+00; abs: 1.199e-06; rel: 5.154e-07; norm: 9.377e-02
## It: 466; obj: 2.326e+00; abs: 1.679e-04; rel: 7.217e-05; norm: 9.377e-02
## It: 467; obj: 2.326e+00; abs: 1.596e-04; rel: 6.864e-05; norm: 9.376e-02
## It: 468; obj: 2.326e+00; abs: 3.753e-06; rel: 1.614e-06; norm: 9.376e-02
## It: 469; obj: 2.326e+00; abs: 5.365e-05; rel: 2.307e-05; norm: 9.375e-02
## It: 470; obj: 2.326e+00; abs: 7.552e-05; rel: 3.247e-05; norm: 9.374e-02
## It: 471; obj: 2.326e+00; abs: 8.802e-05; rel: 3.785e-05; norm: 9.374e-02
## It: 472; obj: 2.326e+00; abs: 1.436e-04; rel: 6.175e-05; norm: 9.376e-02
## It: 473; obj: 2.326e+00; abs: 1.283e-04; rel: 5.514e-05; norm: 9.377e-02
## It: 474; obj: 2.326e+00; abs: 9.228e-05; rel: 3.967e-05; norm: 9.378e-02
## It: 475; obj: 2.326e+00; abs: 5.188e-05; rel: 2.230e-05; norm: 9.378e-02
## It: 476; obj: 2.326e+00; abs: 1.379e-05; rel: 5.929e-06; norm: 9.377e-02
## It: 477; obj: 2.326e+00; abs: 7.278e-05; rel: 3.129e-05; norm: 9.376e-02
## It: 478; obj: 2.326e+00; abs: 3.476e-04; rel: 1.494e-04; norm: 9.377e-02
## It: 479; obj: 2.326e+00; abs: 2.604e-04; rel: 1.120e-04; norm: 9.379e-02
## It: 480; obj: 2.326e+00; abs: 3.694e-05; rel: 1.588e-05; norm: 9.378e-02
## It: 481; obj: 2.326e+00; abs: 9.789e-05; rel: 4.209e-05; norm: 9.376e-02
## It: 482; obj: 2.326e+00; abs: 1.414e-04; rel: 6.078e-05; norm: 9.375e-02
## It: 483; obj: 2.326e+00; abs: 1.317e-04; rel: 5.662e-05; norm: 9.375e-02
## It: 484; obj: 2.326e+00; abs: 1.055e-04; rel: 4.536e-05; norm: 9.376e-02
## It: 485; obj: 2.326e+00; abs: 6.523e-05; rel: 2.804e-05; norm: 9.378e-02
## It: 486; obj: 2.326e+00; abs: 3.819e-05; rel: 1.642e-05; norm: 9.379e-02
## It: 487; obj: 2.326e+00; abs: 2.416e-05; rel: 1.038e-05; norm: 9.379e-02
## It: 488; obj: 2.326e+00; abs: 3.281e-05; rel: 1.411e-05; norm: 9.380e-02
## It: 489; obj: 2.326e+00; abs: 5.959e-05; rel: 2.562e-05; norm: 9.380e-02
## It: 490; obj: 2.326e+00; abs: 2.838e-04; rel: 1.220e-04; norm: 9.380e-02
## It: 491; obj: 2.326e+00; abs: 2.336e-04; rel: 1.004e-04; norm: 9.380e-02
## It: 492; obj: 2.326e+00; abs: 3.190e-06; rel: 1.372e-06; norm: 9.380e-02
## It: 493; obj: 2.326e+00; abs: 5.837e-05; rel: 2.510e-05; norm: 9.379e-02
## It: 494; obj: 2.326e+00; abs: 1.067e-04; rel: 4.590e-05; norm: 9.378e-02
## It: 495; obj: 2.326e+00; abs: 1.529e-04; rel: 6.572e-05; norm: 9.378e-02
## It: 496; obj: 2.326e+00; abs: 1.376e-04; rel: 5.918e-05; norm: 9.379e-02
## It: 497; obj: 2.326e+00; abs: 9.136e-05; rel: 3.928e-05; norm: 9.380e-02
## It: 498; obj: 2.326e+00; abs: 3.540e-05; rel: 1.522e-05; norm: 9.381e-02
## It: 499; obj: 2.326e+00; abs: 4.783e-05; rel: 2.056e-05; norm: 9.381e-02
## It: 500; obj: 2.326e+00; abs: 6.556e-05; rel: 2.818e-05; norm: 9.380e-02
```

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## It: 501; obj: 2.326e+00; abs: 2.030e-04; rel: 8.729e-05; norm: 9.381e-02
## It: 502; obj: 2.326e+00; abs: 3.095e-04; rel: 1.331e-04; norm: 9.381e-02
## It: 503; obj: 2.325e+00; abs: 2.602e-05; rel: 1.119e-05; norm: 9.380e-02
## It: 504; obj: 2.326e+00; abs: 2.901e-05; rel: 1.247e-05; norm: 9.380e-02
## It: 505; obj: 2.326e+00; abs: 3.174e-05; rel: 1.365e-05; norm: 9.380e-02
## It: 506; obj: 2.326e+00; abs: 9.062e-05; rel: 3.897e-05; norm: 9.380e-02
## It: 507; obj: 2.326e+00; abs: 1.613e-04; rel: 6.937e-05; norm: 9.381e-02
## It: 508; obj: 2.326e+00; abs: 1.297e-04; rel: 5.575e-05; norm: 9.381e-02
## It: 509; obj: 2.326e+00; abs: 7.712e-05; rel: 3.315e-05; norm: 9.382e-02
## It: 510; obj: 2.326e+00; abs: 3.109e-05; rel: 1.336e-05; norm: 9.382e-02
## It: 511; obj: 2.326e+00; abs: 3.052e-05; rel: 1.312e-05; norm: 9.382e-02
## It: 512; obj: 2.326e+00; abs: 1.616e-04; rel: 6.947e-05; norm: 9.382e-02
## It: 513; obj: 2.326e+00; abs: 2.979e-04; rel: 1.281e-04; norm: 9.382e-02
## It: 514; obj: 2.326e+00; abs: 4.504e-05; rel: 1.937e-05; norm: 9.382e-02
## It: 515; obj: 2.325e+00; abs: 4.554e-05; rel: 1.958e-05; norm: 9.383e-02
## It: 516; obj: 2.325e+00; abs: 8.209e-05; rel: 3.530e-05; norm: 9.382e-02
## It: 517; obj: 2.325e+00; abs: 1.601e-05; rel: 6.884e-06; norm: 9.381e-02
## It: 518; obj: 2.326e+00; abs: 1.293e-04; rel: 5.562e-05; norm: 9.381e-02
## It: 519; obj: 2.326e+00; abs: 8.229e-05; rel: 3.539e-05; norm: 9.382e-02
## It: 520; obj: 2.326e+00; abs: 4.205e-05; rel: 1.808e-05; norm: 9.382e-02
## It: 521; obj: 2.326e+00; abs: 2.740e-06; rel: 1.178e-06; norm: 9.382e-02
## It: 522; obj: 2.326e+00; abs: 4.950e-05; rel: 2.128e-05; norm: 9.382e-02
## It: 523; obj: 2.326e+00; abs: 1.026e-04; rel: 4.410e-05; norm: 9.381e-02
## It: 524; obj: 2.325e+00; abs: 8.561e-05; rel: 3.681e-05; norm: 9.380e-02
## It: 525; obj: 2.325e+00; abs: 1.989e-05; rel: 8.555e-06; norm: 9.379e-02
## It: 526; obj: 2.325e+00; abs: 2.144e-05; rel: 9.219e-06; norm: 9.381e-02
## It: 527; obj: 2.325e+00; abs: 5.345e-05; rel: 2.299e-05; norm: 9.383e-02
## It: 528; obj: 2.326e+00; abs: 9.107e-05; rel: 3.916e-05; norm: 9.384e-02
## It: 529; obj: 2.326e+00; abs: 1.211e-04; rel: 5.206e-05; norm: 9.384e-02
## It: 530; obj: 2.326e+00; abs: 3.297e-05; rel: 1.418e-05; norm: 9.383e-02
## It: 531; obj: 2.326e+00; abs: 9.978e-05; rel: 4.290e-05; norm: 9.383e-02
## It: 532; obj: 2.326e+00; abs: 9.707e-05; rel: 4.174e-05; norm: 9.383e-02
## It: 533; obj: 2.326e+00; abs: 1.381e-05; rel: 5.939e-06; norm: 9.384e-02
## It: 534; obj: 2.326e+00; abs: 1.974e-05; rel: 8.487e-06; norm: 9.384e-02
## It: 535; obj: 2.326e+00; abs: 2.649e-05; rel: 1.139e-05; norm: 9.383e-02
## It: 536; obj: 2.326e+00; abs: 4.198e-05; rel: 1.805e-05; norm: 9.381e-02
## It: 537; obj: 2.325e+00; abs: 1.495e-04; rel: 6.430e-05; norm: 9.380e-02
## It: 538; obj: 2.325e+00; abs: 5.052e-05; rel: 2.173e-05; norm: 9.381e-02
## It: 539; obj: 2.326e+00; abs: 1.402e-04; rel: 6.027e-05; norm: 9.383e-02
## It: 540; obj: 2.326e+00; abs: 8.846e-05; rel: 3.804e-05; norm: 9.385e-02
## It: 541; obj: 2.326e+00; abs: 7.485e-06; rel: 3.218e-06; norm: 9.386e-02
## It: 542; obj: 2.325e+00; abs: 1.473e-04; rel: 6.336e-05; norm: 9.385e-02
## It: 543; obj: 2.325e+00; abs: 7.931e-05; rel: 3.410e-05; norm: 9.385e-02
## It: 544; obj: 2.325e+00; abs: 4.989e-06; rel: 2.145e-06; norm: 9.384e-02
## It: 545; obj: 2.325e+00; abs: 3.834e-05; rel: 1.649e-05; norm: 9.384e-02
## It: 546; obj: 2.326e+00; abs: 7.231e-05; rel: 3.109e-05; norm: 9.383e-02
## It: 547; obj: 2.326e+00; abs: 1.310e-04; rel: 5.635e-05; norm: 9.383e-02
## It: 548; obj: 2.326e+00; abs: 1.381e-04; rel: 5.938e-05; norm: 9.384e-02
## It: 549; obj: 2.326e+00; abs: 9.271e-05; rel: 3.986e-05; norm: 9.385e-02
## It: 550; obj: 2.326e+00; abs: 4.476e-05; rel: 1.924e-05; norm: 9.385e-02
## It: 551; obj: 2.326e+00; abs: 2.246e-06; rel: 9.657e-07; norm: 9.385e-02
## It: 552; obj: 2.326e+00; abs: 9.664e-05; rel: 4.155e-05; norm: 9.385e-02
## It: 553; obj: 2.325e+00; abs: 3.517e-04; rel: 1.512e-04; norm: 9.384e-02
## It: 554; obj: 2.325e+00; abs: 1.422e-04; rel: 6.114e-05; norm: 9.382e-02
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## It: 555; obj: 2.325e+00; abs: 1.992e-05; rel: 8.566e-06; norm: 9.383e-02
## It: 556; obj: 2.325e+00; abs: 2.563e-05; rel: 1.102e-05; norm: 9.385e-02
## It: 557; obj: 2.325e+00; abs: 3.490e-05; rel: 1.501e-05; norm: 9.385e-02
## It: 558; obj: 2.325e+00; abs: 1.459e-05; rel: 6.273e-06; norm: 9.386e-02
## It: 559; obj: 2.325e+00; abs: 3.415e-06; rel: 1.468e-06; norm: 9.386e-02
## It: 560; obj: 2.325e+00; abs: 5.594e-06; rel: 2.406e-06; norm: 9.386e-02
## It: 561; obj: 2.325e+00; abs: 6.887e-05; rel: 2.962e-05; norm: 9.385e-02
## It: 562; obj: 2.326e+00; abs: 7.829e-05; rel: 3.367e-05; norm: 9.385e-02
## It: 563; obj: 2.326e+00; abs: 1.529e-05; rel: 6.576e-06; norm: 9.385e-02
## It: 564; obj: 2.326e+00; abs: 3.452e-05; rel: 1.484e-05; norm: 9.385e-02
## It: 565; obj: 2.326e+00; abs: 2.210e-05; rel: 9.503e-06; norm: 9.384e-02
## It: 566; obj: 2.325e+00; abs: 6.691e-05; rel: 2.877e-05; norm: 9.383e-02
## It: 567; obj: 2.325e+00; abs: 1.867e-04; rel: 8.028e-05; norm: 9.381e-02
## It: 568; obj: 2.325e+00; abs: 2.516e-07; rel: 1.082e-07; norm: 9.382e-02
## It: 569; obj: 2.325e+00; abs: 1.610e-04; rel: 6.923e-05; norm: 9.385e-02
## It: 570; obj: 2.326e+00; abs: 1.354e-04; rel: 5.824e-05; norm: 9.387e-02
## It: 571; obj: 2.326e+00; abs: 5.568e-05; rel: 2.394e-05; norm: 9.387e-02
## It: 572; obj: 2.326e+00; abs: 7.228e-05; rel: 3.108e-05; norm: 9.387e-02
## It: 573; obj: 2.325e+00; abs: 1.841e-04; rel: 7.914e-05; norm: 9.386e-02
## It: 574; obj: 2.325e+00; abs: 5.203e-05; rel: 2.237e-05; norm: 9.386e-02
## It: 575; obj: 2.325e+00; abs: 3.059e-05; rel: 1.315e-05; norm: 9.386e-02
## It: 576; obj: 2.325e+00; abs: 7.812e-05; rel: 3.360e-05; norm: 9.385e-02
## It: 577; obj: 2.326e+00; abs: 1.014e-04; rel: 4.360e-05; norm: 9.384e-02
## It: 578; obj: 2.326e+00; abs: 1.461e-04; rel: 6.281e-05; norm: 9.384e-02
## It: 579; obj: 2.326e+00; abs: 1.368e-04; rel: 5.881e-05; norm: 9.385e-02
## It: 580; obj: 2.326e+00; abs: 9.630e-05; rel: 4.140e-05; norm: 9.386e-02
## It: 581; obj: 2.326e+00; abs: 5.509e-05; rel: 2.369e-05; norm: 9.387e-02
## It: 582; obj: 2.326e+00; abs: 7.578e-06; rel: 3.258e-06; norm: 9.386e-02
## It: 583; obj: 2.326e+00; abs: 8.854e-05; rel: 3.807e-05; norm: 9.386e-02
## It: 584; obj: 2.326e+00; abs: 1.114e-04; rel: 4.791e-05; norm: 9.386e-02
## It: 585; obj: 2.325e+00; abs: 3.380e-04; rel: 1.453e-04; norm: 9.387e-02
## It: 586; obj: 2.325e+00; abs: 1.434e-04; rel: 6.166e-05; norm: 9.386e-02
## It: 587; obj: 2.325e+00; abs: 3.357e-05; rel: 1.444e-05; norm: 9.385e-02
## It: 588; obj: 2.325e+00; abs: 5.255e-05; rel: 2.260e-05; norm: 9.385e-02
## It: 589; obj: 2.325e+00; abs: 6.888e-05; rel: 2.962e-05; norm: 9.385e-02
## It: 590; obj: 2.326e+00; abs: 1.509e-04; rel: 6.491e-05; norm: 9.385e-02
## It: 591; obj: 2.326e+00; abs: 1.508e-04; rel: 6.483e-05; norm: 9.386e-02
## It: 592; obj: 2.326e+00; abs: 9.797e-05; rel: 4.213e-05; norm: 9.387e-02
## It: 593; obj: 2.326e+00; abs: 5.672e-05; rel: 2.439e-05; norm: 9.387e-02
## It: 594; obj: 2.326e+00; abs: 1.610e-05; rel: 6.923e-06; norm: 9.386e-02
## It: 595; obj: 2.326e+00; abs: 3.039e-05; rel: 1.306e-05; norm: 9.385e-02
## It: 596; obj: 2.326e+00; abs: 1.576e-04; rel: 6.777e-05; norm: 9.385e-02
## It: 597; obj: 2.325e+00; abs: 3.471e-04; rel: 1.492e-04; norm: 9.386e-02
## It: 598; obj: 2.325e+00; abs: 1.574e-04; rel: 6.770e-05; norm: 9.387e-02
## It: 599; obj: 2.325e+00; abs: 4.324e-08; rel: 1.860e-08; norm: 9.386e-02
## It: 600; obj: 2.325e+00; abs: 1.173e-04; rel: 5.046e-05; norm: 9.384e-02
## It: 601; obj: 2.325e+00; abs: 1.375e-04; rel: 5.914e-05; norm: 9.383e-02
## It: 602; obj: 2.326e+00; abs: 1.093e-04; rel: 4.698e-05; norm: 9.383e-02
## It: 603; obj: 2.326e+00; abs: 5.656e-05; rel: 2.432e-05; norm: 9.384e-02
## It: 604; obj: 2.326e+00; abs: 2.134e-05; rel: 9.177e-06; norm: 9.385e-02
## It: 605; obj: 2.326e+00; abs: 6.272e-05; rel: 2.697e-05; norm: 9.386e-02
## It: 606; obj: 2.325e+00; abs: 7.180e-05; rel: 3.087e-05; norm: 9.386e-02
## It: 607; obj: 2.325e+00; abs: 1.061e-04; rel: 4.563e-05; norm: 9.387e-02
## It: 608; obj: 2.325e+00; abs: 1.241e-04; rel: 5.339e-05; norm: 9.387e-02
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## It: 609; obj: 2.325e+00; abs: 1.722e-05; rel: 7.407e-06; norm: 9.387e-02
## It: 610; obj: 2.325e+00; abs: 3.031e-05; rel: 1.304e-05; norm: 9.386e-02
## It: 611; obj: 2.325e+00; abs: 2.984e-05; rel: 1.283e-05; norm: 9.387e-02
## It: 612; obj: 2.325e+00; abs: 2.855e-05; rel: 1.228e-05; norm: 9.387e-02
## It: 613; obj: 2.325e+00; abs: 9.891e-05; rel: 4.253e-05; norm: 9.387e-02
## It: 614; obj: 2.326e+00; abs: 1.457e-04; rel: 6.264e-05; norm: 9.386e-02
## It: 615; obj: 2.326e+00; abs: 8.129e-05; rel: 3.496e-05; norm: 9.387e-02
## It: 616; obj: 2.326e+00; abs: 2.398e-05; rel: 1.031e-05; norm: 9.387e-02
## It: 617; obj: 2.325e+00; abs: 1.504e-04; rel: 6.468e-05; norm: 9.387e-02
## It: 618; obj: 2.325e+00; abs: 1.277e-04; rel: 5.493e-05; norm: 9.387e-02
## It: 619; obj: 2.325e+00; abs: 4.025e-05; rel: 1.731e-05; norm: 9.386e-02
## It: 620; obj: 2.325e+00; abs: 6.048e-05; rel: 2.601e-05; norm: 9.386e-02
## It: 621; obj: 2.325e+00; abs: 5.087e-05; rel: 2.188e-05; norm: 9.386e-02
## It: 622; obj: 2.325e+00; abs: 1.044e-04; rel: 4.490e-05; norm: 9.386e-02
## It: 623; obj: 2.325e+00; abs: 1.399e-04; rel: 6.016e-05; norm: 9.387e-02
## It: 624; obj: 2.325e+00; abs: 3.772e-05; rel: 1.622e-05; norm: 9.388e-02
## It: 625; obj: 2.325e+00; abs: 4.340e-05; rel: 1.866e-05; norm: 9.388e-02
## It: 626; obj: 2.325e+00; abs: 3.641e-05; rel: 1.566e-05; norm: 9.387e-02
## It: 627; obj: 2.325e+00; abs: 4.575e-06; rel: 1.967e-06; norm: 9.385e-02
## It: 628; obj: 2.325e+00; abs: 1.494e-05; rel: 6.425e-06; norm: 9.384e-02
## It: 629; obj: 2.325e+00; abs: 2.439e-05; rel: 1.049e-05; norm: 9.383e-02
## It: 630; obj: 2.325e+00; abs: 5.763e-05; rel: 2.478e-05; norm: 9.383e-02
## It: 631; obj: 2.325e+00; abs: 1.741e-05; rel: 7.488e-06; norm: 9.387e-02
## It: 632; obj: 2.325e+00; abs: 1.021e-04; rel: 4.389e-05; norm: 9.388e-02
## It: 633; obj: 2.326e+00; abs: 2.305e-04; rel: 9.914e-05; norm: 9.388e-02
## It: 634; obj: 2.326e+00; abs: 1.445e-04; rel: 6.213e-05; norm: 9.387e-02
## It: 635; obj: 2.326e+00; abs: 7.606e-05; rel: 3.271e-05; norm: 9.387e-02
## It: 636; obj: 2.326e+00; abs: 5.800e-05; rel: 2.494e-05; norm: 9.387e-02
## It: 637; obj: 2.326e+00; abs: 2.851e-05; rel: 1.226e-05; norm: 9.387e-02
## It: 638; obj: 2.326e+00; abs: 1.087e-04; rel: 4.672e-05; norm: 9.388e-02
## It: 639; obj: 2.326e+00; abs: 2.661e-04; rel: 1.144e-04; norm: 9.389e-02
## It: 640; obj: 2.325e+00; abs: 1.579e-04; rel: 6.788e-05; norm: 9.388e-02
## It: 641; obj: 2.325e+00; abs: 5.599e-05; rel: 2.408e-05; norm: 9.385e-02
## It: 642; obj: 2.325e+00; abs: 3.011e-05; rel: 1.295e-05; norm: 9.383e-02
## It: 643; obj: 2.325e+00; abs: 4.438e-05; rel: 1.908e-05; norm: 9.384e-02
## It: 644; obj: 2.325e+00; abs: 2.534e-05; rel: 1.090e-05; norm: 9.387e-02
## It: 645; obj: 2.325e+00; abs: 1.631e-04; rel: 7.016e-05; norm: 9.388e-02
## It: 646; obj: 2.326e+00; abs: 2.196e-04; rel: 9.441e-05; norm: 9.387e-02
## It: 647; obj: 2.326e+00; abs: 1.199e-04; rel: 5.156e-05; norm: 9.387e-02
## It: 648; obj: 2.326e+00; abs: 7.365e-05; rel: 3.167e-05; norm: 9.387e-02
## It: 649; obj: 2.326e+00; abs: 5.620e-05; rel: 2.416e-05; norm: 9.387e-02
## It: 650; obj: 2.326e+00; abs: 1.275e-05; rel: 5.483e-06; norm: 9.387e-02
## It: 651; obj: 2.326e+00; abs: 7.847e-05; rel: 3.374e-05; norm: 9.388e-02
## It: 652; obj: 2.326e+00; abs: 2.179e-04; rel: 9.370e-05; norm: 9.388e-02
## It: 653; obj: 2.325e+00; abs: 2.726e-04; rel: 1.172e-04; norm: 9.387e-02
## It: 654; obj: 2.325e+00; abs: 1.691e-04; rel: 7.273e-05; norm: 9.384e-02
## It: 655; obj: 2.325e+00; abs: 4.814e-06; rel: 2.070e-06; norm: 9.383e-02
## It: 656; obj: 2.325e+00; abs: 2.136e-05; rel: 9.188e-06; norm: 9.385e-02
## It: 657; obj: 2.325e+00; abs: 7.651e-05; rel: 3.290e-05; norm: 9.387e-02
## It: 658; obj: 2.325e+00; abs: 1.536e-04; rel: 6.604e-05; norm: 9.388e-02
## It: 659; obj: 2.326e+00; abs: 1.135e-04; rel: 4.880e-05; norm: 9.387e-02
## It: 660; obj: 2.326e+00; abs: 2.609e-05; rel: 1.122e-05; norm: 9.387e-02
## It: 661; obj: 2.325e+00; abs: 1.256e-04; rel: 5.403e-05; norm: 9.387e-02
## It: 662; obj: 2.325e+00; abs: 6.096e-05; rel: 2.621e-05; norm: 9.388e-02
```

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## It: 663; obj: 2.325e+00; abs: 6.513e-06; rel: 2.801e-06; norm: 9.388e-02
## It: 664; obj: 2.325e+00; abs: 1.540e-07; rel: 6.625e-08; norm: 9.386e-02
## It: 665; obj: 2.325e+00; abs: 1.302e-04; rel: 5.599e-05; norm: 9.384e-02
## It: 666; obj: 2.325e+00; abs: 7.844e-05; rel: 3.374e-05; norm: 9.383e-02
## It: 667; obj: 2.325e+00; abs: 1.275e-04; rel: 5.484e-05; norm: 9.385e-02
## It: 668; obj: 2.325e+00; abs: 1.393e-04; rel: 5.990e-05; norm: 9.388e-02
## It: 669; obj: 2.325e+00; abs: 7.749e-05; rel: 3.332e-05; norm: 9.389e-02
## It: 670; obj: 2.325e+00; abs: 2.229e-05; rel: 9.583e-06; norm: 9.389e-02
## It: 671; obj: 2.325e+00; abs: 1.883e-04; rel: 8.097e-05; norm: 9.388e-02
## It: 672; obj: 2.325e+00; abs: 1.035e-04; rel: 4.452e-05; norm: 9.388e-02
## It: 673; obj: 2.325e+00; abs: 1.857e-05; rel: 7.988e-06; norm: 9.387e-02
## It: 674; obj: 2.325e+00; abs: 7.648e-05; rel: 3.289e-05; norm: 9.387e-02
## It: 675; obj: 2.325e+00; abs: 7.974e-05; rel: 3.429e-05; norm: 9.386e-02
## It: 676; obj: 2.325e+00; abs: 1.049e-04; rel: 4.513e-05; norm: 9.386e-02
## It: 677; obj: 2.326e+00; abs: 1.540e-04; rel: 6.621e-05; norm: 9.387e-02
## It: 678; obj: 2.326e+00; abs: 1.202e-04; rel: 5.168e-05; norm: 9.388e-02
## It: 679; obj: 2.326e+00; abs: 8.222e-05; rel: 3.535e-05; norm: 9.388e-02
## It: 680; obj: 2.326e+00; abs: 6.277e-05; rel: 2.699e-05; norm: 9.388e-02
## It: 681; obj: 2.326e+00; abs: 4.587e-05; rel: 1.972e-05; norm: 9.388e-02
## It: 682; obj: 2.326e+00; abs: 3.120e-06; rel: 1.341e-06; norm: 9.387e-02
## It: 683; obj: 2.326e+00; abs: 3.838e-05; rel: 1.650e-05; norm: 9.386e-02
## It: 684; obj: 2.326e+00; abs: 2.908e-04; rel: 1.250e-04; norm: 9.387e-02
## It: 685; obj: 2.325e+00; abs: 4.386e-04; rel: 1.886e-04; norm: 9.388e-02
## It: 686; obj: 2.325e+00; abs: 2.461e-05; rel: 1.058e-05; norm: 9.388e-02
## It: 687; obj: 2.325e+00; abs: 1.120e-04; rel: 4.815e-05; norm: 9.386e-02
## It: 688; obj: 2.325e+00; abs: 1.479e-04; rel: 6.362e-05; norm: 9.384e-02
## It: 689; obj: 2.325e+00; abs: 1.190e-04; rel: 5.119e-05; norm: 9.384e-02
## It: 690; obj: 2.326e+00; abs: 1.134e-04; rel: 4.875e-05; norm: 9.385e-02
## It: 691; obj: 2.326e+00; abs: 1.076e-04; rel: 4.628e-05; norm: 9.387e-02
## It: 692; obj: 2.326e+00; abs: 4.683e-05; rel: 2.014e-05; norm: 9.388e-02
## It: 693; obj: 2.326e+00; abs: 5.115e-05; rel: 2.199e-05; norm: 9.388e-02
## It: 694; obj: 2.326e+00; abs: 1.802e-04; rel: 7.750e-05; norm: 9.387e-02
## It: 695; obj: 2.325e+00; abs: 2.277e-04; rel: 9.793e-05; norm: 9.386e-02
## It: 696; obj: 2.325e+00; abs: 1.396e-04; rel: 6.005e-05; norm: 9.387e-02
## It: 697; obj: 2.325e+00; abs: 9.767e-05; rel: 4.201e-05; norm: 9.388e-02
## It: 698; obj: 2.325e+00; abs: 3.624e-05; rel: 1.559e-05; norm: 9.386e-02
## It: 699; obj: 2.325e+00; abs: 1.139e-04; rel: 4.899e-05; norm: 9.385e-02
## It: 700; obj: 2.325e+00; abs: 1.062e-04; rel: 4.567e-05; norm: 9.384e-02
## It: 701; obj: 2.325e+00; abs: 7.083e-05; rel: 3.046e-05; norm: 9.385e-02
## It: 702; obj: 2.325e+00; abs: 2.478e-06; rel: 1.066e-06; norm: 9.385e-02
## It: 703; obj: 2.325e+00; abs: 9.717e-05; rel: 4.179e-05; norm: 9.386e-02
## It: 704; obj: 2.325e+00; abs: 1.286e-04; rel: 5.531e-05; norm: 9.386e-02
## It: 705; obj: 2.325e+00; abs: 6.909e-05; rel: 2.971e-05; norm: 9.386e-02
## It: 706; obj: 2.325e+00; abs: 2.446e-05; rel: 1.052e-05; norm: 9.387e-02
## It: 707; obj: 2.325e+00; abs: 2.179e-05; rel: 9.370e-06; norm: 9.387e-02
## It: 708; obj: 2.325e+00; abs: 4.310e-05; rel: 1.854e-05; norm: 9.388e-02
## It: 709; obj: 2.325e+00; abs: 2.847e-05; rel: 1.225e-05; norm: 9.388e-02
## It: 710; obj: 2.325e+00; abs: 1.243e-05; rel: 5.346e-06; norm: 9.388e-02
## It: 711; obj: 2.325e+00; abs: 1.220e-05; rel: 5.246e-06; norm: 9.388e-02
## It: 712; obj: 2.325e+00; abs: 5.408e-05; rel: 2.326e-05; norm: 9.388e-02
## It: 713; obj: 2.325e+00; abs: 1.049e-04; rel: 4.512e-05; norm: 9.387e-02
## It: 714; obj: 2.325e+00; abs: 5.472e-05; rel: 2.353e-05; norm: 9.387e-02
## It: 715; obj: 2.325e+00; abs: 3.003e-05; rel: 1.291e-05; norm: 9.387e-02
## It: 716; obj: 2.325e+00; abs: 6.849e-05; rel: 2.946e-05; norm: 9.387e-02
```

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## It: 717; obj: 2.325e+00; abs: 3.357e-05; rel: 1.444e-05; norm: 9.387e-02
## It: 718; obj: 2.325e+00; abs: 6.107e-05; rel: 2.626e-05; norm: 9.386e-02
## It: 719; obj: 2.325e+00; abs: 1.255e-04; rel: 5.399e-05; norm: 9.385e-02
## It: 720; obj: 2.325e+00; abs: 1.556e-05; rel: 6.694e-06; norm: 9.385e-02
## It: 721; obj: 2.325e+00; abs: 1.778e-04; rel: 7.647e-05; norm: 9.387e-02
## It: 722; obj: 2.325e+00; abs: 1.400e-04; rel: 6.019e-05; norm: 9.388e-02
## It: 723; obj: 2.325e+00; abs: 5.106e-05; rel: 2.196e-05; norm: 9.389e-02
## It: 724; obj: 2.325e+00; abs: 7.001e-05; rel: 3.011e-05; norm: 9.388e-02
## It: 725; obj: 2.325e+00; abs: 1.624e-04; rel: 6.983e-05; norm: 9.388e-02
## It: 726; obj: 2.325e+00; abs: 6.501e-05; rel: 2.796e-05; norm: 9.386e-02
## It: 727; obj: 2.325e+00; abs: 7.541e-06; rel: 3.243e-06; norm: 9.384e-02
## It: 728; obj: 2.325e+00; abs: 4.535e-05; rel: 1.950e-05; norm: 9.383e-02
## It: 729; obj: 2.325e+00; abs: 1.173e-05; rel: 5.044e-06; norm: 9.383e-02
## It: 730; obj: 2.325e+00; abs: 3.425e-05; rel: 1.473e-05; norm: 9.385e-02
## It: 731; obj: 2.325e+00; abs: 9.768e-06; rel: 4.201e-06; norm: 9.388e-02
## It: 732; obj: 2.325e+00; abs: 1.383e-04; rel: 5.948e-05; norm: 9.389e-02
## It: 733; obj: 2.326e+00; abs: 2.067e-04; rel: 8.888e-05; norm: 9.387e-02
## It: 734; obj: 2.326e+00; abs: 9.268e-05; rel: 3.985e-05; norm: 9.387e-02
## It: 735; obj: 2.326e+00; abs: 1.499e-05; rel: 6.447e-06; norm: 9.387e-02
## It: 736; obj: 2.325e+00; abs: 2.264e-04; rel: 9.735e-05; norm: 9.387e-02
## It: 737; obj: 2.325e+00; abs: 2.287e-04; rel: 9.837e-05; norm: 9.388e-02
## It: 738; obj: 2.325e+00; abs: 5.889e-05; rel: 2.533e-05; norm: 9.389e-02
## It: 739; obj: 2.325e+00; abs: 7.559e-06; rel: 3.251e-06; norm: 9.387e-02
## It: 740; obj: 2.325e+00; abs: 1.020e-04; rel: 4.388e-05; norm: 9.384e-02
## It: 741; obj: 2.325e+00; abs: 1.362e-04; rel: 5.858e-05; norm: 9.383e-02
## It: 742; obj: 2.325e+00; abs: 7.838e-05; rel: 3.371e-05; norm: 9.384e-02
## It: 743; obj: 2.325e+00; abs: 5.337e-05; rel: 2.295e-05; norm: 9.386e-02
## It: 744; obj: 2.326e+00; abs: 6.285e-05; rel: 2.703e-05; norm: 9.387e-02
## It: 745; obj: 2.326e+00; abs: 4.544e-05; rel: 1.954e-05; norm: 9.388e-02
## It: 746; obj: 2.325e+00; abs: 7.598e-05; rel: 3.267e-05; norm: 9.389e-02
## It: 747; obj: 2.325e+00; abs: 2.359e-04; rel: 1.014e-04; norm: 9.388e-02
## It: 748; obj: 2.325e+00; abs: 1.503e-04; rel: 6.465e-05; norm: 9.388e-02
## It: 749; obj: 2.325e+00; abs: 1.504e-05; rel: 6.471e-06; norm: 9.387e-02
## It: 750; obj: 2.325e+00; abs: 7.767e-05; rel: 3.340e-05; norm: 9.387e-02
## It: 751; obj: 2.325e+00; abs: 9.521e-05; rel: 4.095e-05; norm: 9.386e-02
## It: 752; obj: 2.325e+00; abs: 1.367e-04; rel: 5.880e-05; norm: 9.386e-02
## It: 753; obj: 2.326e+00; abs: 1.314e-04; rel: 5.652e-05; norm: 9.387e-02
## It: 754; obj: 2.326e+00; abs: 7.612e-05; rel: 3.273e-05; norm: 9.387e-02
## It: 755; obj: 2.326e+00; abs: 2.040e-05; rel: 8.770e-06; norm: 9.388e-02
## It: 756; obj: 2.326e+00; abs: 3.794e-05; rel: 1.631e-05; norm: 9.387e-02
## It: 757; obj: 2.325e+00; abs: 2.383e-04; rel: 1.025e-04; norm: 9.387e-02
## It: 758; obj: 2.325e+00; abs: 3.159e-04; rel: 1.359e-04; norm: 9.385e-02
## It: 759; obj: 2.325e+00; abs: 6.292e-06; rel: 2.706e-06; norm: 9.385e-02
## It: 760; obj: 2.325e+00; abs: 2.830e-05; rel: 1.217e-05; norm: 9.387e-02
## It: 761; obj: 2.325e+00; abs: 2.990e-05; rel: 1.286e-05; norm: 9.388e-02
## It: 762; obj: 2.325e+00; abs: 1.658e-05; rel: 7.132e-06; norm: 9.388e-02
## It: 763; obj: 2.325e+00; abs: 6.645e-06; rel: 2.858e-06; norm: 9.388e-02
## It: 764; obj: 2.325e+00; abs: 1.064e-05; rel: 4.576e-06; norm: 9.388e-02
## It: 765; obj: 2.325e+00; abs: 6.010e-05; rel: 2.585e-05; norm: 9.388e-02
## It: 766; obj: 2.325e+00; abs: 8.843e-05; rel: 3.803e-05; norm: 9.387e-02
## It: 767; obj: 2.325e+00; abs: 3.484e-05; rel: 1.499e-05; norm: 9.387e-02
## It: 768; obj: 2.325e+00; abs: 2.380e-05; rel: 1.024e-05; norm: 9.387e-02
## It: 769; obj: 2.325e+00; abs: 1.978e-05; rel: 8.507e-06; norm: 9.386e-02
## It: 770; obj: 2.325e+00; abs: 2.799e-05; rel: 1.204e-05; norm: 9.385e-02
```

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## It: 771; obj: 2.325e+00; abs: 1.566e-04; rel: 6.736e-05; norm: 9.384e-02
## It: 772; obj: 2.325e+00; abs: 1.235e-04; rel: 5.312e-05; norm: 9.384e-02
## It: 773; obj: 2.325e+00; abs: 1.107e-04; rel: 4.760e-05; norm: 9.386e-02
## It: 774; obj: 2.325e+00; abs: 1.703e-04; rel: 7.323e-05; norm: 9.388e-02
## It: 775; obj: 2.325e+00; abs: 9.616e-05; rel: 4.136e-05; norm: 9.389e-02
## It: 776; obj: 2.325e+00; abs: 7.828e-06; rel: 3.367e-06; norm: 9.389e-02
## It: 777; obj: 2.325e+00; abs: 1.516e-04; rel: 6.519e-05; norm: 9.388e-02
## It: 778; obj: 2.325e+00; abs: 1.591e-04; rel: 6.843e-05; norm: 9.387e-02
## It: 779; obj: 2.325e+00; abs: 7.172e-06; rel: 3.085e-06; norm: 9.387e-02
## It: 780; obj: 2.325e+00; abs: 7.997e-05; rel: 3.440e-05; norm: 9.386e-02
## It: 781; obj: 2.325e+00; abs: 1.118e-04; rel: 4.807e-05; norm: 9.385e-02
## It: 782; obj: 2.325e+00; abs: 9.880e-05; rel: 4.249e-05; norm: 9.385e-02
## It: 783; obj: 2.325e+00; abs: 1.506e-04; rel: 6.476e-05; norm: 9.386e-02
## It: 784; obj: 2.326e+00; abs: 1.373e-04; rel: 5.903e-05; norm: 9.387e-02
## It: 785; obj: 2.326e+00; abs: 1.035e-04; rel: 4.449e-05; norm: 9.388e-02
## It: 786; obj: 2.326e+00; abs: 7.249e-05; rel: 3.117e-05; norm: 9.388e-02
## It: 787; obj: 2.326e+00; abs: 3.790e-07; rel: 1.629e-07; norm: 9.387e-02
## It: 788; obj: 2.326e+00; abs: 5.016e-05; rel: 2.157e-05; norm: 9.386e-02
## It: 789; obj: 2.326e+00; abs: 1.812e-04; rel: 7.789e-05; norm: 9.386e-02
## It: 790; obj: 2.325e+00; abs: 4.466e-04; rel: 1.920e-04; norm: 9.387e-02
## It: 791; obj: 2.325e+00; abs: 1.235e-04; rel: 5.311e-05; norm: 9.387e-02
## It: 792; obj: 2.325e+00; abs: 8.411e-05; rel: 3.617e-05; norm: 9.386e-02
## It: 793; obj: 2.325e+00; abs: 1.295e-04; rel: 5.569e-05; norm: 9.385e-02
## It: 794; obj: 2.325e+00; abs: 8.742e-05; rel: 3.760e-05; norm: 9.384e-02
## It: 795; obj: 2.325e+00; abs: 1.259e-04; rel: 5.412e-05; norm: 9.385e-02
## It: 796; obj: 2.326e+00; abs: 1.407e-04; rel: 6.050e-05; norm: 9.387e-02
## It: 797; obj: 2.326e+00; abs: 7.521e-05; rel: 3.234e-05; norm: 9.388e-02
## It: 798; obj: 2.326e+00; abs: 2.084e-05; rel: 8.961e-06; norm: 9.387e-02
## It: 799; obj: 2.326e+00; abs: 4.916e-05; rel: 2.114e-05; norm: 9.386e-02
## It: 800; obj: 2.325e+00; abs: 2.164e-04; rel: 9.307e-05; norm: 9.386e-02
## It: 801; obj: 2.325e+00; abs: 3.292e-04; rel: 1.416e-04; norm: 9.387e-02
## It: 802; obj: 2.325e+00; abs: 1.191e-04; rel: 5.124e-05; norm: 9.387e-02
## It: 803; obj: 2.325e+00; abs: 7.858e-05; rel: 3.380e-05; norm: 9.386e-02
## It: 804; obj: 2.325e+00; abs: 1.316e-04; rel: 5.662e-05; norm: 9.384e-02
## It: 805; obj: 2.325e+00; abs: 1.248e-04; rel: 5.367e-05; norm: 9.383e-02
## It: 806; obj: 2.325e+00; abs: 8.323e-05; rel: 3.579e-05; norm: 9.383e-02
## It: 807; obj: 2.325e+00; abs: 1.603e-05; rel: 6.893e-06; norm: 9.384e-02
## It: 808; obj: 2.325e+00; abs: 5.273e-05; rel: 2.268e-05; norm: 9.384e-02
## It: 809; obj: 2.325e+00; abs: 8.428e-05; rel: 3.624e-05; norm: 9.384e-02
## It: 810; obj: 2.325e+00; abs: 1.216e-04; rel: 5.227e-05; norm: 9.385e-02
## It: 811; obj: 2.325e+00; abs: 6.362e-05; rel: 2.736e-05; norm: 9.387e-02
## It: 812; obj: 2.325e+00; abs: 8.098e-05; rel: 3.483e-05; norm: 9.388e-02
## It: 813; obj: 2.325e+00; abs: 2.110e-04; rel: 9.077e-05; norm: 9.387e-02
## It: 814; obj: 2.325e+00; abs: 1.249e-04; rel: 5.370e-05; norm: 9.387e-02
## It: 815; obj: 2.325e+00; abs: 1.209e-05; rel: 5.200e-06; norm: 9.387e-02
## It: 816; obj: 2.325e+00; abs: 1.741e-04; rel: 7.486e-05; norm: 9.387e-02
## It: 817; obj: 2.325e+00; abs: 2.156e-04; rel: 9.274e-05; norm: 9.388e-02
## It: 818; obj: 2.325e+00; abs: 4.874e-05; rel: 2.096e-05; norm: 9.386e-02
## It: 819; obj: 2.325e+00; abs: 7.406e-05; rel: 3.185e-05; norm: 9.384e-02
## It: 820; obj: 2.325e+00; abs: 4.130e-05; rel: 1.776e-05; norm: 9.383e-02
## It: 821; obj: 2.325e+00; abs: 4.263e-05; rel: 1.833e-05; norm: 9.383e-02
## It: 822; obj: 2.325e+00; abs: 7.851e-05; rel: 3.377e-05; norm: 9.386e-02
## It: 823; obj: 2.325e+00; abs: 1.824e-05; rel: 7.845e-06; norm: 9.388e-02
## It: 824; obj: 2.325e+00; abs: 1.447e-04; rel: 6.224e-05; norm: 9.388e-02
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## It: 826; obj: 2.325e+00; abs: 7.106e-05; rel: 3.056e-05; norm: 9.387e-02
## It: 827; obj: 2.325e+00; abs: 2.124e-04; rel: 9.134e-05; norm: 9.387e-02
## It: 828; obj: 2.325e+00; abs: 1.529e-04; rel: 6.577e-05; norm: 9.387e-02
## It: 829; obj: 2.325e+00; abs: 1.229e-05; rel: 5.284e-06; norm: 9.387e-02
## It: 830; obj: 2.325e+00; abs: 1.061e-04; rel: 4.565e-05; norm: 9.385e-02
## It: 831; obj: 2.325e+00; abs: 1.349e-04; rel: 5.802e-05; norm: 9.383e-02
## It: 832; obj: 2.325e+00; abs: 9.948e-05; rel: 4.279e-05; norm: 9.383e-02
## It: 833; obj: 2.325e+00; abs: 3.093e-05; rel: 1.330e-05; norm: 9.384e-02
## It: 834; obj: 2.325e+00; abs: 9.098e-05; rel: 3.913e-05; norm: 9.384e-02
## It: 835; obj: 2.325e+00; abs: 1.939e-04; rel: 8.337e-05; norm: 9.384e-02
## It: 836; obj: 2.325e+00; abs: 7.984e-05; rel: 3.434e-05; norm: 9.384e-02
## It: 837; obj: 2.325e+00; abs: 2.198e-06; rel: 9.456e-07; norm: 9.386e-02
## It: 838; obj: 2.325e+00; abs: 5.557e-05; rel: 2.390e-05; norm: 9.387e-02
## It: 839; obj: 2.325e+00; abs: 5.646e-05; rel: 2.428e-05; norm: 9.388e-02
## It: 840; obj: 2.325e+00; abs: 1.522e-05; rel: 6.548e-06; norm: 9.387e-02
## It: 841; obj: 2.325e+00; abs: 1.355e-05; rel: 5.830e-06; norm: 9.387e-02
## It: 842; obj: 2.325e+00; abs: 1.181e-05; rel: 5.078e-06; norm: 9.387e-02
## It: 843; obj: 2.325e+00; abs: 1.327e-05; rel: 5.709e-06; norm: 9.387e-02
## It: 844; obj: 2.325e+00; abs: 5.993e-05; rel: 2.577e-05; norm: 9.387e-02
## It: 845; obj: 2.325e+00; abs: 7.255e-05; rel: 3.120e-05; norm: 9.387e-02
## It: 846; obj: 2.325e+00; abs: 4.216e-05; rel: 1.813e-05; norm: 9.386e-02
## It: 847; obj: 2.325e+00; abs: 1.945e-05; rel: 8.367e-06; norm: 9.386e-02
## It: 848; obj: 2.325e+00; abs: 8.921e-06; rel: 3.837e-06; norm: 9.386e-02
## It: 849; obj: 2.325e+00; abs: 2.251e-05; rel: 9.682e-06; norm: 9.385e-02
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## It: 852; obj: 2.325e+00; abs: 6.210e-05; rel: 2.671e-05; norm: 9.385e-02
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## It: 855; obj: 2.325e+00; abs: 1.347e-05; rel: 5.795e-06; norm: 9.388e-02
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## It: 857; obj: 2.325e+00; abs: 6.742e-05; rel: 2.900e-05; norm: 9.387e-02
## It: 858; obj: 2.325e+00; abs: 1.081e-05; rel: 4.651e-06; norm: 9.387e-02
## It: 859; obj: 2.325e+00; abs: 8.549e-05; rel: 3.677e-05; norm: 9.387e-02
## It: 860; obj: 2.325e+00; abs: 9.608e-05; rel: 4.132e-05; norm: 9.386e-02
## It: 861; obj: 2.325e+00; abs: 1.171e-04; rel: 5.037e-05; norm: 9.385e-02
## It: 862; obj: 2.325e+00; abs: 1.147e-04; rel: 4.934e-05; norm: 9.385e-02
## It: 863; obj: 2.325e+00; abs: 6.472e-05; rel: 2.783e-05; norm: 9.386e-02
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## It: 865; obj: 2.325e+00; abs: 5.779e-05; rel: 2.485e-05; norm: 9.386e-02
## It: 866; obj: 2.325e+00; abs: 3.509e-04; rel: 1.509e-04; norm: 9.385e-02
## It: 867; obj: 2.325e+00; abs: 1.452e-04; rel: 6.244e-05; norm: 9.384e-02
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## It: 869; obj: 2.325e+00; abs: 2.712e-05; rel: 1.167e-05; norm: 9.387e-02
## It: 870; obj: 2.325e+00; abs: 1.792e-05; rel: 7.709e-06; norm: 9.387e-02
## It: 871; obj: 2.325e+00; abs: 6.493e-06; rel: 2.793e-06; norm: 9.387e-02
## It: 872; obj: 2.325e+00; abs: 5.256e-06; rel: 2.260e-06; norm: 9.387e-02
## It: 873; obj: 2.325e+00; abs: 2.927e-05; rel: 1.259e-05; norm: 9.387e-02
## It: 874; obj: 2.325e+00; abs: 8.384e-05; rel: 3.606e-05; norm: 9.387e-02
## It: 875; obj: 2.325e+00; abs: 7.302e-05; rel: 3.140e-05; norm: 9.386e-02
## It: 876; obj: 2.325e+00; abs: 1.680e-05; rel: 7.226e-06; norm: 9.386e-02
## It: 877; obj: 2.325e+00; abs: 1.570e-05; rel: 6.751e-06; norm: 9.386e-02
## It: 878; obj: 2.325e+00; abs: 8.504e-06; rel: 3.657e-06; norm: 9.385e-02
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## It: 879; obj: 2.325e+00; abs: 6.082e-05; rel: 2.616e-05; norm: 9.384e-02
## It: 880; obj: 2.325e+00; abs: 2.110e-04; rel: 9.074e-05; norm: 9.383e-02
## It: 881; obj: 2.325e+00; abs: 5.297e-05; rel: 2.279e-05; norm: 9.384e-02
## It: 882; obj: 2.325e+00; abs: 1.471e-04; rel: 6.326e-05; norm: 9.386e-02
## It: 883; obj: 2.325e+00; abs: 1.445e-04; rel: 6.214e-05; norm: 9.388e-02
## It: 884; obj: 2.325e+00; abs: 6.452e-05; rel: 2.775e-05; norm: 9.388e-02
## It: 885; obj: 2.325e+00; abs: 5.378e-05; rel: 2.313e-05; norm: 9.388e-02
## It: 886; obj: 2.325e+00; abs: 1.830e-04; rel: 7.871e-05; norm: 9.387e-02
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## It: 889; obj: 2.325e+00; abs: 1.047e-04; rel: 4.503e-05; norm: 9.386e-02
## It: 890; obj: 2.325e+00; abs: 1.020e-04; rel: 4.386e-05; norm: 9.385e-02
## It: 891; obj: 2.325e+00; abs: 1.244e-04; rel: 5.349e-05; norm: 9.385e-02
## It: 892; obj: 2.325e+00; abs: 1.447e-04; rel: 6.221e-05; norm: 9.386e-02
## It: 893; obj: 2.326e+00; abs: 1.036e-04; rel: 4.455e-05; norm: 9.387e-02
## It: 894; obj: 2.326e+00; abs: 6.697e-05; rel: 2.880e-05; norm: 9.387e-02
## It: 895; obj: 2.326e+00; abs: 9.534e-06; rel: 4.100e-06; norm: 9.387e-02
## It: 896; obj: 2.326e+00; abs: 1.114e-04; rel: 4.791e-05; norm: 9.387e-02
## It: 897; obj: 2.325e+00; abs: 1.653e-04; rel: 7.108e-05; norm: 9.386e-02
## It: 898; obj: 2.325e+00; abs: 2.419e-04; rel: 1.040e-04; norm: 9.387e-02
## It: 899; obj: 2.325e+00; abs: 2.028e-04; rel: 8.724e-05; norm: 9.387e-02
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## It: 901; obj: 2.325e+00; abs: 4.712e-05; rel: 2.027e-05; norm: 9.386e-02
## It: 902; obj: 2.325e+00; abs: 6.997e-05; rel: 3.009e-05; norm: 9.386e-02
## It: 903; obj: 2.325e+00; abs: 9.946e-05; rel: 4.278e-05; norm: 9.386e-02
## It: 904; obj: 2.325e+00; abs: 1.525e-04; rel: 6.558e-05; norm: 9.386e-02
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## It: 907; obj: 2.325e+00; abs: 6.616e-05; rel: 2.845e-05; norm: 9.387e-02
## It: 908; obj: 2.325e+00; abs: 2.757e-04; rel: 1.185e-04; norm: 9.387e-02
## It: 909; obj: 2.325e+00; abs: 1.178e-04; rel: 5.065e-05; norm: 9.387e-02
## It: 910; obj: 2.325e+00; abs: 4.861e-05; rel: 2.091e-05; norm: 9.387e-02
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## It: 915; obj: 2.325e+00; abs: 4.605e-05; rel: 1.981e-05; norm: 9.386e-02
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## It: 920; obj: 2.325e+00; abs: 2.226e-05; rel: 9.573e-06; norm: 9.384e-02
## It: 921; obj: 2.325e+00; abs: 1.053e-05; rel: 4.528e-06; norm: 9.385e-02
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## It: 926; obj: 2.325e+00; abs: 2.295e-05; rel: 9.869e-06; norm: 9.386e-02
## It: 927; obj: 2.325e+00; abs: 7.159e-05; rel: 3.079e-05; norm: 9.386e-02
## It: 928; obj: 2.325e+00; abs: 1.947e-05; rel: 8.375e-06; norm: 9.386e-02
## It: 929; obj: 2.325e+00; abs: 5.482e-06; rel: 2.358e-06; norm: 9.387e-02
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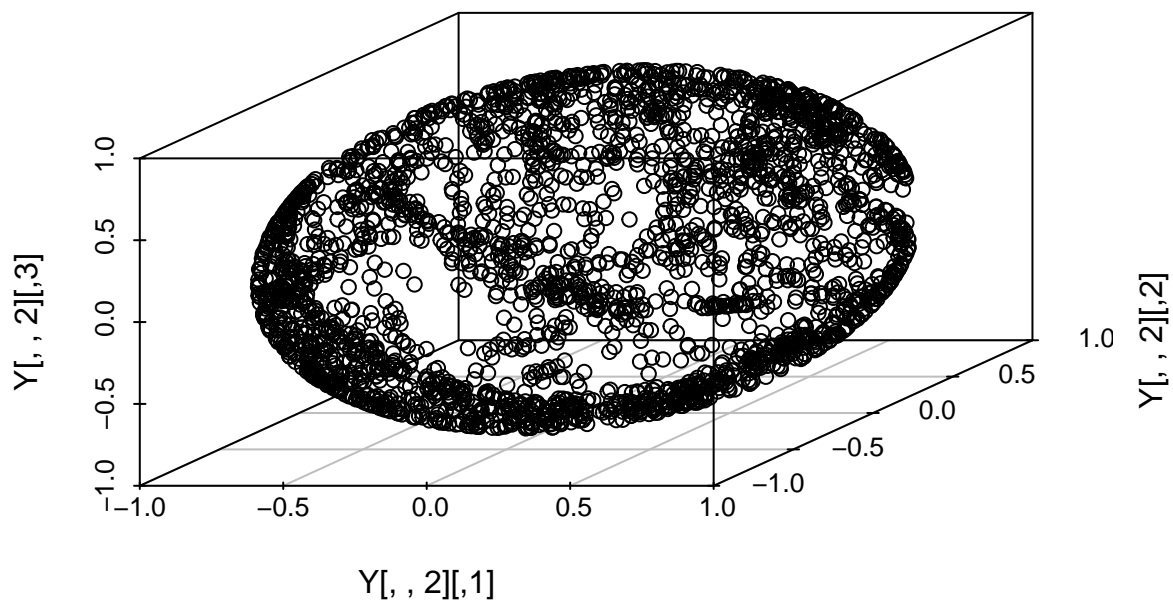
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## It: 949; obj: 2.325e+00; abs: 1.283e-04; rel: 5.519e-05; norm: 9.386e-02
## It: 950; obj: 2.325e+00; abs: 6.106e-05; rel: 2.626e-05; norm: 9.387e-02
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## It: 952; obj: 2.325e+00; abs: 5.481e-05; rel: 2.358e-05; norm: 9.387e-02
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## It: 954; obj: 2.325e+00; abs: 9.045e-05; rel: 3.890e-05; norm: 9.385e-02
## It: 955; obj: 2.325e+00; abs: 6.209e-05; rel: 2.671e-05; norm: 9.385e-02
## It: 956; obj: 2.325e+00; abs: 2.260e-05; rel: 9.721e-06; norm: 9.385e-02
## It: 957; obj: 2.325e+00; abs: 5.426e-05; rel: 2.334e-05; norm: 9.385e-02
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## It: 965; obj: 2.325e+00; abs: 1.750e-05; rel: 7.527e-06; norm: 9.387e-02
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## It: 967; obj: 2.325e+00; abs: 9.717e-07; rel: 4.180e-07; norm: 9.386e-02
## It: 968; obj: 2.325e+00; abs: 8.693e-06; rel: 3.739e-06; norm: 9.387e-02
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## It: 984; obj: 2.325e+00; abs: 3.759e-05; rel: 1.617e-05; norm: 9.385e-02
## It: 985; obj: 2.325e+00; abs: 2.268e-05; rel: 9.757e-06; norm: 9.386e-02
## It: 986; obj: 2.325e+00; abs: 8.921e-05; rel: 3.837e-05; norm: 9.387e-02
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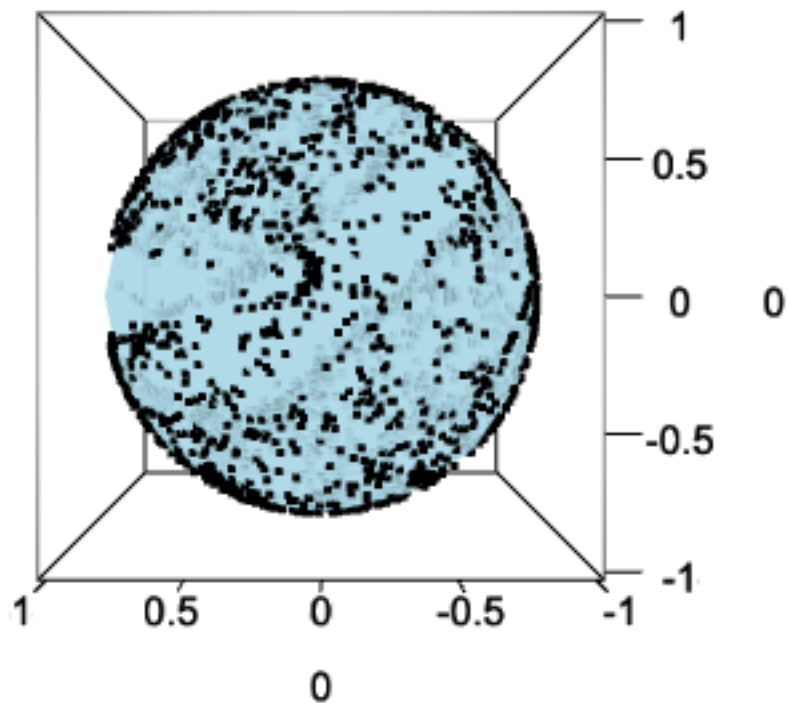
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## It: 991; obj: 2.325e+00; abs: 8.402e-05; rel: 3.614e-05; norm: 9.387e-02
## It: 992; obj: 2.325e+00; abs: 8.964e-05; rel: 3.856e-05; norm: 9.387e-02
## It: 993; obj: 2.325e+00; abs: 8.359e-06; rel: 3.596e-06; norm: 9.386e-02
## It: 994; obj: 2.325e+00; abs: 9.950e-05; rel: 4.280e-05; norm: 9.385e-02
## It: 995; obj: 2.325e+00; abs: 9.109e-05; rel: 3.918e-05; norm: 9.384e-02
## It: 996; obj: 2.325e+00; abs: 5.366e-05; rel: 2.308e-05; norm: 9.384e-02
## It: 997; obj: 2.325e+00; abs: 2.053e-05; rel: 8.831e-06; norm: 9.384e-02
## It: 998; obj: 2.325e+00; abs: 1.024e-04; rel: 4.405e-05; norm: 9.384e-02
## It: 999; obj: 2.325e+00; abs: 9.799e-05; rel: 4.215e-05; norm: 9.385e-02
## It: 1000; obj: 2.325e+00; abs: 5.356e-05; rel: 2.304e-05; norm: 9.385e-02
```


Iteration 1000

```
rgl::plot3d(0, 0, 0, xlim = c(-1, 1), ylim = c(-1, 1), zlim = c(-1, 1),
            radius = 1, type = "s", col = "lightblue", alpha = 0.8,
            lit = FALSE)
rgl::points3d(Y, col = rep(1, nrow(Y)))
rgl.viewpoint(theta=180, phi=90, zoom=.9)
```

Let's do the same but initializing the resultant reduced dimension data with optimized evenly space points:

```
Y <- psc_sne(X=jdf_pscsne, d=2,
             rho_psc_list = rho_30,
             num_iteration=1000, init = "equispaced")
```

```
## It: 1; obj: 2.367e+01; abs: 0.000e+00; rel: 0.000e+00; norm: 9.672e-02
## It: 2; obj: 2.196e+01; abs: 1.713e+00; rel: 7.235e-02; norm: 1.793e-01
## It: 3; obj: 2.058e+01; abs: 1.376e+00; rel: 6.266e-02; norm: 3.071e-01
## It: 4; obj: 1.966e+01; abs: 9.253e-01; rel: 4.496e-02; norm: 4.199e-01
## It: 5; obj: 1.902e+01; abs: 6.388e-01; rel: 3.250e-02; norm: 4.953e-01
## It: 6; obj: 1.854e+01; abs: 4.734e-01; rel: 2.490e-02; norm: 5.453e-01
## It: 7; obj: 1.817e+01; abs: 3.750e-01; rel: 2.022e-02; norm: 5.812e-01
## It: 8; obj: 1.786e+01; abs: 3.062e-01; rel: 1.685e-02; norm: 6.073e-01
## It: 9; obj: 1.762e+01; abs: 2.442e-01; rel: 1.367e-02; norm: 6.266e-01
## It: 10; obj: 1.742e+01; abs: 1.989e-01; rel: 1.129e-02; norm: 6.406e-01
## It: 11; obj: 1.725e+01; abs: 1.709e-01; rel: 9.811e-03; norm: 6.514e-01
## It: 12; obj: 1.710e+01; abs: 1.522e-01; rel: 8.824e-03; norm: 6.599e-01
## It: 13; obj: 1.696e+01; abs: 1.344e-01; rel: 7.861e-03; norm: 6.668e-01
## It: 14; obj: 1.684e+01; abs: 1.175e-01; rel: 6.925e-03; norm: 6.723e-01
## It: 15; obj: 1.674e+01; abs: 1.037e-01; rel: 6.156e-03; norm: 6.765e-01
## It: 16; obj: 1.665e+01; abs: 9.274e-02; rel: 5.540e-03; norm: 6.797e-01
## It: 17; obj: 1.657e+01; abs: 8.273e-02; rel: 4.969e-03; norm: 6.822e-01
## It: 18; obj: 1.649e+01; abs: 7.376e-02; rel: 4.453e-03; norm: 6.843e-01
```

```
## It: 19; obj: 1.642e+01; abs: 6.705e-02; rel: 4.066e-03; norm: 6.862e-01
## It: 20; obj: 1.636e+01; abs: 6.270e-02; rel: 3.818e-03; norm: 6.878e-01
## It: 21; obj: 1.630e+01; abs: 5.923e-02; rel: 3.620e-03; norm: 6.893e-01
## It: 22; obj: 1.625e+01; abs: 5.534e-02; rel: 3.395e-03; norm: 6.906e-01
## It: 23; obj: 1.620e+01; abs: 5.103e-02; rel: 3.141e-03; norm: 6.916e-01
## It: 24; obj: 1.615e+01; abs: 4.725e-02; rel: 2.918e-03; norm: 6.925e-01
## It: 25; obj: 1.610e+01; abs: 4.427e-02; rel: 2.741e-03; norm: 6.931e-01
## It: 26; obj: 1.606e+01; abs: 4.176e-02; rel: 2.593e-03; norm: 6.935e-01
## It: 27; obj: 1.602e+01; abs: 3.951e-02; rel: 2.460e-03; norm: 6.938e-01
## It: 28; obj: 1.599e+01; abs: 3.738e-02; rel: 2.333e-03; norm: 6.939e-01
## It: 29; obj: 1.595e+01; abs: 3.527e-02; rel: 2.206e-03; norm: 6.939e-01
## It: 30; obj: 1.592e+01; abs: 3.318e-02; rel: 2.080e-03; norm: 6.937e-01
## It: 31; obj: 1.589e+01; abs: 3.106e-02; rel: 1.951e-03; norm: 6.935e-01
## It: 32; obj: 1.586e+01; abs: 2.887e-02; rel: 1.817e-03; norm: 6.932e-01
## It: 33; obj: 1.583e+01; abs: 2.675e-02; rel: 1.687e-03; norm: 6.929e-01
## It: 34; obj: 1.581e+01; abs: 2.482e-02; rel: 1.568e-03; norm: 6.927e-01
## It: 35; obj: 1.578e+01; abs: 2.245e-02; rel: 1.420e-03; norm: 6.925e-01
## It: 36; obj: 1.576e+01; abs: 2.003e-02; rel: 1.269e-03; norm: 6.924e-01
## It: 37; obj: 1.575e+01; abs: 1.805e-02; rel: 1.145e-03; norm: 6.923e-01
## It: 38; obj: 1.573e+01; abs: 1.631e-02; rel: 1.036e-03; norm: 6.923e-01
## It: 39; obj: 1.571e+01; abs: 1.490e-02; rel: 9.476e-04; norm: 6.923e-01
## It: 40; obj: 1.570e+01; abs: 1.394e-02; rel: 8.869e-04; norm: 6.923e-01
## It: 41; obj: 1.569e+01; abs: 1.332e-02; rel: 8.482e-04; norm: 6.924e-01
## It: 42; obj: 1.567e+01; abs: 1.288e-02; rel: 8.213e-04; norm: 6.925e-01
## It: 43; obj: 1.566e+01; abs: 1.238e-02; rel: 7.899e-04; norm: 6.927e-01
## It: 44; obj: 1.565e+01; abs: 1.172e-02; rel: 7.486e-04; norm: 6.930e-01
## It: 45; obj: 1.564e+01; abs: 1.100e-02; rel: 7.029e-04; norm: 6.932e-01
## It: 46; obj: 1.563e+01; abs: 1.027e-02; rel: 6.565e-04; norm: 6.935e-01
## It: 47; obj: 1.562e+01; abs: 9.634e-03; rel: 6.165e-04; norm: 6.939e-01
## It: 48; obj: 1.561e+01; abs: 9.142e-03; rel: 5.853e-04; norm: 6.942e-01
## It: 49; obj: 1.560e+01; abs: 8.712e-03; rel: 5.581e-04; norm: 6.946e-01
## It: 50; obj: 1.559e+01; abs: 8.204e-03; rel: 5.258e-04; norm: 6.949e-01
## It: 51; obj: 1.559e+01; abs: 7.616e-03; rel: 4.884e-04; norm: 6.953e-01
## It: 52; obj: 1.558e+01; abs: 7.073e-03; rel: 4.538e-04; norm: 6.958e-01
## It: 53; obj: 1.557e+01; abs: 6.613e-03; rel: 4.245e-04; norm: 6.962e-01
## It: 54; obj: 1.557e+01; abs: 6.181e-03; rel: 3.969e-04; norm: 6.966e-01
## It: 55; obj: 1.556e+01; abs: 5.735e-03; rel: 3.684e-04; norm: 6.971e-01
## It: 56; obj: 1.555e+01; abs: 5.328e-03; rel: 3.425e-04; norm: 6.976e-01
## It: 57; obj: 1.555e+01; abs: 5.008e-03; rel: 3.220e-04; norm: 6.981e-01
## It: 58; obj: 1.554e+01; abs: 4.767e-03; rel: 3.066e-04; norm: 6.986e-01
## It: 59; obj: 1.554e+01; abs: 4.579e-03; rel: 2.945e-04; norm: 6.991e-01
## It: 60; obj: 1.554e+01; abs: 4.411e-03; rel: 2.839e-04; norm: 6.996e-01
## It: 61; obj: 1.553e+01; abs: 4.276e-03; rel: 2.752e-04; norm: 7.002e-01
## It: 62; obj: 1.553e+01; abs: 4.205e-03; rel: 2.708e-04; norm: 7.007e-01
## It: 63; obj: 1.552e+01; abs: 4.179e-03; rel: 2.692e-04; norm: 7.013e-01
## It: 64; obj: 1.552e+01; abs: 4.133e-03; rel: 2.663e-04; norm: 7.019e-01
## It: 65; obj: 1.551e+01; abs: 4.015e-03; rel: 2.587e-04; norm: 7.025e-01
## It: 66; obj: 1.551e+01; abs: 3.819e-03; rel: 2.461e-04; norm: 7.030e-01
## It: 67; obj: 1.551e+01; abs: 3.586e-03; rel: 2.312e-04; norm: 7.036e-01
## It: 68; obj: 1.550e+01; abs: 3.376e-03; rel: 2.177e-04; norm: 7.042e-01
## It: 69; obj: 1.550e+01; abs: 3.224e-03; rel: 2.079e-04; norm: 7.048e-01
## It: 70; obj: 1.550e+01; abs: 3.137e-03; rel: 2.024e-04; norm: 7.053e-01
## It: 71; obj: 1.549e+01; abs: 3.109e-03; rel: 2.006e-04; norm: 7.059e-01
## It: 72; obj: 1.549e+01; abs: 3.127e-03; rel: 2.018e-04; norm: 7.064e-01
```

```
## It: 73; obj: 1.549e+01; abs: 3.178e-03; rel: 2.052e-04; norm: 7.070e-01
## It: 74; obj: 1.548e+01; abs: 3.246e-03; rel: 2.096e-04; norm: 7.075e-01
## It: 75; obj: 1.548e+01; abs: 3.316e-03; rel: 2.142e-04; norm: 7.080e-01
## It: 76; obj: 1.548e+01; abs: 3.380e-03; rel: 2.183e-04; norm: 7.086e-01
## It: 77; obj: 1.547e+01; abs: 3.437e-03; rel: 2.220e-04; norm: 7.091e-01
## It: 78; obj: 1.547e+01; abs: 3.493e-03; rel: 2.257e-04; norm: 7.096e-01
## It: 79; obj: 1.547e+01; abs: 3.562e-03; rel: 2.302e-04; norm: 7.101e-01
## It: 80; obj: 1.546e+01; abs: 3.654e-03; rel: 2.362e-04; norm: 7.105e-01
## It: 81; obj: 1.546e+01; abs: 3.768e-03; rel: 2.437e-04; norm: 7.110e-01
## It: 82; obj: 1.546e+01; abs: 3.900e-03; rel: 2.523e-04; norm: 7.114e-01
## It: 83; obj: 1.545e+01; abs: 4.041e-03; rel: 2.615e-04; norm: 7.119e-01
## It: 84; obj: 1.545e+01; abs: 4.184e-03; rel: 2.708e-04; norm: 7.123e-01
## It: 85; obj: 1.544e+01; abs: 4.323e-03; rel: 2.798e-04; norm: 7.127e-01
## It: 86; obj: 1.544e+01; abs: 4.456e-03; rel: 2.885e-04; norm: 7.131e-01
## It: 87; obj: 1.543e+01; abs: 4.585e-03; rel: 2.970e-04; norm: 7.135e-01
## It: 88; obj: 1.543e+01; abs: 4.712e-03; rel: 3.053e-04; norm: 7.138e-01
## It: 89; obj: 1.543e+01; abs: 4.836e-03; rel: 3.134e-04; norm: 7.142e-01
## It: 90; obj: 1.542e+01; abs: 4.954e-03; rel: 3.212e-04; norm: 7.145e-01
## It: 91; obj: 1.542e+01; abs: 5.063e-03; rel: 3.283e-04; norm: 7.149e-01
## It: 92; obj: 1.541e+01; abs: 5.158e-03; rel: 3.346e-04; norm: 7.152e-01
## It: 93; obj: 1.540e+01; abs: 5.241e-03; rel: 3.401e-04; norm: 7.155e-01
## It: 94; obj: 1.540e+01; abs: 5.315e-03; rel: 3.450e-04; norm: 7.158e-01
## It: 95; obj: 1.539e+01; abs: 5.382e-03; rel: 3.495e-04; norm: 7.161e-01
## It: 96; obj: 1.539e+01; abs: 5.443e-03; rel: 3.536e-04; norm: 7.164e-01
## It: 97; obj: 1.538e+01; abs: 5.499e-03; rel: 3.574e-04; norm: 7.166e-01
## It: 98; obj: 1.538e+01; abs: 5.549e-03; rel: 3.607e-04; norm: 7.169e-01
## It: 99; obj: 1.537e+01; abs: 5.589e-03; rel: 3.634e-04; norm: 7.172e-01
## It: 100; obj: 1.537e+01; abs: 5.613e-03; rel: 3.652e-04; norm: 7.175e-01
## It: 101; obj: 2.417e+00; abs: 1.295e+01; rel: 8.427e-01; norm: 9.346e-02
## It: 102; obj: 2.385e+00; abs: 3.273e-02; rel: 1.354e-02; norm: 9.434e-02
## It: 103; obj: 2.364e+00; abs: 2.058e-02; rel: 8.629e-03; norm: 9.528e-02
## It: 104; obj: 2.352e+00; abs: 1.254e-02; rel: 5.304e-03; norm: 9.591e-02
## It: 105; obj: 2.344e+00; abs: 7.895e-03; rel: 3.357e-03; norm: 9.619e-02
## It: 106; obj: 2.339e+00; abs: 5.119e-03; rel: 2.184e-03; norm: 9.625e-02
## It: 107; obj: 2.335e+00; abs: 3.474e-03; rel: 1.485e-03; norm: 9.619e-02
## It: 108; obj: 2.333e+00; abs: 2.513e-03; rel: 1.076e-03; norm: 9.612e-02
## It: 109; obj: 2.331e+00; abs: 1.932e-03; rel: 8.282e-04; norm: 9.606e-02
## It: 110; obj: 2.329e+00; abs: 1.563e-03; rel: 6.707e-04; norm: 9.604e-02
## It: 111; obj: 2.328e+00; abs: 1.325e-03; rel: 5.689e-04; norm: 9.603e-02
## It: 112; obj: 2.327e+00; abs: 1.169e-03; rel: 5.022e-04; norm: 9.604e-02
## It: 113; obj: 2.326e+00; abs: 1.066e-03; rel: 4.581e-04; norm: 9.605e-02
## It: 114; obj: 2.325e+00; abs: 9.963e-04; rel: 4.284e-04; norm: 9.607e-02
## It: 115; obj: 2.324e+00; abs: 9.468e-04; rel: 4.073e-04; norm: 9.610e-02
## It: 116; obj: 2.323e+00; abs: 9.060e-04; rel: 3.899e-04; norm: 9.613e-02
## It: 117; obj: 2.322e+00; abs: 8.683e-04; rel: 3.738e-04; norm: 9.616e-02
## It: 118; obj: 2.321e+00; abs: 8.320e-04; rel: 3.583e-04; norm: 9.619e-02
## It: 119; obj: 2.320e+00; abs: 7.925e-04; rel: 3.414e-04; norm: 9.623e-02
## It: 120; obj: 2.320e+00; abs: 7.471e-04; rel: 3.220e-04; norm: 9.627e-02
## It: 121; obj: 2.319e+00; abs: 7.031e-04; rel: 3.031e-04; norm: 9.631e-02
## It: 122; obj: 2.318e+00; abs: 6.683e-04; rel: 2.882e-04; norm: 9.635e-02
## It: 123; obj: 2.317e+00; abs: 6.414e-04; rel: 2.767e-04; norm: 9.639e-02
## It: 124; obj: 2.317e+00; abs: 6.179e-04; rel: 2.666e-04; norm: 9.644e-02
## It: 125; obj: 2.316e+00; abs: 5.961e-04; rel: 2.573e-04; norm: 9.648e-02
## It: 126; obj: 2.316e+00; abs: 5.763e-04; rel: 2.488e-04; norm: 9.653e-02
```

```
## It: 127; obj: 2.315e+00; abs: 5.589e-04; rel: 2.414e-04; norm: 9.657e-02
## It: 128; obj: 2.315e+00; abs: 5.435e-04; rel: 2.347e-04; norm: 9.661e-02
## It: 129; obj: 2.314e+00; abs: 5.293e-04; rel: 2.287e-04; norm: 9.666e-02
## It: 130; obj: 2.314e+00; abs: 5.160e-04; rel: 2.230e-04; norm: 9.670e-02
## It: 131; obj: 2.313e+00; abs: 5.033e-04; rel: 2.176e-04; norm: 9.674e-02
## It: 132; obj: 2.313e+00; abs: 4.915e-04; rel: 2.125e-04; norm: 9.678e-02
## It: 133; obj: 2.312e+00; abs: 4.808e-04; rel: 2.079e-04; norm: 9.682e-02
## It: 134; obj: 2.312e+00; abs: 4.716e-04; rel: 2.040e-04; norm: 9.686e-02
## It: 135; obj: 2.311e+00; abs: 4.643e-04; rel: 2.009e-04; norm: 9.689e-02
## It: 136; obj: 2.311e+00; abs: 4.591e-04; rel: 1.987e-04; norm: 9.693e-02
## It: 137; obj: 2.310e+00; abs: 4.561e-04; rel: 1.974e-04; norm: 9.696e-02
## It: 138; obj: 2.310e+00; abs: 4.554e-04; rel: 1.971e-04; norm: 9.699e-02
## It: 139; obj: 2.309e+00; abs: 4.572e-04; rel: 1.979e-04; norm: 9.702e-02
## It: 140; obj: 2.309e+00; abs: 4.619e-04; rel: 2.000e-04; norm: 9.705e-02
## It: 141; obj: 2.308e+00; abs: 4.697e-04; rel: 2.034e-04; norm: 9.708e-02
## It: 142; obj: 2.308e+00; abs: 4.807e-04; rel: 2.083e-04; norm: 9.711e-02
## It: 143; obj: 2.307e+00; abs: 4.949e-04; rel: 2.144e-04; norm: 9.714e-02
## It: 144; obj: 2.307e+00; abs: 5.112e-04; rel: 2.215e-04; norm: 9.717e-02
## It: 145; obj: 2.306e+00; abs: 5.280e-04; rel: 2.289e-04; norm: 9.720e-02
## It: 146; obj: 2.306e+00; abs: 5.427e-04; rel: 2.353e-04; norm: 9.723e-02
## It: 147; obj: 2.305e+00; abs: 5.520e-04; rel: 2.394e-04; norm: 9.726e-02
## It: 148; obj: 2.305e+00; abs: 5.530e-04; rel: 2.399e-04; norm: 9.729e-02
## It: 149; obj: 2.304e+00; abs: 5.447e-04; rel: 2.363e-04; norm: 9.732e-02
## It: 150; obj: 2.304e+00; abs: 5.295e-04; rel: 2.298e-04; norm: 9.734e-02
## It: 151; obj: 2.303e+00; abs: 5.127e-04; rel: 2.226e-04; norm: 9.737e-02
## It: 152; obj: 2.303e+00; abs: 4.991e-04; rel: 2.167e-04; norm: 9.740e-02
## It: 153; obj: 2.302e+00; abs: 4.894e-04; rel: 2.125e-04; norm: 9.743e-02
## It: 154; obj: 2.302e+00; abs: 4.758e-04; rel: 2.067e-04; norm: 9.746e-02
## It: 155; obj: 2.301e+00; abs: 4.440e-04; rel: 1.929e-04; norm: 9.749e-02
## It: 156; obj: 2.301e+00; abs: 3.928e-04; rel: 1.707e-04; norm: 9.751e-02
## It: 157; obj: 2.300e+00; abs: 3.392e-04; rel: 1.474e-04; norm: 9.753e-02
## It: 158; obj: 2.300e+00; abs: 2.965e-04; rel: 1.289e-04; norm: 9.755e-02
## It: 159; obj: 2.300e+00; abs: 2.659e-04; rel: 1.156e-04; norm: 9.756e-02
## It: 160; obj: 2.300e+00; abs: 2.439e-04; rel: 1.060e-04; norm: 9.758e-02
## It: 161; obj: 2.299e+00; abs: 2.274e-04; rel: 9.889e-05; norm: 9.759e-02
## It: 162; obj: 2.299e+00; abs: 2.144e-04; rel: 9.326e-05; norm: 9.760e-02
## It: 163; obj: 2.299e+00; abs: 2.037e-04; rel: 8.858e-05; norm: 9.761e-02
## It: 164; obj: 2.299e+00; abs: 1.944e-04; rel: 8.455e-05; norm: 9.762e-02
## It: 165; obj: 2.299e+00; abs: 1.862e-04; rel: 8.101e-05; norm: 9.762e-02
## It: 166; obj: 2.298e+00; abs: 1.789e-04; rel: 7.783e-05; norm: 9.763e-02
## It: 167; obj: 2.298e+00; abs: 1.723e-04; rel: 7.494e-05; norm: 9.764e-02
## It: 168; obj: 2.298e+00; abs: 1.662e-04; rel: 7.230e-05; norm: 9.765e-02
## It: 169; obj: 2.298e+00; abs: 1.605e-04; rel: 6.986e-05; norm: 9.765e-02
## It: 170; obj: 2.298e+00; abs: 1.553e-04; rel: 6.759e-05; norm: 9.766e-02
## It: 171; obj: 2.298e+00; abs: 1.504e-04; rel: 6.547e-05; norm: 9.767e-02
## It: 172; obj: 2.298e+00; abs: 1.459e-04; rel: 6.348e-05; norm: 9.768e-02
## It: 173; obj: 2.297e+00; abs: 1.415e-04; rel: 6.160e-05; norm: 9.768e-02
## It: 174; obj: 2.297e+00; abs: 1.375e-04; rel: 5.983e-05; norm: 9.769e-02
## It: 175; obj: 2.297e+00; abs: 1.336e-04; rel: 5.816e-05; norm: 9.770e-02
## It: 176; obj: 2.297e+00; abs: 1.299e-04; rel: 5.656e-05; norm: 9.770e-02
## It: 177; obj: 2.297e+00; abs: 1.264e-04; rel: 5.504e-05; norm: 9.771e-02
## It: 178; obj: 2.297e+00; abs: 1.231e-04; rel: 5.358e-05; norm: 9.772e-02
## It: 179; obj: 2.297e+00; abs: 1.199e-04; rel: 5.219e-05; norm: 9.772e-02
## It: 180; obj: 2.297e+00; abs: 1.168e-04; rel: 5.086e-05; norm: 9.773e-02
```

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## It: 181; obj: 2.296e+00; abs: 1.139e-04; rel: 4.958e-05; norm: 9.774e-02
## It: 182; obj: 2.296e+00; abs: 1.110e-04; rel: 4.835e-05; norm: 9.774e-02
## It: 183; obj: 2.296e+00; abs: 1.083e-04; rel: 4.716e-05; norm: 9.775e-02
## It: 184; obj: 2.296e+00; abs: 1.057e-04; rel: 4.602e-05; norm: 9.776e-02
## It: 185; obj: 2.296e+00; abs: 1.031e-04; rel: 4.492e-05; norm: 9.776e-02
## It: 186; obj: 2.296e+00; abs: 1.007e-04; rel: 4.386e-05; norm: 9.777e-02
## It: 187; obj: 2.296e+00; abs: 9.834e-05; rel: 4.284e-05; norm: 9.778e-02
## It: 188; obj: 2.296e+00; abs: 9.607e-05; rel: 4.185e-05; norm: 9.778e-02
## It: 189; obj: 2.296e+00; abs: 9.388e-05; rel: 4.089e-05; norm: 9.779e-02
## It: 190; obj: 2.295e+00; abs: 9.176e-05; rel: 3.997e-05; norm: 9.780e-02
## It: 191; obj: 2.295e+00; abs: 8.972e-05; rel: 3.909e-05; norm: 9.780e-02
## It: 192; obj: 2.295e+00; abs: 8.775e-05; rel: 3.823e-05; norm: 9.781e-02
## It: 193; obj: 2.295e+00; abs: 8.585e-05; rel: 3.740e-05; norm: 9.781e-02
## It: 194; obj: 2.295e+00; abs: 8.401e-05; rel: 3.660e-05; norm: 9.782e-02
## It: 195; obj: 2.295e+00; abs: 8.224e-05; rel: 3.583e-05; norm: 9.782e-02
## It: 196; obj: 2.295e+00; abs: 8.053e-05; rel: 3.509e-05; norm: 9.783e-02
## It: 197; obj: 2.295e+00; abs: 7.888e-05; rel: 3.437e-05; norm: 9.784e-02
## It: 198; obj: 2.295e+00; abs: 7.728e-05; rel: 3.368e-05; norm: 9.784e-02
## It: 199; obj: 2.295e+00; abs: 7.574e-05; rel: 3.301e-05; norm: 9.785e-02
## It: 200; obj: 2.295e+00; abs: 7.426e-05; rel: 3.236e-05; norm: 9.785e-02
## It: 201; obj: 2.295e+00; abs: 7.281e-05; rel: 3.173e-05; norm: 9.786e-02
## It: 202; obj: 2.295e+00; abs: 7.142e-05; rel: 3.113e-05; norm: 9.786e-02
## It: 203; obj: 2.294e+00; abs: 7.007e-05; rel: 3.054e-05; norm: 9.787e-02
## It: 204; obj: 2.294e+00; abs: 6.875e-05; rel: 2.997e-05; norm: 9.787e-02
## It: 205; obj: 2.294e+00; abs: 6.748e-05; rel: 2.941e-05; norm: 9.788e-02
## It: 206; obj: 2.294e+00; abs: 6.623e-05; rel: 2.887e-05; norm: 9.788e-02
## It: 207; obj: 2.294e+00; abs: 6.501e-05; rel: 2.834e-05; norm: 9.789e-02
## It: 208; obj: 2.294e+00; abs: 6.381e-05; rel: 2.782e-05; norm: 9.789e-02
## It: 209; obj: 2.294e+00; abs: 6.264e-05; rel: 2.730e-05; norm: 9.790e-02
## It: 210; obj: 2.294e+00; abs: 6.148e-05; rel: 2.680e-05; norm: 9.790e-02
## It: 211; obj: 2.294e+00; abs: 6.033e-05; rel: 2.630e-05; norm: 9.791e-02
## It: 212; obj: 2.294e+00; abs: 5.919e-05; rel: 2.580e-05; norm: 9.791e-02
## It: 213; obj: 2.294e+00; abs: 5.805e-05; rel: 2.531e-05; norm: 9.792e-02
## It: 214; obj: 2.294e+00; abs: 5.692e-05; rel: 2.482e-05; norm: 9.792e-02
## It: 215; obj: 2.294e+00; abs: 5.579e-05; rel: 2.432e-05; norm: 9.792e-02
## It: 216; obj: 2.294e+00; abs: 5.467e-05; rel: 2.383e-05; norm: 9.793e-02
## It: 217; obj: 2.294e+00; abs: 5.355e-05; rel: 2.335e-05; norm: 9.793e-02
## It: 218; obj: 2.294e+00; abs: 5.243e-05; rel: 2.286e-05; norm: 9.794e-02
## It: 219; obj: 2.293e+00; abs: 5.133e-05; rel: 2.238e-05; norm: 9.794e-02
## It: 220; obj: 2.293e+00; abs: 5.024e-05; rel: 2.190e-05; norm: 9.794e-02
## It: 221; obj: 2.293e+00; abs: 4.916e-05; rel: 2.144e-05; norm: 9.795e-02
## It: 222; obj: 2.293e+00; abs: 4.811e-05; rel: 2.098e-05; norm: 9.795e-02
## It: 223; obj: 2.293e+00; abs: 4.708e-05; rel: 2.053e-05; norm: 9.796e-02
## It: 224; obj: 2.293e+00; abs: 4.607e-05; rel: 2.009e-05; norm: 9.796e-02
## It: 225; obj: 2.293e+00; abs: 4.509e-05; rel: 1.966e-05; norm: 9.796e-02
## It: 226; obj: 2.293e+00; abs: 4.414e-05; rel: 1.925e-05; norm: 9.797e-02
## It: 227; obj: 2.293e+00; abs: 4.321e-05; rel: 1.884e-05; norm: 9.797e-02
## It: 228; obj: 2.293e+00; abs: 4.232e-05; rel: 1.845e-05; norm: 9.797e-02
## It: 229; obj: 2.293e+00; abs: 4.145e-05; rel: 1.808e-05; norm: 9.798e-02
## It: 230; obj: 2.293e+00; abs: 4.061e-05; rel: 1.771e-05; norm: 9.798e-02
## It: 231; obj: 2.293e+00; abs: 3.980e-05; rel: 1.736e-05; norm: 9.798e-02
## It: 232; obj: 2.293e+00; abs: 3.901e-05; rel: 1.701e-05; norm: 9.799e-02
## It: 233; obj: 2.293e+00; abs: 3.824e-05; rel: 1.668e-05; norm: 9.799e-02
## It: 234; obj: 2.293e+00; abs: 3.750e-05; rel: 1.635e-05; norm: 9.799e-02
```

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## It: 235; obj: 2.293e+00; abs: 3.678e-05; rel: 1.604e-05; norm: 9.800e-02
## It: 236; obj: 2.293e+00; abs: 3.608e-05; rel: 1.574e-05; norm: 9.800e-02
## It: 237; obj: 2.293e+00; abs: 3.540e-05; rel: 1.544e-05; norm: 9.800e-02
## It: 238; obj: 2.293e+00; abs: 3.475e-05; rel: 1.515e-05; norm: 9.801e-02
## It: 239; obj: 2.293e+00; abs: 3.411e-05; rel: 1.488e-05; norm: 9.801e-02
## It: 240; obj: 2.293e+00; abs: 3.349e-05; rel: 1.461e-05; norm: 9.801e-02
## It: 241; obj: 2.293e+00; abs: 3.290e-05; rel: 1.435e-05; norm: 9.801e-02
## It: 242; obj: 2.293e+00; abs: 3.232e-05; rel: 1.410e-05; norm: 9.802e-02
## It: 243; obj: 2.293e+00; abs: 3.176e-05; rel: 1.385e-05; norm: 9.802e-02
## It: 244; obj: 2.292e+00; abs: 3.121e-05; rel: 1.361e-05; norm: 9.802e-02
## It: 245; obj: 2.292e+00; abs: 3.069e-05; rel: 1.339e-05; norm: 9.802e-02
## It: 246; obj: 2.292e+00; abs: 3.018e-05; rel: 1.316e-05; norm: 9.803e-02
## It: 247; obj: 2.292e+00; abs: 2.968e-05; rel: 1.295e-05; norm: 9.803e-02
## It: 248; obj: 2.292e+00; abs: 3.485e-05; rel: 1.520e-05; norm: 9.803e-02
## It: 249; obj: 2.292e+00; abs: 3.720e-05; rel: 1.623e-05; norm: 9.803e-02
## It: 250; obj: 2.292e+00; abs: 3.814e-05; rel: 1.664e-05; norm: 9.804e-02
## It: 251; obj: 2.292e+00; abs: 3.837e-05; rel: 1.674e-05; norm: 9.804e-02
## It: 252; obj: 2.292e+00; abs: 3.816e-05; rel: 1.665e-05; norm: 9.804e-02
## It: 253; obj: 2.292e+00; abs: 3.768e-05; rel: 1.644e-05; norm: 9.804e-02
## It: 254; obj: 2.292e+00; abs: 3.702e-05; rel: 1.615e-05; norm: 9.805e-02
## It: 255; obj: 2.292e+00; abs: 3.629e-05; rel: 1.583e-05; norm: 9.805e-02
## It: 256; obj: 2.292e+00; abs: 3.556e-05; rel: 1.551e-05; norm: 9.805e-02
## It: 257; obj: 2.292e+00; abs: 3.484e-05; rel: 1.520e-05; norm: 9.805e-02
## It: 258; obj: 2.292e+00; abs: 3.416e-05; rel: 1.490e-05; norm: 9.806e-02
## It: 259; obj: 2.292e+00; abs: 3.354e-05; rel: 1.463e-05; norm: 9.806e-02
## It: 260; obj: 2.292e+00; abs: 3.298e-05; rel: 1.439e-05; norm: 9.806e-02
## It: 261; obj: 2.292e+00; abs: 3.250e-05; rel: 1.418e-05; norm: 9.806e-02
## It: 262; obj: 2.292e+00; abs: 3.208e-05; rel: 1.400e-05; norm: 9.807e-02
## It: 263; obj: 2.292e+00; abs: 3.171e-05; rel: 1.384e-05; norm: 9.807e-02
## It: 264; obj: 2.292e+00; abs: 3.135e-05; rel: 1.368e-05; norm: 9.807e-02
## It: 265; obj: 2.292e+00; abs: 3.098e-05; rel: 1.352e-05; norm: 9.807e-02
## It: 266; obj: 2.292e+00; abs: 3.060e-05; rel: 1.335e-05; norm: 9.808e-02
## It: 267; obj: 2.292e+00; abs: 3.023e-05; rel: 1.319e-05; norm: 9.808e-02
## It: 268; obj: 2.292e+00; abs: 2.987e-05; rel: 1.303e-05; norm: 9.808e-02
## It: 269; obj: 2.292e+00; abs: 2.955e-05; rel: 1.289e-05; norm: 9.808e-02
## It: 270; obj: 2.292e+00; abs: 2.928e-05; rel: 1.278e-05; norm: 9.808e-02
## It: 271; obj: 2.292e+00; abs: 2.908e-05; rel: 1.269e-05; norm: 9.809e-02
## It: 272; obj: 2.292e+00; abs: 2.895e-05; rel: 1.263e-05; norm: 9.809e-02
## It: 273; obj: 2.292e+00; abs: 2.892e-05; rel: 1.262e-05; norm: 9.809e-02
## It: 274; obj: 2.292e+00; abs: 2.901e-05; rel: 1.266e-05; norm: 9.809e-02
## It: 275; obj: 2.291e+00; abs: 2.922e-05; rel: 1.275e-05; norm: 9.809e-02
## It: 276; obj: 2.291e+00; abs: 2.952e-05; rel: 1.288e-05; norm: 9.809e-02
## It: 277; obj: 2.291e+00; abs: 2.989e-05; rel: 1.305e-05; norm: 9.810e-02
## It: 278; obj: 2.291e+00; abs: 3.033e-05; rel: 1.324e-05; norm: 9.810e-02
## It: 279; obj: 2.291e+00; abs: 3.087e-05; rel: 1.347e-05; norm: 9.810e-02
## It: 280; obj: 2.291e+00; abs: 3.157e-05; rel: 1.378e-05; norm: 9.810e-02
## It: 281; obj: 2.291e+00; abs: 3.248e-05; rel: 1.418e-05; norm: 9.810e-02
## It: 282; obj: 2.291e+00; abs: 3.359e-05; rel: 1.466e-05; norm: 9.810e-02
## It: 283; obj: 2.291e+00; abs: 3.475e-05; rel: 1.517e-05; norm: 9.811e-02
## It: 284; obj: 2.291e+00; abs: 3.581e-05; rel: 1.563e-05; norm: 9.811e-02
## It: 285; obj: 2.291e+00; abs: 3.660e-05; rel: 1.598e-05; norm: 9.811e-02
## It: 286; obj: 2.291e+00; abs: 3.705e-05; rel: 1.617e-05; norm: 9.811e-02
## It: 287; obj: 2.291e+00; abs: 3.715e-05; rel: 1.622e-05; norm: 9.811e-02
## It: 288; obj: 2.291e+00; abs: 3.697e-05; rel: 1.614e-05; norm: 9.812e-02
```

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## It: 289; obj: 2.291e+00; abs: 3.656e-05; rel: 1.596e-05; norm: 9.812e-02
## It: 290; obj: 2.291e+00; abs: 3.594e-05; rel: 1.569e-05; norm: 9.812e-02
## It: 291; obj: 2.291e+00; abs: 3.510e-05; rel: 1.532e-05; norm: 9.812e-02
## It: 292; obj: 2.291e+00; abs: 3.407e-05; rel: 1.487e-05; norm: 9.812e-02
## It: 293; obj: 2.291e+00; abs: 3.297e-05; rel: 1.439e-05; norm: 9.812e-02
## It: 294; obj: 2.291e+00; abs: 3.198e-05; rel: 1.396e-05; norm: 9.812e-02
## It: 295; obj: 2.291e+00; abs: 3.119e-05; rel: 1.362e-05; norm: 9.812e-02
## It: 296; obj: 2.291e+00; abs: 3.055e-05; rel: 1.333e-05; norm: 9.812e-02
## It: 297; obj: 2.291e+00; abs: 2.985e-05; rel: 1.303e-05; norm: 9.812e-02
## It: 298; obj: 2.291e+00; abs: 2.895e-05; rel: 1.264e-05; norm: 9.812e-02
## It: 299; obj: 2.291e+00; abs: 2.785e-05; rel: 1.216e-05; norm: 9.812e-02
## It: 300; obj: 2.291e+00; abs: 2.678e-05; rel: 1.169e-05; norm: 9.812e-02
## It: 301; obj: 2.291e+00; abs: 2.603e-05; rel: 1.137e-05; norm: 9.812e-02
## It: 302; obj: 2.291e+00; abs: 2.574e-05; rel: 1.124e-05; norm: 9.812e-02
## It: 303; obj: 2.291e+00; abs: 2.575e-05; rel: 1.124e-05; norm: 9.812e-02
## It: 304; obj: 2.291e+00; abs: 2.570e-05; rel: 1.122e-05; norm: 9.812e-02
## It: 305; obj: 2.291e+00; abs: 2.529e-05; rel: 1.104e-05; norm: 9.812e-02
## It: 306; obj: 2.291e+00; abs: 2.458e-05; rel: 1.073e-05; norm: 9.811e-02
## It: 307; obj: 2.290e+00; abs: 2.392e-05; rel: 1.044e-05; norm: 9.811e-02
## It: 308; obj: 2.290e+00; abs: 2.370e-05; rel: 1.035e-05; norm: 9.811e-02
## It: 309; obj: 2.290e+00; abs: 2.397e-05; rel: 1.047e-05; norm: 9.811e-02
## It: 310; obj: 2.290e+00; abs: 2.435e-05; rel: 1.063e-05; norm: 9.811e-02
## It: 311; obj: 2.290e+00; abs: 2.428e-05; rel: 1.060e-05; norm: 9.810e-02
## It: 312; obj: 2.290e+00; abs: 2.348e-05; rel: 1.025e-05; norm: 9.810e-02
## It: 313; obj: 2.290e+00; abs: 2.224e-05; rel: 9.709e-06; norm: 9.810e-02
## It: 314; obj: 2.290e+00; abs: 2.126e-05; rel: 9.285e-06; norm: 9.810e-02
## It: 315; obj: 2.290e+00; abs: 2.117e-05; rel: 9.243e-06; norm: 9.809e-02
## It: 316; obj: 2.290e+00; abs: 2.196e-05; rel: 9.590e-06; norm: 9.809e-02
## It: 317; obj: 2.290e+00; abs: 2.298e-05; rel: 1.003e-05; norm: 9.809e-02
## It: 318; obj: 2.290e+00; abs: 2.319e-05; rel: 1.012e-05; norm: 9.808e-02
## It: 319; obj: 2.290e+00; abs: 2.199e-05; rel: 9.600e-06; norm: 9.808e-02
## It: 320; obj: 2.290e+00; abs: 1.994e-05; rel: 8.708e-06; norm: 9.808e-02
## It: 321; obj: 2.290e+00; abs: 1.855e-05; rel: 8.099e-06; norm: 9.807e-02
## It: 322; obj: 2.290e+00; abs: 1.892e-05; rel: 8.260e-06; norm: 9.807e-02
## It: 323; obj: 2.290e+00; abs: 2.079e-05; rel: 9.078e-06; norm: 9.807e-02
## It: 324; obj: 2.290e+00; abs: 2.271e-05; rel: 9.916e-06; norm: 9.806e-02
## It: 325; obj: 2.290e+00; abs: 2.302e-05; rel: 1.005e-05; norm: 9.806e-02
## It: 326; obj: 2.290e+00; abs: 2.112e-05; rel: 9.221e-06; norm: 9.806e-02
## It: 327; obj: 2.290e+00; abs: 1.805e-05; rel: 7.882e-06; norm: 9.806e-02
## It: 328; obj: 2.290e+00; abs: 1.585e-05; rel: 6.920e-06; norm: 9.805e-02
## It: 329; obj: 2.290e+00; abs: 1.610e-05; rel: 7.029e-06; norm: 9.805e-02
## It: 330; obj: 2.290e+00; abs: 1.886e-05; rel: 8.236e-06; norm: 9.805e-02
## It: 331; obj: 2.290e+00; abs: 2.234e-05; rel: 9.756e-06; norm: 9.804e-02
## It: 332; obj: 2.290e+00; abs: 2.336e-05; rel: 1.020e-05; norm: 9.804e-02
## It: 333; obj: 2.290e+00; abs: 1.981e-05; rel: 8.650e-06; norm: 9.803e-02
## It: 334; obj: 2.290e+00; abs: 1.405e-05; rel: 6.136e-06; norm: 9.803e-02
## It: 335; obj: 2.290e+00; abs: 1.091e-05; rel: 4.766e-06; norm: 9.803e-02
## It: 336; obj: 2.290e+00; abs: 1.261e-05; rel: 5.507e-06; norm: 9.802e-02
## It: 337; obj: 2.290e+00; abs: 1.792e-05; rel: 7.824e-06; norm: 9.802e-02
## It: 338; obj: 2.290e+00; abs: 2.359e-05; rel: 1.030e-05; norm: 9.802e-02
## It: 339; obj: 2.290e+00; abs: 2.572e-05; rel: 1.123e-05; norm: 9.801e-02
## It: 340; obj: 2.290e+00; abs: 2.181e-05; rel: 9.525e-06; norm: 9.801e-02
## It: 341; obj: 2.290e+00; abs: 1.317e-05; rel: 5.750e-06; norm: 9.800e-02
## It: 342; obj: 2.290e+00; abs: 5.460e-06; rel: 2.385e-06; norm: 9.800e-02
```

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## It: 343; obj: 2.290e+00; abs: 4.650e-06; rel: 2.031e-06; norm: 9.800e-02
## It: 344; obj: 2.290e+00; abs: 1.139e-05; rel: 4.976e-06; norm: 9.799e-02
## It: 345; obj: 2.290e+00; abs: 2.251e-05; rel: 9.832e-06; norm: 9.799e-02
## It: 346; obj: 2.290e+00; abs: 3.167e-05; rel: 1.383e-05; norm: 9.799e-02
## It: 347; obj: 2.290e+00; abs: 2.712e-05; rel: 1.184e-05; norm: 9.798e-02
## It: 348; obj: 2.290e+00; abs: 9.647e-06; rel: 4.213e-06; norm: 9.798e-02
## It: 349; obj: 2.290e+00; abs: 3.706e-06; rel: 1.619e-06; norm: 9.797e-02
## It: 350; obj: 2.290e+00; abs: 5.661e-06; rel: 2.472e-06; norm: 9.797e-02
## It: 351; obj: 2.290e+00; abs: 3.277e-06; rel: 1.431e-06; norm: 9.796e-02
## It: 352; obj: 2.290e+00; abs: 1.955e-05; rel: 8.537e-06; norm: 9.796e-02
## It: 353; obj: 2.290e+00; abs: 3.615e-05; rel: 1.579e-05; norm: 9.795e-02
## It: 354; obj: 2.290e+00; abs: 4.169e-05; rel: 1.821e-05; norm: 9.795e-02
## It: 355; obj: 2.290e+00; abs: 2.622e-05; rel: 1.145e-05; norm: 9.795e-02
## It: 356; obj: 2.290e+00; abs: 2.739e-06; rel: 1.196e-06; norm: 9.794e-02
## It: 357; obj: 2.290e+00; abs: 2.002e-05; rel: 8.745e-06; norm: 9.794e-02
## It: 358; obj: 2.290e+00; abs: 1.749e-05; rel: 7.638e-06; norm: 9.794e-02
## It: 359; obj: 2.290e+00; abs: 7.478e-06; rel: 3.266e-06; norm: 9.793e-02
## It: 360; obj: 2.290e+00; abs: 6.588e-06; rel: 2.877e-06; norm: 9.793e-02
## It: 361; obj: 2.290e+00; abs: 3.705e-05; rel: 1.618e-05; norm: 9.793e-02
## It: 362; obj: 2.289e+00; abs: 9.755e-05; rel: 4.261e-05; norm: 9.792e-02
## It: 363; obj: 2.289e+00; abs: 1.280e-04; rel: 5.590e-05; norm: 9.791e-02
## It: 364; obj: 2.289e+00; abs: 2.755e-05; rel: 1.203e-05; norm: 9.790e-02
## It: 365; obj: 2.289e+00; abs: 1.329e-05; rel: 5.805e-06; norm: 9.790e-02
## It: 366; obj: 2.289e+00; abs: 7.936e-06; rel: 3.466e-06; norm: 9.791e-02
## It: 367; obj: 2.289e+00; abs: 3.160e-05; rel: 1.380e-05; norm: 9.790e-02
## It: 368; obj: 2.289e+00; abs: 2.554e-05; rel: 1.116e-05; norm: 9.789e-02
## It: 369; obj: 2.289e+00; abs: 7.719e-06; rel: 3.371e-06; norm: 9.787e-02
## It: 370; obj: 2.289e+00; abs: 4.512e-05; rel: 1.971e-05; norm: 9.785e-02
## It: 371; obj: 2.290e+00; abs: 5.501e-05; rel: 2.403e-05; norm: 9.784e-02
## It: 372; obj: 2.290e+00; abs: 3.595e-05; rel: 1.570e-05; norm: 9.784e-02
## It: 373; obj: 2.290e+00; abs: 4.837e-05; rel: 2.113e-05; norm: 9.786e-02
## It: 374; obj: 2.289e+00; abs: 4.882e-05; rel: 2.132e-05; norm: 9.787e-02
## It: 375; obj: 2.290e+00; abs: 8.846e-05; rel: 3.864e-05; norm: 9.786e-02
## It: 376; obj: 2.290e+00; abs: 1.217e-04; rel: 5.316e-05; norm: 9.784e-02
## It: 377; obj: 2.290e+00; abs: 1.123e-05; rel: 4.903e-06; norm: 9.783e-02
## It: 378; obj: 2.290e+00; abs: 1.027e-04; rel: 4.487e-05; norm: 9.784e-02
## It: 379; obj: 2.289e+00; abs: 2.430e-04; rel: 1.061e-04; norm: 9.786e-02
## It: 380; obj: 2.289e+00; abs: 6.103e-05; rel: 2.666e-05; norm: 9.784e-02
## It: 381; obj: 2.289e+00; abs: 6.248e-05; rel: 2.729e-05; norm: 9.781e-02
## It: 382; obj: 2.289e+00; abs: 6.674e-05; rel: 2.915e-05; norm: 9.780e-02
## It: 383; obj: 2.289e+00; abs: 4.736e-08; rel: 2.069e-08; norm: 9.781e-02
## It: 384; obj: 2.289e+00; abs: 4.663e-06; rel: 2.037e-06; norm: 9.782e-02
## It: 385; obj: 2.289e+00; abs: 6.948e-05; rel: 3.035e-05; norm: 9.781e-02
## It: 386; obj: 2.290e+00; abs: 8.753e-05; rel: 3.823e-05; norm: 9.779e-02
## It: 387; obj: 2.290e+00; abs: 4.224e-05; rel: 1.845e-05; norm: 9.779e-02
## It: 388; obj: 2.290e+00; abs: 3.117e-05; rel: 1.361e-05; norm: 9.780e-02
## It: 389; obj: 2.289e+00; abs: 1.512e-04; rel: 6.605e-05; norm: 9.781e-02
## It: 390; obj: 2.289e+00; abs: 2.187e-04; rel: 9.554e-05; norm: 9.780e-02
## It: 391; obj: 2.289e+00; abs: 1.087e-05; rel: 4.748e-06; norm: 9.776e-02
## It: 392; obj: 2.289e+00; abs: 5.719e-05; rel: 2.498e-05; norm: 9.775e-02
## It: 393; obj: 2.289e+00; abs: 9.935e-06; rel: 4.340e-06; norm: 9.776e-02
## It: 394; obj: 2.289e+00; abs: 1.092e-05; rel: 4.770e-06; norm: 9.777e-02
## It: 395; obj: 2.289e+00; abs: 8.905e-05; rel: 3.890e-05; norm: 9.776e-02
## It: 396; obj: 2.289e+00; abs: 1.160e-04; rel: 5.065e-05; norm: 9.775e-02
```

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## It: 397; obj: 2.290e+00; abs: 5.732e-05; rel: 2.504e-05; norm: 9.774e-02
## It: 398; obj: 2.289e+00; abs: 2.000e-05; rel: 8.738e-06; norm: 9.775e-02
## It: 399; obj: 2.289e+00; abs: 8.217e-05; rel: 3.589e-05; norm: 9.776e-02
## It: 400; obj: 2.289e+00; abs: 1.837e-04; rel: 8.022e-05; norm: 9.776e-02
## It: 401; obj: 2.289e+00; abs: 1.041e-04; rel: 4.549e-05; norm: 9.772e-02
## It: 402; obj: 2.289e+00; abs: 5.026e-05; rel: 2.196e-05; norm: 9.769e-02
## It: 403; obj: 2.289e+00; abs: 8.164e-06; rel: 3.567e-06; norm: 9.771e-02
## It: 404; obj: 2.289e+00; abs: 9.121e-05; rel: 3.985e-05; norm: 9.772e-02
## It: 405; obj: 2.289e+00; abs: 8.021e-05; rel: 3.504e-05; norm: 9.771e-02
## It: 406; obj: 2.289e+00; abs: 1.343e-04; rel: 5.868e-05; norm: 9.770e-02
## It: 407; obj: 2.289e+00; abs: 1.231e-04; rel: 5.379e-05; norm: 9.769e-02
## It: 408; obj: 2.289e+00; abs: 3.698e-05; rel: 1.615e-05; norm: 9.769e-02
## It: 409; obj: 2.289e+00; abs: 1.424e-04; rel: 6.221e-05; norm: 9.771e-02
## It: 410; obj: 2.289e+00; abs: 9.844e-05; rel: 4.300e-05; norm: 9.771e-02
## It: 411; obj: 2.289e+00; abs: 1.344e-05; rel: 5.871e-06; norm: 9.770e-02
## It: 412; obj: 2.289e+00; abs: 4.379e-05; rel: 1.913e-05; norm: 9.766e-02
## It: 413; obj: 2.289e+00; abs: 8.963e-06; rel: 3.915e-06; norm: 9.764e-02
## It: 414; obj: 2.289e+00; abs: 8.657e-05; rel: 3.782e-05; norm: 9.766e-02
## It: 415; obj: 2.289e+00; abs: 4.141e-05; rel: 1.809e-05; norm: 9.767e-02
## It: 416; obj: 2.289e+00; abs: 8.051e-05; rel: 3.517e-05; norm: 9.766e-02
## It: 417; obj: 2.289e+00; abs: 1.746e-04; rel: 7.629e-05; norm: 9.766e-02
## It: 418; obj: 2.289e+00; abs: 1.212e-04; rel: 5.293e-05; norm: 9.765e-02
## It: 419; obj: 2.289e+00; abs: 1.042e-04; rel: 4.553e-05; norm: 9.764e-02
## It: 420; obj: 2.289e+00; abs: 2.679e-04; rel: 1.170e-04; norm: 9.766e-02
## It: 421; obj: 2.289e+00; abs: 3.607e-05; rel: 1.576e-05; norm: 9.766e-02
## It: 422; obj: 2.289e+00; abs: 6.351e-05; rel: 2.775e-05; norm: 9.765e-02
## It: 423; obj: 2.289e+00; abs: 5.816e-06; rel: 2.541e-06; norm: 9.762e-02
## It: 424; obj: 2.289e+00; abs: 3.469e-05; rel: 1.516e-05; norm: 9.759e-02
## It: 425; obj: 2.289e+00; abs: 1.010e-04; rel: 4.413e-05; norm: 9.760e-02
## It: 426; obj: 2.289e+00; abs: 5.089e-05; rel: 2.223e-05; norm: 9.761e-02
## It: 427; obj: 2.289e+00; abs: 8.786e-05; rel: 3.839e-05; norm: 9.762e-02
## It: 428; obj: 2.289e+00; abs: 1.660e-04; rel: 7.251e-05; norm: 9.762e-02
## It: 429; obj: 2.289e+00; abs: 1.614e-04; rel: 7.050e-05; norm: 9.760e-02
## It: 430; obj: 2.289e+00; abs: 3.914e-05; rel: 1.710e-05; norm: 9.759e-02
## It: 431; obj: 2.289e+00; abs: 2.893e-04; rel: 1.264e-04; norm: 9.760e-02
## It: 432; obj: 2.289e+00; abs: 1.504e-04; rel: 6.569e-05; norm: 9.761e-02
## It: 433; obj: 2.289e+00; abs: 7.847e-05; rel: 3.428e-05; norm: 9.760e-02
## It: 434; obj: 2.289e+00; abs: 7.546e-05; rel: 3.297e-05; norm: 9.758e-02
## It: 435; obj: 2.289e+00; abs: 8.850e-06; rel: 3.866e-06; norm: 9.756e-02
## It: 436; obj: 2.289e+00; abs: 1.175e-04; rel: 5.131e-05; norm: 9.755e-02
## It: 437; obj: 2.289e+00; abs: 1.495e-04; rel: 6.533e-05; norm: 9.756e-02
## It: 438; obj: 2.289e+00; abs: 7.907e-05; rel: 3.455e-05; norm: 9.757e-02
## It: 439; obj: 2.289e+00; abs: 1.460e-04; rel: 6.377e-05; norm: 9.757e-02
## It: 440; obj: 2.289e+00; abs: 1.658e-04; rel: 7.242e-05; norm: 9.756e-02
## It: 441; obj: 2.289e+00; abs: 7.844e-05; rel: 3.427e-05; norm: 9.755e-02
## It: 442; obj: 2.289e+00; abs: 1.194e-04; rel: 5.218e-05; norm: 9.755e-02
## It: 443; obj: 2.289e+00; abs: 2.526e-04; rel: 1.104e-04; norm: 9.755e-02
## It: 444; obj: 2.289e+00; abs: 1.001e-04; rel: 4.375e-05; norm: 9.755e-02
## It: 445; obj: 2.289e+00; abs: 9.042e-05; rel: 3.951e-05; norm: 9.753e-02
## It: 446; obj: 2.289e+00; abs: 9.197e-05; rel: 4.018e-05; norm: 9.752e-02
## It: 447; obj: 2.289e+00; abs: 3.260e-05; rel: 1.424e-05; norm: 9.751e-02
## It: 448; obj: 2.289e+00; abs: 1.544e-04; rel: 6.744e-05; norm: 9.752e-02
## It: 449; obj: 2.288e+00; abs: 1.394e-04; rel: 6.092e-05; norm: 9.752e-02
## It: 450; obj: 2.289e+00; abs: 1.423e-04; rel: 6.219e-05; norm: 9.752e-02
```

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## It: 451; obj: 2.289e+00; abs: 1.554e-04; rel: 6.790e-05; norm: 9.752e-02
## It: 452; obj: 2.289e+00; abs: 1.447e-04; rel: 6.323e-05; norm: 9.751e-02
## It: 453; obj: 2.289e+00; abs: 2.736e-05; rel: 1.195e-05; norm: 9.751e-02
## It: 454; obj: 2.289e+00; abs: 1.135e-04; rel: 4.957e-05; norm: 9.751e-02
## It: 455; obj: 2.289e+00; abs: 1.635e-04; rel: 7.144e-05; norm: 9.749e-02
## It: 456; obj: 2.289e+00; abs: 5.552e-05; rel: 2.426e-05; norm: 9.747e-02
## It: 457; obj: 2.289e+00; abs: 9.453e-05; rel: 4.130e-05; norm: 9.747e-02
## It: 458; obj: 2.289e+00; abs: 3.121e-05; rel: 1.364e-05; norm: 9.747e-02
## It: 459; obj: 2.289e+00; abs: 1.282e-04; rel: 5.601e-05; norm: 9.747e-02
## It: 460; obj: 2.289e+00; abs: 1.055e-04; rel: 4.608e-05; norm: 9.746e-02
## It: 461; obj: 2.289e+00; abs: 2.982e-06; rel: 1.303e-06; norm: 9.745e-02
## It: 462; obj: 2.288e+00; abs: 2.720e-05; rel: 1.189e-05; norm: 9.746e-02
## It: 463; obj: 2.289e+00; abs: 7.407e-05; rel: 3.237e-05; norm: 9.746e-02
## It: 464; obj: 2.289e+00; abs: 3.113e-05; rel: 1.360e-05; norm: 9.746e-02
## It: 465; obj: 2.289e+00; abs: 7.082e-05; rel: 3.095e-05; norm: 9.745e-02
## It: 466; obj: 2.289e+00; abs: 6.361e-06; rel: 2.779e-06; norm: 9.743e-02
## It: 467; obj: 2.289e+00; abs: 7.369e-05; rel: 3.220e-05; norm: 9.740e-02
## It: 468; obj: 2.289e+00; abs: 8.190e-05; rel: 3.579e-05; norm: 9.739e-02
## It: 469; obj: 2.289e+00; abs: 3.563e-05; rel: 1.557e-05; norm: 9.739e-02
## It: 470; obj: 2.289e+00; abs: 6.378e-05; rel: 2.787e-05; norm: 9.741e-02
## It: 471; obj: 2.289e+00; abs: 7.642e-05; rel: 3.339e-05; norm: 9.742e-02
## It: 472; obj: 2.289e+00; abs: 7.971e-05; rel: 3.483e-05; norm: 9.741e-02
## It: 473; obj: 2.289e+00; abs: 1.089e-04; rel: 4.757e-05; norm: 9.740e-02
## It: 474; obj: 2.289e+00; abs: 1.753e-05; rel: 7.660e-06; norm: 9.739e-02
## It: 475; obj: 2.289e+00; abs: 9.494e-05; rel: 4.148e-05; norm: 9.740e-02
## It: 476; obj: 2.288e+00; abs: 2.700e-04; rel: 1.180e-04; norm: 9.741e-02
## It: 477; obj: 2.288e+00; abs: 3.356e-05; rel: 1.466e-05; norm: 9.739e-02
## It: 478; obj: 2.288e+00; abs: 7.563e-05; rel: 3.305e-05; norm: 9.737e-02
## It: 479; obj: 2.289e+00; abs: 7.624e-05; rel: 3.332e-05; norm: 9.736e-02
## It: 480; obj: 2.289e+00; abs: 3.272e-06; rel: 1.430e-06; norm: 9.737e-02
## It: 481; obj: 2.289e+00; abs: 9.384e-06; rel: 4.100e-06; norm: 9.738e-02
## It: 482; obj: 2.289e+00; abs: 6.885e-05; rel: 3.008e-05; norm: 9.737e-02
## It: 483; obj: 2.289e+00; abs: 5.529e-05; rel: 2.416e-05; norm: 9.735e-02
## It: 484; obj: 2.289e+00; abs: 5.691e-05; rel: 2.487e-05; norm: 9.735e-02
## It: 485; obj: 2.289e+00; abs: 1.629e-05; rel: 7.120e-06; norm: 9.736e-02
## It: 486; obj: 2.289e+00; abs: 1.793e-04; rel: 7.834e-05; norm: 9.737e-02
## It: 487; obj: 2.288e+00; abs: 1.891e-04; rel: 8.264e-05; norm: 9.735e-02
## It: 488; obj: 2.288e+00; abs: 2.713e-05; rel: 1.185e-05; norm: 9.732e-02
## It: 489; obj: 2.288e+00; abs: 5.056e-05; rel: 2.209e-05; norm: 9.731e-02
## It: 490; obj: 2.288e+00; abs: 2.703e-05; rel: 1.181e-05; norm: 9.733e-02
## It: 491; obj: 2.288e+00; abs: 6.665e-06; rel: 2.913e-06; norm: 9.733e-02
## It: 492; obj: 2.289e+00; abs: 1.088e-04; rel: 4.753e-05; norm: 9.732e-02
## It: 493; obj: 2.289e+00; abs: 1.099e-04; rel: 4.804e-05; norm: 9.731e-02
## It: 494; obj: 2.289e+00; abs: 3.887e-05; rel: 1.698e-05; norm: 9.730e-02
## It: 495; obj: 2.289e+00; abs: 1.106e-05; rel: 4.831e-06; norm: 9.731e-02
## It: 496; obj: 2.289e+00; abs: 5.819e-05; rel: 2.543e-05; norm: 9.732e-02
## It: 497; obj: 2.288e+00; abs: 1.163e-04; rel: 5.080e-05; norm: 9.732e-02
## It: 498; obj: 2.288e+00; abs: 1.034e-04; rel: 4.518e-05; norm: 9.728e-02
## It: 499; obj: 2.288e+00; abs: 4.204e-05; rel: 1.837e-05; norm: 9.725e-02
## It: 500; obj: 2.288e+00; abs: 2.572e-05; rel: 1.124e-05; norm: 9.727e-02
## It: 501; obj: 2.288e+00; abs: 8.900e-05; rel: 3.889e-05; norm: 9.728e-02
## It: 502; obj: 2.288e+00; abs: 7.594e-05; rel: 3.319e-05; norm: 9.727e-02
## It: 503; obj: 2.289e+00; abs: 1.245e-04; rel: 5.440e-05; norm: 9.727e-02
## It: 504; obj: 2.289e+00; abs: 1.122e-04; rel: 4.902e-05; norm: 9.726e-02
```

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## It: 505; obj: 2.289e+00; abs: 1.074e-04; rel: 4.692e-05; norm: 9.726e-02
## It: 506; obj: 2.288e+00; abs: 1.280e-04; rel: 5.594e-05; norm: 9.728e-02
## It: 507; obj: 2.288e+00; abs: 2.189e-05; rel: 9.565e-06; norm: 9.728e-02
## It: 508; obj: 2.288e+00; abs: 4.195e-05; rel: 1.833e-05; norm: 9.726e-02
## It: 509; obj: 2.288e+00; abs: 3.137e-05; rel: 1.371e-05; norm: 9.723e-02
## It: 510; obj: 2.288e+00; abs: 1.522e-05; rel: 6.652e-06; norm: 9.720e-02
## It: 511; obj: 2.288e+00; abs: 4.805e-05; rel: 2.100e-05; norm: 9.721e-02
## It: 512; obj: 2.288e+00; abs: 6.521e-05; rel: 2.849e-05; norm: 9.723e-02
## It: 513; obj: 2.288e+00; abs: 3.781e-05; rel: 1.652e-05; norm: 9.724e-02
## It: 514; obj: 2.288e+00; abs: 1.461e-04; rel: 6.386e-05; norm: 9.723e-02
## It: 515; obj: 2.289e+00; abs: 1.274e-04; rel: 5.566e-05; norm: 9.722e-02
## It: 516; obj: 2.288e+00; abs: 6.018e-05; rel: 2.630e-05; norm: 9.721e-02
## It: 517; obj: 2.288e+00; abs: 2.597e-04; rel: 1.135e-04; norm: 9.722e-02
## It: 518; obj: 2.288e+00; abs: 5.335e-06; rel: 2.332e-06; norm: 9.723e-02
## It: 519; obj: 2.288e+00; abs: 9.481e-05; rel: 4.143e-05; norm: 9.722e-02
## It: 520; obj: 2.288e+00; abs: 2.631e-05; rel: 1.150e-05; norm: 9.719e-02
## It: 521; obj: 2.288e+00; abs: 1.220e-04; rel: 5.330e-05; norm: 9.717e-02
## It: 522; obj: 2.288e+00; abs: 1.569e-05; rel: 6.855e-06; norm: 9.715e-02
## It: 523; obj: 2.288e+00; abs: 9.010e-06; rel: 3.937e-06; norm: 9.718e-02
## It: 524; obj: 2.288e+00; abs: 2.957e-06; rel: 1.292e-06; norm: 9.720e-02
## It: 525; obj: 2.288e+00; abs: 5.391e-05; rel: 2.356e-05; norm: 9.720e-02
## It: 526; obj: 2.288e+00; abs: 6.060e-05; rel: 2.648e-05; norm: 9.718e-02
## It: 527; obj: 2.288e+00; abs: 5.716e-05; rel: 2.498e-05; norm: 9.717e-02
## It: 528; obj: 2.288e+00; abs: 1.578e-06; rel: 6.897e-07; norm: 9.717e-02
## It: 529; obj: 2.288e+00; abs: 6.341e-06; rel: 2.771e-06; norm: 9.718e-02
## It: 530; obj: 2.288e+00; abs: 1.114e-05; rel: 4.870e-06; norm: 9.718e-02
## It: 531; obj: 2.288e+00; abs: 4.172e-05; rel: 1.823e-05; norm: 9.716e-02
## It: 532; obj: 2.288e+00; abs: 1.604e-05; rel: 7.010e-06; norm: 9.713e-02
## It: 533; obj: 2.288e+00; abs: 5.623e-05; rel: 2.457e-05; norm: 9.713e-02
## It: 534; obj: 2.288e+00; abs: 6.609e-05; rel: 2.888e-05; norm: 9.714e-02
## It: 535; obj: 2.288e+00; abs: 6.572e-05; rel: 2.872e-05; norm: 9.716e-02
## It: 536; obj: 2.288e+00; abs: 1.086e-04; rel: 4.745e-05; norm: 9.715e-02
## It: 537; obj: 2.288e+00; abs: 2.311e-04; rel: 1.010e-04; norm: 9.714e-02
## It: 538; obj: 2.288e+00; abs: 8.057e-06; rel: 3.521e-06; norm: 9.714e-02
## It: 539; obj: 2.288e+00; abs: 1.149e-04; rel: 5.022e-05; norm: 9.714e-02
## It: 540; obj: 2.288e+00; abs: 1.030e-04; rel: 4.500e-05; norm: 9.714e-02
## It: 541; obj: 2.288e+00; abs: 2.775e-05; rel: 1.213e-05; norm: 9.713e-02
## It: 542; obj: 2.288e+00; abs: 1.922e-05; rel: 8.397e-06; norm: 9.711e-02
## It: 543; obj: 2.288e+00; abs: 7.140e-06; rel: 3.120e-06; norm: 9.711e-02
## It: 544; obj: 2.288e+00; abs: 4.556e-05; rel: 1.991e-05; norm: 9.711e-02
## It: 545; obj: 2.288e+00; abs: 8.044e-05; rel: 3.515e-05; norm: 9.711e-02
## It: 546; obj: 2.288e+00; abs: 6.337e-05; rel: 2.769e-05; norm: 9.711e-02
## It: 547; obj: 2.288e+00; abs: 9.314e-06; rel: 4.070e-06; norm: 9.710e-02
## It: 548; obj: 2.288e+00; abs: 2.950e-04; rel: 1.289e-04; norm: 9.709e-02
## It: 549; obj: 2.288e+00; abs: 1.629e-04; rel: 7.121e-05; norm: 9.709e-02
## It: 550; obj: 2.288e+00; abs: 7.923e-05; rel: 3.463e-05; norm: 9.709e-02
## It: 551; obj: 2.288e+00; abs: 1.746e-04; rel: 7.631e-05; norm: 9.709e-02
## It: 552; obj: 2.288e+00; abs: 7.868e-05; rel: 3.439e-05; norm: 9.708e-02
## It: 553; obj: 2.288e+00; abs: 1.042e-04; rel: 4.554e-05; norm: 9.708e-02
## It: 554; obj: 2.288e+00; abs: 7.979e-05; rel: 3.487e-05; norm: 9.707e-02
## It: 555; obj: 2.288e+00; abs: 1.419e-05; rel: 6.203e-06; norm: 9.707e-02
## It: 556; obj: 2.288e+00; abs: 1.098e-04; rel: 4.799e-05; norm: 9.706e-02
## It: 557; obj: 2.288e+00; abs: 1.245e-04; rel: 5.442e-05; norm: 9.706e-02
## It: 558; obj: 2.288e+00; abs: 3.566e-05; rel: 1.558e-05; norm: 9.705e-02
```

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## It: 559; obj: 2.288e+00; abs: 1.526e-04; rel: 6.670e-05; norm: 9.704e-02
## It: 560; obj: 2.288e+00; abs: 3.560e-04; rel: 1.556e-04; norm: 9.705e-02
## It: 561; obj: 2.288e+00; abs: 5.640e-07; rel: 2.465e-07; norm: 9.705e-02
## It: 562; obj: 2.288e+00; abs: 1.485e-04; rel: 6.492e-05; norm: 9.704e-02
## It: 563; obj: 2.288e+00; abs: 1.643e-04; rel: 7.180e-05; norm: 9.703e-02
## It: 564; obj: 2.288e+00; abs: 3.983e-05; rel: 1.740e-05; norm: 9.702e-02
## It: 565; obj: 2.288e+00; abs: 1.709e-04; rel: 7.470e-05; norm: 9.702e-02
## It: 566; obj: 2.288e+00; abs: 1.129e-04; rel: 4.934e-05; norm: 9.703e-02
## It: 567; obj: 2.288e+00; abs: 1.004e-04; rel: 4.387e-05; norm: 9.703e-02
## It: 568; obj: 2.288e+00; abs: 1.560e-04; rel: 6.817e-05; norm: 9.702e-02
## It: 569; obj: 2.288e+00; abs: 9.912e-05; rel: 4.332e-05; norm: 9.700e-02
## It: 570; obj: 2.288e+00; abs: 3.511e-05; rel: 1.534e-05; norm: 9.699e-02
## It: 571; obj: 2.288e+00; abs: 2.998e-04; rel: 1.310e-04; norm: 9.699e-02
## It: 572; obj: 2.288e+00; abs: 2.124e-04; rel: 9.284e-05; norm: 9.701e-02
## It: 573; obj: 2.288e+00; abs: 1.054e-04; rel: 4.607e-05; norm: 9.701e-02
## It: 574; obj: 2.288e+00; abs: 1.855e-04; rel: 8.107e-05; norm: 9.699e-02
## It: 575; obj: 2.288e+00; abs: 1.083e-04; rel: 4.731e-05; norm: 9.697e-02
## It: 576; obj: 2.288e+00; abs: 8.028e-06; rel: 3.509e-06; norm: 9.696e-02
## It: 577; obj: 2.288e+00; abs: 1.557e-04; rel: 6.803e-05; norm: 9.697e-02
## It: 578; obj: 2.288e+00; abs: 8.423e-05; rel: 3.682e-05; norm: 9.698e-02
## It: 579; obj: 2.288e+00; abs: 1.401e-04; rel: 6.126e-05; norm: 9.698e-02
## It: 580; obj: 2.288e+00; abs: 1.407e-04; rel: 6.148e-05; norm: 9.697e-02
## It: 581; obj: 2.288e+00; abs: 7.269e-06; rel: 3.177e-06; norm: 9.696e-02
## It: 582; obj: 2.288e+00; abs: 2.225e-04; rel: 9.724e-05; norm: 9.695e-02
## It: 583; obj: 2.288e+00; abs: 2.316e-04; rel: 1.012e-04; norm: 9.695e-02
## It: 584; obj: 2.288e+00; abs: 5.047e-06; rel: 2.206e-06; norm: 9.697e-02
## It: 585; obj: 2.288e+00; abs: 1.309e-04; rel: 5.722e-05; norm: 9.696e-02
## It: 586; obj: 2.288e+00; abs: 1.485e-04; rel: 6.492e-05; norm: 9.694e-02
## It: 587; obj: 2.288e+00; abs: 2.949e-05; rel: 1.289e-05; norm: 9.693e-02
## It: 588; obj: 2.288e+00; abs: 1.436e-06; rel: 6.277e-07; norm: 9.692e-02
## It: 589; obj: 2.288e+00; abs: 4.498e-05; rel: 1.966e-05; norm: 9.693e-02
## It: 590; obj: 2.288e+00; abs: 3.964e-05; rel: 1.732e-05; norm: 9.694e-02
## It: 591; obj: 2.288e+00; abs: 2.990e-05; rel: 1.307e-05; norm: 9.694e-02
## It: 592; obj: 2.288e+00; abs: 3.092e-05; rel: 1.351e-05; norm: 9.693e-02
## It: 593; obj: 2.288e+00; abs: 8.957e-05; rel: 3.914e-05; norm: 9.691e-02
## It: 594; obj: 2.288e+00; abs: 1.811e-04; rel: 7.914e-05; norm: 9.691e-02
## It: 595; obj: 2.288e+00; abs: 7.105e-05; rel: 3.105e-05; norm: 9.692e-02
## It: 596; obj: 2.288e+00; abs: 1.098e-05; rel: 4.801e-06; norm: 9.692e-02
## It: 597; obj: 2.288e+00; abs: 2.804e-05; rel: 1.225e-05; norm: 9.691e-02
## It: 598; obj: 2.288e+00; abs: 9.692e-05; rel: 4.236e-05; norm: 9.690e-02
## It: 599; obj: 2.288e+00; abs: 1.177e-05; rel: 5.142e-06; norm: 9.690e-02
## It: 600; obj: 2.288e+00; abs: 3.868e-05; rel: 1.691e-05; norm: 9.690e-02
## It: 601; obj: 2.288e+00; abs: 7.847e-05; rel: 3.429e-05; norm: 9.691e-02
## It: 602; obj: 2.288e+00; abs: 1.110e-04; rel: 4.850e-05; norm: 9.690e-02
## It: 603; obj: 2.288e+00; abs: 1.203e-05; rel: 5.258e-06; norm: 9.688e-02
## It: 604; obj: 2.288e+00; abs: 1.514e-04; rel: 6.615e-05; norm: 9.686e-02
## It: 605; obj: 2.288e+00; abs: 1.721e-04; rel: 7.524e-05; norm: 9.687e-02
## It: 606; obj: 2.288e+00; abs: 2.651e-05; rel: 1.159e-05; norm: 9.689e-02
## It: 607; obj: 2.288e+00; abs: 7.281e-05; rel: 3.183e-05; norm: 9.688e-02
## It: 608; obj: 2.288e+00; abs: 1.157e-05; rel: 5.058e-06; norm: 9.686e-02
## It: 609; obj: 2.288e+00; abs: 7.968e-05; rel: 3.483e-05; norm: 9.684e-02
## It: 610; obj: 2.288e+00; abs: 6.429e-05; rel: 2.810e-05; norm: 9.685e-02
## It: 611; obj: 2.288e+00; abs: 6.595e-05; rel: 2.883e-05; norm: 9.687e-02
## It: 612; obj: 2.288e+00; abs: 1.205e-04; rel: 5.267e-05; norm: 9.687e-02
```

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## It: 613; obj: 2.288e+00; abs: 1.011e-04; rel: 4.420e-05; norm: 9.685e-02
## It: 614; obj: 2.288e+00; abs: 1.137e-04; rel: 4.970e-05; norm: 9.683e-02
## It: 615; obj: 2.288e+00; abs: 1.544e-04; rel: 6.749e-05; norm: 9.683e-02
## It: 616; obj: 2.288e+00; abs: 7.719e-06; rel: 3.374e-06; norm: 9.685e-02
## It: 617; obj: 2.288e+00; abs: 8.024e-05; rel: 3.507e-05; norm: 9.685e-02
## It: 618; obj: 2.288e+00; abs: 1.045e-04; rel: 4.568e-05; norm: 9.683e-02
## It: 619; obj: 2.288e+00; abs: 1.706e-05; rel: 7.456e-06; norm: 9.680e-02
## It: 620; obj: 2.288e+00; abs: 1.464e-04; rel: 6.399e-05; norm: 9.680e-02
## It: 621; obj: 2.288e+00; abs: 3.021e-05; rel: 1.320e-05; norm: 9.682e-02
## It: 622; obj: 2.288e+00; abs: 8.901e-05; rel: 3.891e-05; norm: 9.683e-02
## It: 623; obj: 2.288e+00; abs: 1.176e-06; rel: 5.139e-07; norm: 9.682e-02
## It: 624; obj: 2.288e+00; abs: 1.573e-04; rel: 6.875e-05; norm: 9.681e-02
## It: 625; obj: 2.288e+00; abs: 1.814e-05; rel: 7.927e-06; norm: 9.681e-02
## It: 626; obj: 2.288e+00; abs: 4.528e-05; rel: 1.979e-05; norm: 9.682e-02
## It: 627; obj: 2.288e+00; abs: 6.903e-05; rel: 3.017e-05; norm: 9.681e-02
## It: 628; obj: 2.288e+00; abs: 4.460e-05; rel: 1.950e-05; norm: 9.680e-02
## It: 629; obj: 2.288e+00; abs: 5.530e-05; rel: 2.417e-05; norm: 9.678e-02
## It: 630; obj: 2.288e+00; abs: 1.519e-05; rel: 6.637e-06; norm: 9.678e-02
## It: 631; obj: 2.288e+00; abs: 9.473e-06; rel: 4.140e-06; norm: 9.679e-02
## It: 632; obj: 2.288e+00; abs: 1.988e-06; rel: 8.690e-07; norm: 9.679e-02
## It: 633; obj: 2.288e+00; abs: 5.314e-05; rel: 2.323e-05; norm: 9.678e-02
## It: 634; obj: 2.288e+00; abs: 1.658e-04; rel: 7.244e-05; norm: 9.677e-02
## It: 635; obj: 2.288e+00; abs: 1.658e-04; rel: 7.249e-05; norm: 9.677e-02
## It: 636; obj: 2.288e+00; abs: 3.407e-06; rel: 1.489e-06; norm: 9.678e-02
## It: 637; obj: 2.288e+00; abs: 1.206e-04; rel: 5.272e-05; norm: 9.678e-02
## It: 638; obj: 2.288e+00; abs: 7.430e-05; rel: 3.248e-05; norm: 9.677e-02
## It: 639; obj: 2.288e+00; abs: 1.862e-05; rel: 8.137e-06; norm: 9.676e-02
## It: 640; obj: 2.288e+00; abs: 6.133e-06; rel: 2.681e-06; norm: 9.675e-02
## It: 641; obj: 2.288e+00; abs: 1.742e-05; rel: 7.612e-06; norm: 9.675e-02
## It: 642; obj: 2.288e+00; abs: 5.507e-05; rel: 2.407e-05; norm: 9.675e-02
## It: 643; obj: 2.288e+00; abs: 1.048e-04; rel: 4.582e-05; norm: 9.674e-02
## It: 644; obj: 2.288e+00; abs: 2.121e-05; rel: 9.268e-06; norm: 9.673e-02
## It: 645; obj: 2.288e+00; abs: 1.988e-04; rel: 8.688e-05; norm: 9.673e-02
## It: 646; obj: 2.288e+00; abs: 2.116e-04; rel: 9.251e-05; norm: 9.674e-02
## It: 647; obj: 2.288e+00; abs: 2.785e-05; rel: 1.217e-05; norm: 9.674e-02
## It: 648; obj: 2.288e+00; abs: 1.509e-04; rel: 6.598e-05; norm: 9.674e-02
## It: 649; obj: 2.288e+00; abs: 1.292e-04; rel: 5.647e-05; norm: 9.672e-02
## It: 650; obj: 2.288e+00; abs: 3.114e-05; rel: 1.361e-05; norm: 9.671e-02
## It: 651; obj: 2.288e+00; abs: 1.290e-04; rel: 5.638e-05; norm: 9.672e-02
## It: 652; obj: 2.288e+00; abs: 3.489e-05; rel: 1.525e-05; norm: 9.672e-02
## It: 653; obj: 2.288e+00; abs: 9.918e-05; rel: 4.335e-05; norm: 9.672e-02
## It: 654; obj: 2.288e+00; abs: 1.248e-04; rel: 5.454e-05; norm: 9.670e-02
## It: 655; obj: 2.288e+00; abs: 1.823e-05; rel: 7.966e-06; norm: 9.669e-02
## It: 656; obj: 2.288e+00; abs: 2.845e-04; rel: 1.244e-04; norm: 9.669e-02
## It: 657; obj: 2.288e+00; abs: 1.337e-04; rel: 5.844e-05; norm: 9.670e-02
## It: 658; obj: 2.288e+00; abs: 1.926e-05; rel: 8.420e-06; norm: 9.671e-02
## It: 659; obj: 2.288e+00; abs: 1.567e-04; rel: 6.850e-05; norm: 9.670e-02
## It: 660; obj: 2.288e+00; abs: 1.797e-04; rel: 7.857e-05; norm: 9.667e-02
## It: 661; obj: 2.288e+00; abs: 4.328e-05; rel: 1.892e-05; norm: 9.666e-02
## It: 662; obj: 2.288e+00; abs: 1.167e-04; rel: 5.099e-05; norm: 9.667e-02
## It: 663; obj: 2.288e+00; abs: 1.101e-04; rel: 4.811e-05; norm: 9.669e-02
## It: 664; obj: 2.288e+00; abs: 8.345e-05; rel: 3.648e-05; norm: 9.668e-02
## It: 665; obj: 2.288e+00; abs: 1.025e-04; rel: 4.481e-05; norm: 9.667e-02
## It: 666; obj: 2.288e+00; abs: 1.655e-04; rel: 7.232e-05; norm: 9.666e-02
```

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## It: 667; obj: 2.288e+00; abs: 1.450e-04; rel: 6.338e-05; norm: 9.666e-02
## It: 668; obj: 2.288e+00; abs: 5.257e-05; rel: 2.298e-05; norm: 9.668e-02
## It: 669; obj: 2.288e+00; abs: 4.546e-05; rel: 1.987e-05; norm: 9.668e-02
## It: 670; obj: 2.288e+00; abs: 1.669e-04; rel: 7.295e-05; norm: 9.665e-02
## It: 671; obj: 2.288e+00; abs: 1.151e-04; rel: 5.032e-05; norm: 9.664e-02
## It: 672; obj: 2.288e+00; abs: 8.964e-06; rel: 3.918e-06; norm: 9.665e-02
## It: 673; obj: 2.288e+00; abs: 4.625e-05; rel: 2.021e-05; norm: 9.666e-02
## It: 674; obj: 2.288e+00; abs: 2.738e-05; rel: 1.197e-05; norm: 9.666e-02
## It: 675; obj: 2.288e+00; abs: 3.735e-05; rel: 1.633e-05; norm: 9.665e-02
## It: 676; obj: 2.288e+00; abs: 5.038e-05; rel: 2.202e-05; norm: 9.663e-02
## It: 677; obj: 2.288e+00; abs: 1.376e-04; rel: 6.014e-05; norm: 9.662e-02
## It: 678; obj: 2.288e+00; abs: 5.114e-05; rel: 2.236e-05; norm: 9.663e-02
## It: 679; obj: 2.288e+00; abs: 6.707e-06; rel: 2.932e-06; norm: 9.664e-02
## It: 680; obj: 2.288e+00; abs: 3.001e-05; rel: 1.312e-05; norm: 9.663e-02
## It: 681; obj: 2.288e+00; abs: 2.054e-05; rel: 8.978e-06; norm: 9.661e-02
## It: 682; obj: 2.288e+00; abs: 3.273e-05; rel: 1.431e-05; norm: 9.661e-02
## It: 683; obj: 2.288e+00; abs: 2.014e-05; rel: 8.802e-06; norm: 9.662e-02
## It: 684; obj: 2.288e+00; abs: 5.724e-05; rel: 2.502e-05; norm: 9.663e-02
## It: 685; obj: 2.288e+00; abs: 1.135e-04; rel: 4.963e-05; norm: 9.662e-02
## It: 686; obj: 2.288e+00; abs: 7.654e-05; rel: 3.345e-05; norm: 9.660e-02
## It: 687; obj: 2.288e+00; abs: 9.703e-05; rel: 4.241e-05; norm: 9.659e-02
## It: 688; obj: 2.288e+00; abs: 2.211e-04; rel: 9.663e-05; norm: 9.659e-02
## It: 689; obj: 2.288e+00; abs: 1.368e-06; rel: 5.981e-07; norm: 9.661e-02
## It: 690; obj: 2.288e+00; abs: 8.793e-05; rel: 3.844e-05; norm: 9.661e-02
## It: 691; obj: 2.288e+00; abs: 5.873e-05; rel: 2.567e-05; norm: 9.659e-02
## It: 692; obj: 2.288e+00; abs: 5.685e-05; rel: 2.485e-05; norm: 9.656e-02
## It: 693; obj: 2.288e+00; abs: 1.526e-04; rel: 6.672e-05; norm: 9.656e-02
## It: 694; obj: 2.288e+00; abs: 5.006e-06; rel: 2.188e-06; norm: 9.658e-02
## It: 695; obj: 2.288e+00; abs: 1.148e-04; rel: 5.018e-05; norm: 9.660e-02
## It: 696; obj: 2.288e+00; abs: 9.512e-05; rel: 4.158e-05; norm: 9.659e-02
## It: 697; obj: 2.288e+00; abs: 6.911e-05; rel: 3.021e-05; norm: 9.657e-02
## It: 698; obj: 2.288e+00; abs: 1.294e-04; rel: 5.658e-05; norm: 9.656e-02
## It: 699; obj: 2.288e+00; abs: 7.355e-06; rel: 3.215e-06; norm: 9.657e-02
## It: 700; obj: 2.288e+00; abs: 5.522e-05; rel: 2.414e-05; norm: 9.658e-02
## It: 701; obj: 2.288e+00; abs: 9.363e-05; rel: 4.093e-05; norm: 9.657e-02
## It: 702; obj: 2.288e+00; abs: 7.731e-05; rel: 3.379e-05; norm: 9.654e-02
## It: 703; obj: 2.288e+00; abs: 8.239e-06; rel: 3.601e-06; norm: 9.654e-02
## It: 704; obj: 2.288e+00; abs: 9.245e-05; rel: 4.041e-05; norm: 9.654e-02
## It: 705; obj: 2.288e+00; abs: 4.865e-06; rel: 2.127e-06; norm: 9.656e-02
## It: 706; obj: 2.288e+00; abs: 7.145e-05; rel: 3.123e-05; norm: 9.656e-02
## It: 707; obj: 2.288e+00; abs: 1.489e-04; rel: 6.510e-05; norm: 9.655e-02
## It: 708; obj: 2.288e+00; abs: 1.051e-04; rel: 4.594e-05; norm: 9.654e-02
## It: 709; obj: 2.288e+00; abs: 1.224e-05; rel: 5.353e-06; norm: 9.655e-02
## It: 710; obj: 2.288e+00; abs: 9.631e-05; rel: 4.210e-05; norm: 9.655e-02
## It: 711; obj: 2.288e+00; abs: 3.397e-05; rel: 1.485e-05; norm: 9.654e-02
## It: 712; obj: 2.288e+00; abs: 1.457e-05; rel: 6.368e-06; norm: 9.653e-02
## It: 713; obj: 2.288e+00; abs: 3.209e-05; rel: 1.403e-05; norm: 9.652e-02
## It: 714; obj: 2.288e+00; abs: 8.081e-06; rel: 3.532e-06; norm: 9.652e-02
## It: 715; obj: 2.288e+00; abs: 4.796e-05; rel: 2.097e-05; norm: 9.653e-02
## It: 716; obj: 2.288e+00; abs: 5.643e-05; rel: 2.466e-05; norm: 9.652e-02
## It: 717; obj: 2.288e+00; abs: 2.030e-05; rel: 8.872e-06; norm: 9.651e-02
## It: 718; obj: 2.288e+00; abs: 1.720e-04; rel: 7.516e-05; norm: 9.650e-02
## It: 719; obj: 2.287e+00; abs: 1.880e-04; rel: 8.218e-05; norm: 9.651e-02
## It: 720; obj: 2.287e+00; abs: 2.649e-05; rel: 1.158e-05; norm: 9.651e-02
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## It: 721; obj: 2.288e+00; abs: 1.379e-04; rel: 6.027e-05; norm: 9.651e-02
## It: 722; obj: 2.288e+00; abs: 8.895e-05; rel: 3.888e-05; norm: 9.650e-02
## It: 723; obj: 2.288e+00; abs: 5.745e-05; rel: 2.511e-05; norm: 9.649e-02
## It: 724; obj: 2.288e+00; abs: 6.092e-05; rel: 2.663e-05; norm: 9.650e-02
## It: 725; obj: 2.288e+00; abs: 7.455e-06; rel: 3.259e-06; norm: 9.650e-02
## It: 726; obj: 2.288e+00; abs: 7.889e-05; rel: 3.449e-05; norm: 9.649e-02
## It: 727; obj: 2.288e+00; abs: 1.109e-04; rel: 4.847e-05; norm: 9.648e-02
## It: 728; obj: 2.288e+00; abs: 3.735e-05; rel: 1.632e-05; norm: 9.647e-02
## It: 729; obj: 2.288e+00; abs: 2.193e-04; rel: 9.584e-05; norm: 9.646e-02
## It: 730; obj: 2.287e+00; abs: 1.833e-04; rel: 8.011e-05; norm: 9.648e-02
## It: 731; obj: 2.287e+00; abs: 2.840e-05; rel: 1.242e-05; norm: 9.649e-02
## It: 732; obj: 2.288e+00; abs: 1.420e-04; rel: 6.208e-05; norm: 9.648e-02
## It: 733; obj: 2.288e+00; abs: 1.580e-04; rel: 6.905e-05; norm: 9.645e-02
## It: 734; obj: 2.288e+00; abs: 4.756e-06; rel: 2.079e-06; norm: 9.645e-02
## It: 735; obj: 2.288e+00; abs: 1.386e-04; rel: 6.059e-05; norm: 9.646e-02
## It: 736; obj: 2.288e+00; abs: 8.664e-05; rel: 3.788e-05; norm: 9.647e-02
## It: 737; obj: 2.288e+00; abs: 9.354e-05; rel: 4.089e-05; norm: 9.646e-02
## It: 738; obj: 2.288e+00; abs: 1.150e-04; rel: 5.027e-05; norm: 9.645e-02
## It: 739; obj: 2.288e+00; abs: 7.073e-05; rel: 3.092e-05; norm: 9.643e-02
## It: 740; obj: 2.287e+00; abs: 2.266e-04; rel: 9.906e-05; norm: 9.644e-02
## It: 741; obj: 2.287e+00; abs: 3.978e-05; rel: 1.739e-05; norm: 9.646e-02
## It: 742; obj: 2.287e+00; abs: 5.616e-06; rel: 2.455e-06; norm: 9.646e-02
## It: 743; obj: 2.288e+00; abs: 1.488e-04; rel: 6.505e-05; norm: 9.644e-02
## It: 744; obj: 2.288e+00; abs: 1.613e-04; rel: 7.052e-05; norm: 9.642e-02
## It: 745; obj: 2.288e+00; abs: 3.142e-05; rel: 1.373e-05; norm: 9.642e-02
## It: 746; obj: 2.288e+00; abs: 1.603e-05; rel: 7.005e-06; norm: 9.643e-02
## It: 747; obj: 2.288e+00; abs: 6.593e-05; rel: 2.882e-05; norm: 9.644e-02
## It: 748; obj: 2.288e+00; abs: 2.807e-05; rel: 1.227e-05; norm: 9.643e-02
## It: 749; obj: 2.288e+00; abs: 1.657e-05; rel: 7.245e-06; norm: 9.642e-02
## It: 750; obj: 2.288e+00; abs: 1.178e-04; rel: 5.149e-05; norm: 9.641e-02
## It: 751; obj: 2.287e+00; abs: 8.774e-05; rel: 3.836e-05; norm: 9.642e-02
## It: 752; obj: 2.287e+00; abs: 2.821e-05; rel: 1.233e-05; norm: 9.643e-02
## It: 753; obj: 2.287e+00; abs: 5.131e-05; rel: 2.243e-05; norm: 9.642e-02
## It: 754; obj: 2.288e+00; abs: 1.099e-04; rel: 4.804e-05; norm: 9.640e-02
## It: 755; obj: 2.288e+00; abs: 7.799e-05; rel: 3.410e-05; norm: 9.640e-02
## It: 756; obj: 2.288e+00; abs: 5.911e-06; rel: 2.584e-06; norm: 9.641e-02
## It: 757; obj: 2.288e+00; abs: 4.751e-05; rel: 2.077e-05; norm: 9.642e-02
## It: 758; obj: 2.288e+00; abs: 6.976e-05; rel: 3.049e-05; norm: 9.641e-02
## It: 759; obj: 2.288e+00; abs: 2.534e-05; rel: 1.108e-05; norm: 9.639e-02
## It: 760; obj: 2.288e+00; abs: 1.163e-04; rel: 5.083e-05; norm: 9.638e-02
## It: 761; obj: 2.287e+00; abs: 1.336e-04; rel: 5.842e-05; norm: 9.638e-02
## It: 762; obj: 2.287e+00; abs: 6.898e-06; rel: 3.015e-06; norm: 9.640e-02
## It: 763; obj: 2.288e+00; abs: 6.185e-05; rel: 2.704e-05; norm: 9.639e-02
## It: 764; obj: 2.288e+00; abs: 1.650e-05; rel: 7.212e-06; norm: 9.637e-02
## It: 765; obj: 2.288e+00; abs: 1.538e-05; rel: 6.724e-06; norm: 9.635e-02
## It: 766; obj: 2.287e+00; abs: 5.327e-05; rel: 2.329e-05; norm: 9.636e-02
## It: 767; obj: 2.287e+00; abs: 2.397e-05; rel: 1.048e-05; norm: 9.638e-02
## It: 768; obj: 2.288e+00; abs: 9.504e-05; rel: 4.155e-05; norm: 9.639e-02
## It: 769; obj: 2.288e+00; abs: 1.215e-04; rel: 5.312e-05; norm: 9.637e-02
## It: 770; obj: 2.288e+00; abs: 6.912e-05; rel: 3.022e-05; norm: 9.635e-02
## It: 771; obj: 2.287e+00; abs: 2.006e-04; rel: 8.769e-05; norm: 9.635e-02
## It: 772; obj: 2.287e+00; abs: 2.265e-05; rel: 9.900e-06; norm: 9.637e-02
## It: 773; obj: 2.288e+00; abs: 8.564e-05; rel: 3.744e-05; norm: 9.638e-02
## It: 774; obj: 2.288e+00; abs: 1.102e-04; rel: 4.817e-05; norm: 9.635e-02
```

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## It: 775; obj: 2.288e+00; abs: 3.824e-05; rel: 1.672e-05; norm: 9.633e-02
## It: 776; obj: 2.288e+00; abs: 1.455e-04; rel: 6.358e-05; norm: 9.632e-02
## It: 777; obj: 2.287e+00; abs: 5.642e-05; rel: 2.466e-05; norm: 9.634e-02
## It: 778; obj: 2.288e+00; abs: 8.711e-05; rel: 3.808e-05; norm: 9.636e-02
## It: 779; obj: 2.288e+00; abs: 5.400e-05; rel: 2.361e-05; norm: 9.635e-02
## It: 780; obj: 2.287e+00; abs: 1.458e-04; rel: 6.375e-05; norm: 9.634e-02
## It: 781; obj: 2.287e+00; abs: 6.290e-05; rel: 2.750e-05; norm: 9.634e-02
## It: 782; obj: 2.287e+00; abs: 2.109e-05; rel: 9.222e-06; norm: 9.635e-02
## It: 783; obj: 2.287e+00; abs: 7.991e-05; rel: 3.494e-05; norm: 9.635e-02
## It: 784; obj: 2.288e+00; abs: 7.886e-05; rel: 3.448e-05; norm: 9.633e-02
## It: 785; obj: 2.288e+00; abs: 7.486e-05; rel: 3.273e-05; norm: 9.632e-02
## It: 786; obj: 2.288e+00; abs: 1.604e-05; rel: 7.010e-06; norm: 9.631e-02
## It: 787; obj: 2.288e+00; abs: 2.722e-05; rel: 1.190e-05; norm: 9.632e-02
## It: 788; obj: 2.288e+00; abs: 4.042e-05; rel: 1.767e-05; norm: 9.633e-02
## It: 789; obj: 2.288e+00; abs: 7.121e-05; rel: 3.113e-05; norm: 9.632e-02
## It: 790; obj: 2.288e+00; abs: 1.437e-04; rel: 6.282e-05; norm: 9.631e-02
## It: 791; obj: 2.287e+00; abs: 1.218e-04; rel: 5.324e-05; norm: 9.631e-02
## It: 792; obj: 2.287e+00; abs: 3.677e-05; rel: 1.607e-05; norm: 9.632e-02
## It: 793; obj: 2.287e+00; abs: 9.735e-05; rel: 4.256e-05; norm: 9.632e-02
## It: 794; obj: 2.288e+00; abs: 5.194e-05; rel: 2.271e-05; norm: 9.631e-02
## It: 795; obj: 2.288e+00; abs: 4.777e-06; rel: 2.088e-06; norm: 9.631e-02
## It: 796; obj: 2.288e+00; abs: 3.187e-05; rel: 1.393e-05; norm: 9.630e-02
## It: 797; obj: 2.288e+00; abs: 1.402e-05; rel: 6.131e-06; norm: 9.630e-02
## It: 798; obj: 2.288e+00; abs: 4.131e-05; rel: 1.806e-05; norm: 9.630e-02
## It: 799; obj: 2.288e+00; abs: 8.236e-05; rel: 3.600e-05; norm: 9.629e-02
## It: 800; obj: 2.288e+00; abs: 2.341e-05; rel: 1.023e-05; norm: 9.628e-02
## It: 801; obj: 2.288e+00; abs: 1.507e-04; rel: 6.588e-05; norm: 9.628e-02
## It: 802; obj: 2.287e+00; abs: 2.026e-04; rel: 8.858e-05; norm: 9.629e-02
## It: 803; obj: 2.287e+00; abs: 1.417e-05; rel: 6.196e-06; norm: 9.629e-02
## It: 804; obj: 2.287e+00; abs: 1.331e-04; rel: 5.821e-05; norm: 9.629e-02
## It: 805; obj: 2.288e+00; abs: 1.128e-04; rel: 4.931e-05; norm: 9.627e-02
## It: 806; obj: 2.288e+00; abs: 3.917e-05; rel: 1.712e-05; norm: 9.627e-02
## It: 807; obj: 2.287e+00; abs: 1.055e-04; rel: 4.613e-05; norm: 9.627e-02
## It: 808; obj: 2.287e+00; abs: 2.699e-05; rel: 1.180e-05; norm: 9.628e-02
## It: 809; obj: 2.287e+00; abs: 7.520e-05; rel: 3.287e-05; norm: 9.627e-02
## It: 810; obj: 2.288e+00; abs: 1.123e-04; rel: 4.907e-05; norm: 9.626e-02
## It: 811; obj: 2.288e+00; abs: 4.088e-05; rel: 1.787e-05; norm: 9.625e-02
## It: 812; obj: 2.287e+00; abs: 2.211e-04; rel: 9.665e-05; norm: 9.625e-02
## It: 813; obj: 2.287e+00; abs: 1.492e-04; rel: 6.524e-05; norm: 9.626e-02
## It: 814; obj: 2.287e+00; abs: 2.341e-05; rel: 1.023e-05; norm: 9.627e-02
## It: 815; obj: 2.287e+00; abs: 1.368e-04; rel: 5.981e-05; norm: 9.626e-02
## It: 816; obj: 2.288e+00; abs: 1.779e-04; rel: 7.779e-05; norm: 9.623e-02
## It: 817; obj: 2.288e+00; abs: 2.225e-05; rel: 9.726e-06; norm: 9.623e-02
## It: 818; obj: 2.288e+00; abs: 1.268e-04; rel: 5.543e-05; norm: 9.624e-02
## It: 819; obj: 2.287e+00; abs: 1.251e-04; rel: 5.471e-05; norm: 9.625e-02
## It: 820; obj: 2.287e+00; abs: 7.275e-05; rel: 3.181e-05; norm: 9.625e-02
## It: 821; obj: 2.288e+00; abs: 1.009e-04; rel: 4.413e-05; norm: 9.623e-02
## It: 822; obj: 2.287e+00; abs: 1.274e-04; rel: 5.570e-05; norm: 9.622e-02
## It: 823; obj: 2.287e+00; abs: 1.396e-04; rel: 6.102e-05; norm: 9.623e-02
## It: 824; obj: 2.287e+00; abs: 2.641e-05; rel: 1.155e-05; norm: 9.625e-02
## It: 825; obj: 2.287e+00; abs: 2.403e-05; rel: 1.051e-05; norm: 9.625e-02
## It: 826; obj: 2.287e+00; abs: 1.507e-04; rel: 6.588e-05; norm: 9.623e-02
## It: 827; obj: 2.288e+00; abs: 1.403e-04; rel: 6.133e-05; norm: 9.621e-02
## It: 828; obj: 2.288e+00; abs: 5.435e-06; rel: 2.376e-06; norm: 9.622e-02
```

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## It: 829; obj: 2.288e+00; abs: 3.108e-05; rel: 1.359e-05; norm: 9.623e-02
## It: 830; obj: 2.288e+00; abs: 2.312e-05; rel: 1.011e-05; norm: 9.624e-02
## It: 831; obj: 2.288e+00; abs: 7.332e-06; rel: 3.205e-06; norm: 9.622e-02
## It: 832; obj: 2.288e+00; abs: 4.333e-05; rel: 1.894e-05; norm: 9.621e-02
## It: 833; obj: 2.287e+00; abs: 9.128e-05; rel: 3.990e-05; norm: 9.620e-02
## It: 834; obj: 2.287e+00; abs: 5.388e-05; rel: 2.355e-05; norm: 9.622e-02
## It: 835; obj: 2.287e+00; abs: 2.115e-07; rel: 9.248e-08; norm: 9.622e-02
## It: 836; obj: 2.287e+00; abs: 4.512e-05; rel: 1.972e-05; norm: 9.621e-02
## It: 837; obj: 2.287e+00; abs: 4.850e-05; rel: 2.120e-05; norm: 9.619e-02
## It: 838; obj: 2.287e+00; abs: 5.628e-05; rel: 2.460e-05; norm: 9.619e-02
## It: 839; obj: 2.287e+00; abs: 1.163e-05; rel: 5.083e-06; norm: 9.621e-02
## It: 840; obj: 2.287e+00; abs: 5.234e-05; rel: 2.288e-05; norm: 9.621e-02
## It: 841; obj: 2.288e+00; abs: 9.804e-05; rel: 4.286e-05; norm: 9.621e-02
## It: 842; obj: 2.288e+00; abs: 2.089e-05; rel: 9.132e-06; norm: 9.619e-02
## It: 843; obj: 2.287e+00; abs: 1.406e-04; rel: 6.144e-05; norm: 9.617e-02
## It: 844; obj: 2.287e+00; abs: 1.420e-04; rel: 6.207e-05; norm: 9.618e-02
## It: 845; obj: 2.287e+00; abs: 2.964e-05; rel: 1.296e-05; norm: 9.620e-02
## It: 846; obj: 2.287e+00; abs: 8.303e-05; rel: 3.630e-05; norm: 9.619e-02
## It: 847; obj: 2.287e+00; abs: 2.039e-05; rel: 8.912e-06; norm: 9.617e-02
## It: 848; obj: 2.287e+00; abs: 5.215e-05; rel: 2.280e-05; norm: 9.615e-02
## It: 849; obj: 2.287e+00; abs: 1.079e-04; rel: 4.719e-05; norm: 9.616e-02
## It: 850; obj: 2.287e+00; abs: 2.545e-05; rel: 1.113e-05; norm: 9.618e-02
## It: 851; obj: 2.287e+00; abs: 1.074e-04; rel: 4.697e-05; norm: 9.619e-02
## It: 852; obj: 2.288e+00; abs: 1.088e-04; rel: 4.755e-05; norm: 9.617e-02
## It: 853; obj: 2.287e+00; abs: 8.554e-05; rel: 3.739e-05; norm: 9.616e-02
## It: 854; obj: 2.287e+00; abs: 1.610e-04; rel: 7.038e-05; norm: 9.615e-02
## It: 855; obj: 2.287e+00; abs: 3.332e-06; rel: 1.457e-06; norm: 9.618e-02
## It: 856; obj: 2.287e+00; abs: 8.517e-05; rel: 3.724e-05; norm: 9.618e-02
## It: 857; obj: 2.287e+00; abs: 1.171e-04; rel: 5.122e-05; norm: 9.616e-02
## It: 858; obj: 2.288e+00; abs: 6.950e-05; rel: 3.038e-05; norm: 9.614e-02
## It: 859; obj: 2.287e+00; abs: 1.076e-04; rel: 4.705e-05; norm: 9.614e-02
## It: 860; obj: 2.287e+00; abs: 9.828e-05; rel: 4.296e-05; norm: 9.615e-02
## It: 861; obj: 2.287e+00; abs: 7.735e-05; rel: 3.382e-05; norm: 9.616e-02
## It: 862; obj: 2.287e+00; abs: 4.324e-05; rel: 1.890e-05; norm: 9.616e-02
## It: 863; obj: 2.287e+00; abs: 1.589e-04; rel: 6.945e-05; norm: 9.614e-02
## It: 864; obj: 2.287e+00; abs: 8.003e-05; rel: 3.499e-05; norm: 9.614e-02
## It: 865; obj: 2.287e+00; abs: 3.515e-05; rel: 1.537e-05; norm: 9.615e-02
## It: 866; obj: 2.287e+00; abs: 9.212e-05; rel: 4.027e-05; norm: 9.615e-02
## It: 867; obj: 2.287e+00; abs: 3.538e-05; rel: 1.547e-05; norm: 9.615e-02
## It: 868; obj: 2.287e+00; abs: 6.459e-05; rel: 2.824e-05; norm: 9.613e-02
## It: 869; obj: 2.287e+00; abs: 2.653e-05; rel: 1.160e-05; norm: 9.613e-02
## It: 870; obj: 2.288e+00; abs: 2.039e-05; rel: 8.912e-06; norm: 9.614e-02
## It: 871; obj: 2.288e+00; abs: 1.637e-05; rel: 7.157e-06; norm: 9.614e-02
## It: 872; obj: 2.288e+00; abs: 3.026e-05; rel: 1.323e-05; norm: 9.613e-02
## It: 873; obj: 2.288e+00; abs: 3.770e-05; rel: 1.648e-05; norm: 9.612e-02
## It: 874; obj: 2.287e+00; abs: 2.300e-04; rel: 1.006e-04; norm: 9.612e-02
## It: 875; obj: 2.287e+00; abs: 3.551e-05; rel: 1.553e-05; norm: 9.613e-02
## It: 876; obj: 2.287e+00; abs: 6.853e-05; rel: 2.996e-05; norm: 9.613e-02
## It: 877; obj: 2.287e+00; abs: 1.107e-04; rel: 4.839e-05; norm: 9.612e-02
## It: 878; obj: 2.287e+00; abs: 1.956e-07; rel: 8.552e-08; norm: 9.611e-02
## It: 879; obj: 2.287e+00; abs: 1.546e-05; rel: 6.760e-06; norm: 9.611e-02
## It: 880; obj: 2.287e+00; abs: 2.022e-05; rel: 8.842e-06; norm: 9.612e-02
## It: 881; obj: 2.287e+00; abs: 1.443e-05; rel: 6.310e-06; norm: 9.611e-02
## It: 882; obj: 2.288e+00; abs: 9.600e-05; rel: 4.197e-05; norm: 9.610e-02
```

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## It: 883; obj: 2.288e+00; abs: 5.986e-05; rel: 2.617e-05; norm: 9.609e-02
## It: 884; obj: 2.287e+00; abs: 1.422e-04; rel: 6.218e-05; norm: 9.609e-02
## It: 885; obj: 2.287e+00; abs: 2.018e-04; rel: 8.821e-05; norm: 9.610e-02
## It: 886; obj: 2.287e+00; abs: 1.265e-05; rel: 5.530e-06; norm: 9.611e-02
## It: 887; obj: 2.287e+00; abs: 1.096e-04; rel: 4.791e-05; norm: 9.611e-02
## It: 888; obj: 2.287e+00; abs: 1.493e-04; rel: 6.525e-05; norm: 9.608e-02
## It: 889; obj: 2.288e+00; abs: 2.626e-05; rel: 1.148e-05; norm: 9.608e-02
## It: 890; obj: 2.287e+00; abs: 9.804e-05; rel: 4.286e-05; norm: 9.608e-02
## It: 891; obj: 2.287e+00; abs: 1.027e-04; rel: 4.490e-05; norm: 9.610e-02
## It: 892; obj: 2.287e+00; abs: 4.880e-05; rel: 2.133e-05; norm: 9.609e-02
## It: 893; obj: 2.287e+00; abs: 9.882e-05; rel: 4.320e-05; norm: 9.608e-02
## It: 894; obj: 2.287e+00; abs: 4.723e-05; rel: 2.065e-05; norm: 9.606e-02
## It: 895; obj: 2.287e+00; abs: 2.124e-04; rel: 9.287e-05; norm: 9.607e-02
## It: 896; obj: 2.287e+00; abs: 1.765e-05; rel: 7.716e-06; norm: 9.609e-02
## It: 897; obj: 2.287e+00; abs: 9.102e-06; rel: 3.979e-06; norm: 9.609e-02
## It: 898; obj: 2.287e+00; abs: 1.390e-04; rel: 6.077e-05; norm: 9.607e-02
## It: 899; obj: 2.288e+00; abs: 1.770e-04; rel: 7.737e-05; norm: 9.605e-02
## It: 900; obj: 2.288e+00; abs: 3.645e-05; rel: 1.593e-05; norm: 9.605e-02
## It: 901; obj: 2.288e+00; abs: 4.438e-05; rel: 1.940e-05; norm: 9.607e-02
## It: 902; obj: 2.287e+00; abs: 1.082e-04; rel: 4.729e-05; norm: 9.609e-02
## It: 903; obj: 2.287e+00; abs: 3.078e-05; rel: 1.346e-05; norm: 9.607e-02
## It: 904; obj: 2.287e+00; abs: 8.748e-07; rel: 3.824e-07; norm: 9.605e-02
## It: 905; obj: 2.287e+00; abs: 1.158e-04; rel: 5.064e-05; norm: 9.605e-02
## It: 906; obj: 2.287e+00; abs: 5.038e-05; rel: 2.202e-05; norm: 9.607e-02
## It: 907; obj: 2.287e+00; abs: 2.353e-05; rel: 1.029e-05; norm: 9.607e-02
## It: 908; obj: 2.287e+00; abs: 1.752e-05; rel: 7.659e-06; norm: 9.606e-02
## It: 909; obj: 2.287e+00; abs: 1.538e-04; rel: 6.726e-05; norm: 9.604e-02
## It: 910; obj: 2.287e+00; abs: 4.588e-05; rel: 2.006e-05; norm: 9.604e-02
## It: 911; obj: 2.287e+00; abs: 1.117e-05; rel: 4.883e-06; norm: 9.606e-02
## It: 912; obj: 2.287e+00; abs: 2.547e-05; rel: 1.114e-05; norm: 9.607e-02
## It: 913; obj: 2.288e+00; abs: 5.198e-05; rel: 2.272e-05; norm: 9.605e-02
## It: 914; obj: 2.287e+00; abs: 4.546e-05; rel: 1.987e-05; norm: 9.603e-02
## It: 915; obj: 2.287e+00; abs: 1.536e-04; rel: 6.713e-05; norm: 9.603e-02
## It: 916; obj: 2.287e+00; abs: 3.702e-05; rel: 1.618e-05; norm: 9.605e-02
## It: 917; obj: 2.287e+00; abs: 4.267e-05; rel: 1.865e-05; norm: 9.606e-02
## It: 918; obj: 2.287e+00; abs: 2.609e-05; rel: 1.141e-05; norm: 9.604e-02
## It: 919; obj: 2.287e+00; abs: 1.289e-05; rel: 5.635e-06; norm: 9.601e-02
## It: 920; obj: 2.287e+00; abs: 1.400e-05; rel: 6.123e-06; norm: 9.601e-02
## It: 921; obj: 2.287e+00; abs: 1.861e-05; rel: 8.137e-06; norm: 9.603e-02
## It: 922; obj: 2.287e+00; abs: 3.209e-05; rel: 1.403e-05; norm: 9.604e-02
## It: 923; obj: 2.287e+00; abs: 1.212e-04; rel: 5.299e-05; norm: 9.604e-02
## It: 924; obj: 2.288e+00; abs: 2.919e-05; rel: 1.276e-05; norm: 9.601e-02
## It: 925; obj: 2.287e+00; abs: 1.755e-04; rel: 7.672e-05; norm: 9.600e-02
## It: 926; obj: 2.287e+00; abs: 1.196e-04; rel: 5.227e-05; norm: 9.602e-02
## It: 927; obj: 2.287e+00; abs: 4.743e-05; rel: 2.074e-05; norm: 9.604e-02
## It: 928; obj: 2.287e+00; abs: 1.159e-04; rel: 5.067e-05; norm: 9.603e-02
## It: 929; obj: 2.287e+00; abs: 7.602e-05; rel: 3.323e-05; norm: 9.600e-02
## It: 930; obj: 2.287e+00; abs: 7.424e-05; rel: 3.246e-05; norm: 9.599e-02
## It: 931; obj: 2.287e+00; abs: 1.416e-04; rel: 6.189e-05; norm: 9.600e-02
## It: 932; obj: 2.287e+00; abs: 3.767e-05; rel: 1.647e-05; norm: 9.602e-02
## It: 933; obj: 2.287e+00; abs: 9.932e-05; rel: 4.342e-05; norm: 9.602e-02
## It: 934; obj: 2.287e+00; abs: 7.772e-06; rel: 3.398e-06; norm: 9.601e-02
## It: 935; obj: 2.287e+00; abs: 1.669e-04; rel: 7.296e-05; norm: 9.600e-02
## It: 936; obj: 2.287e+00; abs: 2.648e-05; rel: 1.158e-05; norm: 9.601e-02
```

```
## It: 937; obj: 2.287e+00; abs: 5.449e-05; rel: 2.382e-05; norm: 9.602e-02
## It: 938; obj: 2.287e+00; abs: 8.850e-05; rel: 3.869e-05; norm: 9.601e-02
## It: 939; obj: 2.287e+00; abs: 9.995e-05; rel: 4.370e-05; norm: 9.599e-02
## It: 940; obj: 2.287e+00; abs: 5.176e-05; rel: 2.263e-05; norm: 9.598e-02
## It: 941; obj: 2.287e+00; abs: 4.445e-05; rel: 1.943e-05; norm: 9.599e-02
## It: 942; obj: 2.287e+00; abs: 7.435e-05; rel: 3.250e-05; norm: 9.600e-02
## It: 943; obj: 2.287e+00; abs: 4.897e-05; rel: 2.141e-05; norm: 9.600e-02
## It: 944; obj: 2.287e+00; abs: 7.271e-06; rel: 3.179e-06; norm: 9.600e-02
## It: 945; obj: 2.287e+00; abs: 1.725e-04; rel: 7.542e-05; norm: 9.599e-02
## It: 946; obj: 2.287e+00; abs: 9.233e-05; rel: 4.037e-05; norm: 9.600e-02
## It: 947; obj: 2.287e+00; abs: 3.498e-05; rel: 1.530e-05; norm: 9.600e-02
## It: 948; obj: 2.287e+00; abs: 1.035e-04; rel: 4.526e-05; norm: 9.600e-02
## It: 949; obj: 2.287e+00; abs: 1.172e-05; rel: 5.122e-06; norm: 9.599e-02
## It: 950; obj: 2.287e+00; abs: 4.427e-05; rel: 1.935e-05; norm: 9.598e-02
## It: 951; obj: 2.287e+00; abs: 1.483e-05; rel: 6.484e-06; norm: 9.598e-02
## It: 952; obj: 2.287e+00; abs: 1.518e-05; rel: 6.636e-06; norm: 9.598e-02
## It: 953; obj: 2.287e+00; abs: 6.917e-05; rel: 3.024e-05; norm: 9.598e-02
## It: 954; obj: 2.287e+00; abs: 5.264e-05; rel: 2.301e-05; norm: 9.597e-02
## It: 955; obj: 2.287e+00; abs: 3.143e-06; rel: 1.374e-06; norm: 9.596e-02
## It: 956; obj: 2.287e+00; abs: 2.082e-04; rel: 9.103e-05; norm: 9.596e-02
## It: 957; obj: 2.287e+00; abs: 1.382e-04; rel: 6.043e-05; norm: 9.597e-02
## It: 958; obj: 2.287e+00; abs: 4.574e-05; rel: 2.000e-05; norm: 9.598e-02
## It: 959; obj: 2.287e+00; abs: 1.469e-04; rel: 6.421e-05; norm: 9.597e-02
## It: 960; obj: 2.287e+00; abs: 7.171e-05; rel: 3.135e-05; norm: 9.596e-02
## It: 961; obj: 2.287e+00; abs: 8.500e-05; rel: 3.716e-05; norm: 9.596e-02
## It: 962; obj: 2.287e+00; abs: 6.998e-05; rel: 3.060e-05; norm: 9.597e-02
## It: 963; obj: 2.287e+00; abs: 1.938e-06; rel: 8.473e-07; norm: 9.597e-02
## It: 964; obj: 2.287e+00; abs: 8.820e-05; rel: 3.856e-05; norm: 9.596e-02
## It: 965; obj: 2.287e+00; abs: 9.516e-05; rel: 4.160e-05; norm: 9.595e-02
## It: 966; obj: 2.287e+00; abs: 9.279e-06; rel: 4.056e-06; norm: 9.593e-02
## It: 967; obj: 2.287e+00; abs: 2.520e-04; rel: 1.102e-04; norm: 9.594e-02
## It: 968; obj: 2.287e+00; abs: 7.807e-05; rel: 3.413e-05; norm: 9.595e-02
## It: 969; obj: 2.287e+00; abs: 5.138e-05; rel: 2.247e-05; norm: 9.596e-02
## It: 970; obj: 2.287e+00; abs: 1.494e-04; rel: 6.532e-05; norm: 9.595e-02
## It: 971; obj: 2.287e+00; abs: 1.499e-04; rel: 6.555e-05; norm: 9.593e-02
## It: 972; obj: 2.287e+00; abs: 2.965e-05; rel: 1.296e-05; norm: 9.593e-02
## It: 973; obj: 2.287e+00; abs: 1.444e-04; rel: 6.314e-05; norm: 9.594e-02
## It: 974; obj: 2.287e+00; abs: 7.901e-05; rel: 3.454e-05; norm: 9.596e-02
## It: 975; obj: 2.287e+00; abs: 8.464e-05; rel: 3.701e-05; norm: 9.595e-02
## It: 976; obj: 2.287e+00; abs: 7.623e-05; rel: 3.333e-05; norm: 9.593e-02
## It: 977; obj: 2.287e+00; abs: 1.616e-04; rel: 7.063e-05; norm: 9.592e-02
## It: 978; obj: 2.287e+00; abs: 1.007e-04; rel: 4.403e-05; norm: 9.593e-02
## It: 979; obj: 2.287e+00; abs: 5.335e-06; rel: 2.333e-06; norm: 9.595e-02
## It: 980; obj: 2.287e+00; abs: 2.176e-05; rel: 9.515e-06; norm: 9.594e-02
## It: 981; obj: 2.287e+00; abs: 1.676e-04; rel: 7.328e-05; norm: 9.592e-02
## It: 982; obj: 2.287e+00; abs: 1.191e-04; rel: 5.208e-05; norm: 9.591e-02
## It: 983; obj: 2.287e+00; abs: 3.596e-06; rel: 1.572e-06; norm: 9.592e-02
## It: 984; obj: 2.287e+00; abs: 1.975e-05; rel: 8.636e-06; norm: 9.594e-02
## It: 985; obj: 2.287e+00; abs: 5.809e-05; rel: 2.540e-05; norm: 9.594e-02
## It: 986; obj: 2.287e+00; abs: 1.145e-06; rel: 5.007e-07; norm: 9.592e-02
## It: 987; obj: 2.287e+00; abs: 5.844e-05; rel: 2.555e-05; norm: 9.591e-02
## It: 988; obj: 2.287e+00; abs: 7.194e-05; rel: 3.145e-05; norm: 9.592e-02
## It: 989; obj: 2.287e+00; abs: 4.102e-05; rel: 1.794e-05; norm: 9.593e-02
## It: 990; obj: 2.287e+00; abs: 2.932e-06; rel: 1.282e-06; norm: 9.593e-02
```
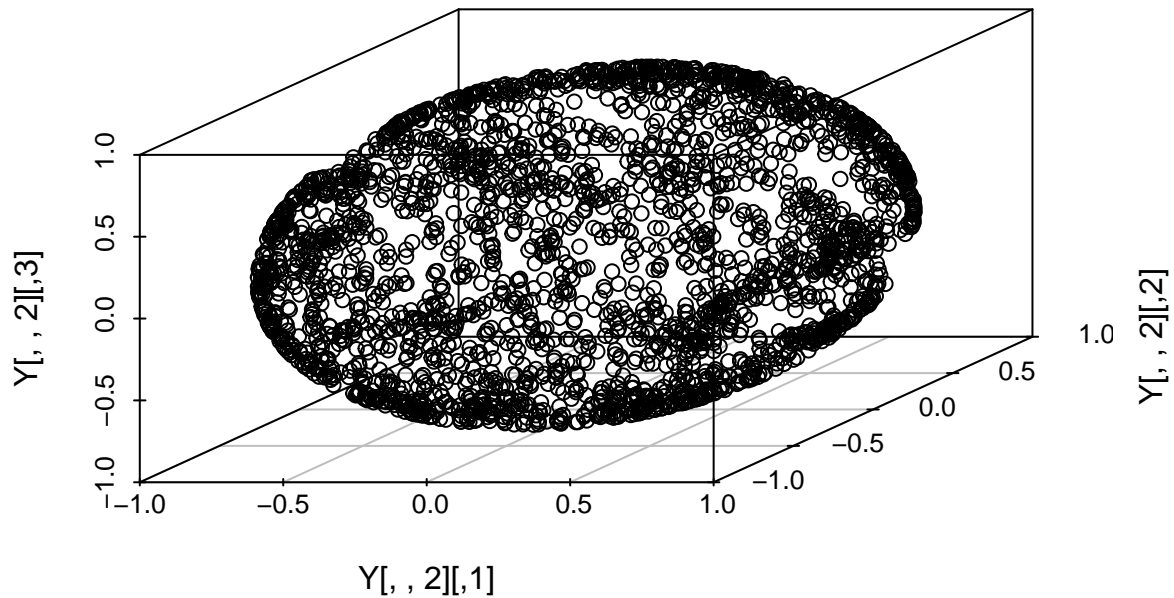
```
## It: 991; obj: 2.287e+00; abs: 2.705e-05; rel: 1.183e-05; norm: 9.591e-02
## It: 992; obj: 2.287e+00; abs: 1.140e-04; rel: 4.985e-05; norm: 9.590e-02
## It: 993; obj: 2.287e+00; abs: 2.526e-05; rel: 1.104e-05; norm: 9.591e-02
## It: 994; obj: 2.287e+00; abs: 1.434e-05; rel: 6.269e-06; norm: 9.592e-02
## It: 995; obj: 2.287e+00; abs: 5.426e-05; rel: 2.372e-05; norm: 9.592e-02
## It: 996; obj: 2.287e+00; abs: 7.296e-05; rel: 3.190e-05; norm: 9.591e-02
## It: 997; obj: 2.287e+00; abs: 6.962e-05; rel: 3.043e-05; norm: 9.589e-02
## It: 998; obj: 2.287e+00; abs: 1.788e-04; rel: 7.819e-05; norm: 9.589e-02
## It: 999; obj: 2.287e+00; abs: 2.161e-05; rel: 9.450e-06; norm: 9.591e-02
## It: 1000; obj: 2.287e+00; abs: 6.752e-05; rel: 2.952e-05; norm: 9.592e-02
```

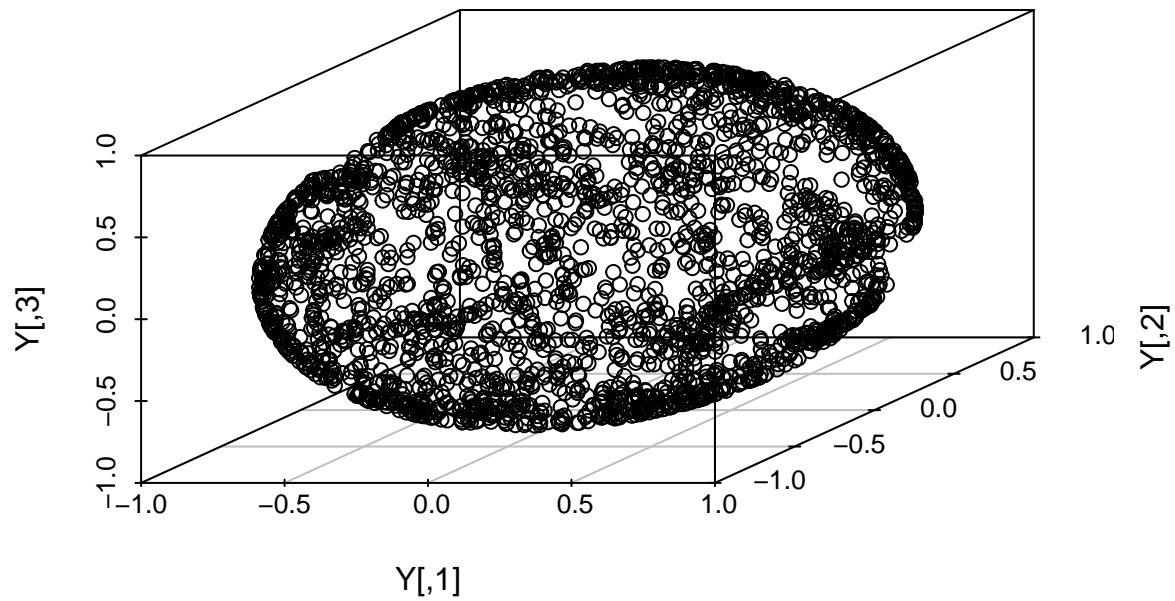**Iteration 1000**

And plot the results in an sphere:

```
scatterplot3d::scatterplot3d(Y, xlim = c(-1, 1), ylim = c(-1, 1),
                             zlim = c(-1, 1), color = rep(1, nrow(Y)))
```
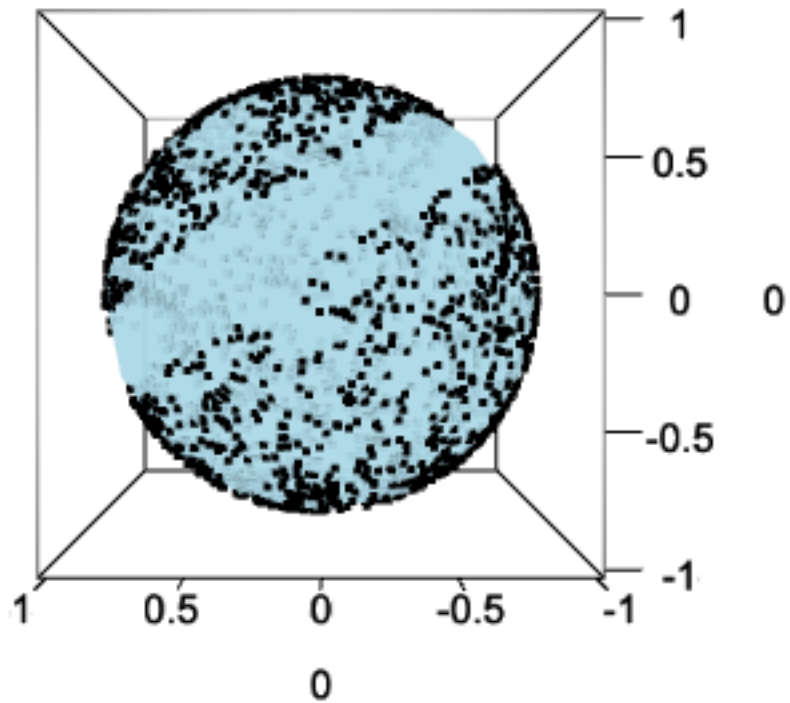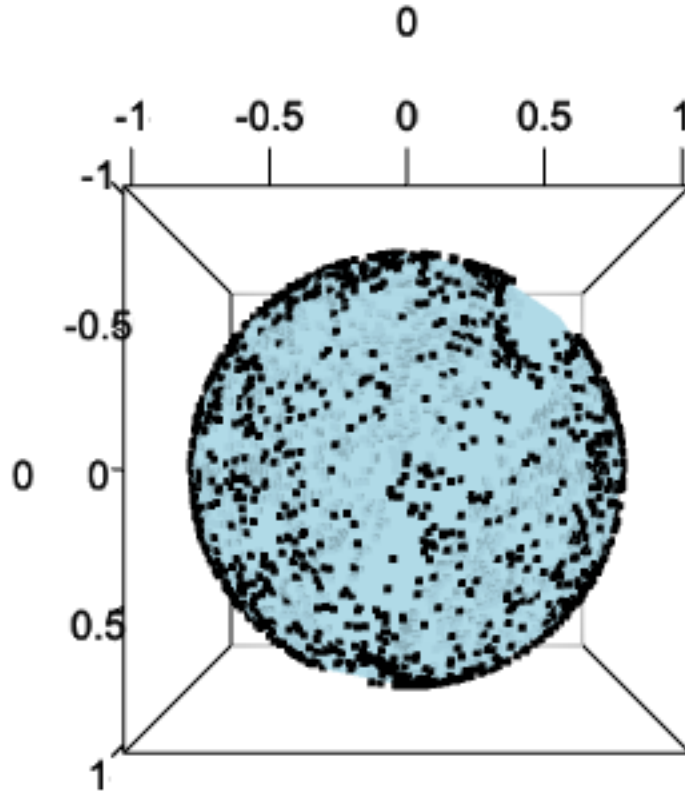
Onto the 3d sphere. Here we can see a well-defined belt which separates observations.

```
rgl::plot3d(0, 0, 0, xlim = c(-1, 1), ylim = c(-1, 1), zlim = c(-1, 1),
            radius = 1, type = "s", col = "lightblue", alpha = 0.8,
            lit = FALSE)
rgl::points3d(Y, col = rep(1, nrow(Y)))
rgl.viewpoint(theta=180, phi=90, zoom=.9)
```

Nevertheless, as you can see in the next plot, there is some continuity so the belt is not completely around the sphere. That could be informing the difference between "East" and "West" flows and also on the existence of other intermediate regimes.

```
rgl::plot3d(0, 0, 0, xlim = c(-1, 1), ylim = c(-1, 1), zlim = c(-1, 1),
            radius = 1, type = "s", col = "lightblue", alpha = 0.8,
            lit = FALSE)
rgl::points3d(Y, col = rep(1, nrow(Y)))
rgl.viewpoint(theta=-90, phi=-90, zoom=.9)
```

Let's see what are the rows located in both sides of the belt, to figure out why they are well separated.

```
rgl::plot3d(0, 0, 0, xlim = c(-1, 1), ylim = c(-1, 1), zlim = c(-1, 1),
            radius = 1, type = "s", col = "lightblue", alpha = 1,
            lit = FALSE)
rgl::text3d(Y, text = 1:nrow(Y), cex=0.8)
rgl.viewpoint(theta=180, phi=90, zoom=.23)
```

As it is shown in the previous plot (which is a zoom-in in the zone around the belt), there are two groups:

- The one group which is above the belt, with the following row ids: *934, 814, 1024, 775, 512, 1400, 1032, 2069, 2054, 1392, 1004, 1208, 1523, 801, 1971, 1026, 1934, 1502, 900, 1744, 2053, 1445, 1536* and *2412*
- The other group is below the well-separated area, with the following row ids: *2051, 2105, 747, 1584, 890, 438, 925, 1633, 831.*

```
up_group <- c(934, 814, 1024, 775, 512, 1400, 1032, 2069, 2054, 1392, 1004, 1208,
              1523, 801, 1971, 1026, 1934, 1502, 900, 1744, 2053, 1445, 1536, 2412)
below_group <- c(2051, 2105, 747, 1584, 890, 438, 925, 1633, 831, 1311, 1893,
                 2055, 614, 2056, 1701, 929, 2023, 749, 479, 197, 445, 1302)

total <- c(up_group, below_group)
colors <- c(rep(2, length(up_group)), rep(3, length(below_group)))

data_groups <- jdf_pscsne[total, , ]
```

```
par(mfrow=c(3, 5))
for(k in 1:dim(jdf_pscsne)[3]) {

  Y_rad <- DirStats::to_rad(data_groups[ , , k])
  r <- 1
  theta <<- Y_rad
  plot(r*sin(theta),
       r*cos(theta),
       col=colors,
       xlim=c(-max(r),max(r)),
       ylim=c(-max(r),max(r)))
  polygon(max(r)*sin(seq(0,2*pi,length.out=100)),max(r)*cos(seq(0,2*pi,length.out=100)))

}
```