

PROBLEM 4 - OUTPUT

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```
>> decToBinary(56)
```

```
a =
```

```
1×6 int32 row vector
```

```
1 1 1 0 0 0
```

```
>> intToBinary(1543)
```

```
a =
```

```
1×11 int32 row vector
```

```
1 1 0 0 0 0 0 0 1 1 1
```

```
>>
```

PROBLEMS 6a, 6b - OUTPUT

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```
>> finiteDifApprox
```

```
FORWARD DIFFERENCE APPROXIMATION
```

```
h = 5.00000000e-01, error = -2.02221084e-01, error / h = -4.04442167e-01, error / h^2 = -8.08884334e-01, error / h^3 = -1.61776867e+00
```

```
h = 2.50000000e-01, error = -9.52716617e-02, error / h = -3.81086647e-01, error / h^2 = -1.52434659e+00, error / h^3 = -6.09738635e+00
```

```
h = 1.25000000e-01, error = -4.59766451e-02, error / h = -3.67813161e-01, error / h^2 = -2.94250529e+00, error / h^3 = -2.35400423e+01
```

```
h = 6.25000000e-02, error = -2.25501609e-02, error / h = -3.60802574e-01, error / h^2 = -5.77284118e+00, error / h^3 = -9.23654589e+01
```

```
h = 3.12500000e-02, error = -1.11627277e-02, error / h = -3.57207287e-01, error / h^2 = -1.14306332e+01, error / h^3 = -3.65780262e+02
```

```
h = 1.56250000e-02, error = -5.55293123e-03, error / h = -3.55387599e-01, error / h^2 = -2.27448063e+01, error / h^3 = -1.45566761e+03
```

```
CENTRAL DIFFERENCE APPROXIMATION
```

```
h = 5.00000000e-01, error = -5.37604256e-01, error / h = -1.07520851e+00, error / h^2 = -2.15041703e+00, error / h^3 = -4.30083405e+00
```

```
h = 2.50000000e-01, error = -6.63371527e-01, error / h = -2.65348611e+00, error / h^2 = -1.06139444e+01, error / h^3 = -4.24557777e+01
```

```
h = 1.25000000e-01, error = -6.96086988e-01, error / h = -5.56869590e+00, error / h^2 = -4.45495672e+01, error / h^3 = -3.56396538e+02
```

```
h = 6.25000000e-02, error = -7.04346443e-01, error / h = -1.12695431e+01, error / h^2 = -1.80312689e+02, error / h^3 = -2.88500303e+03
```

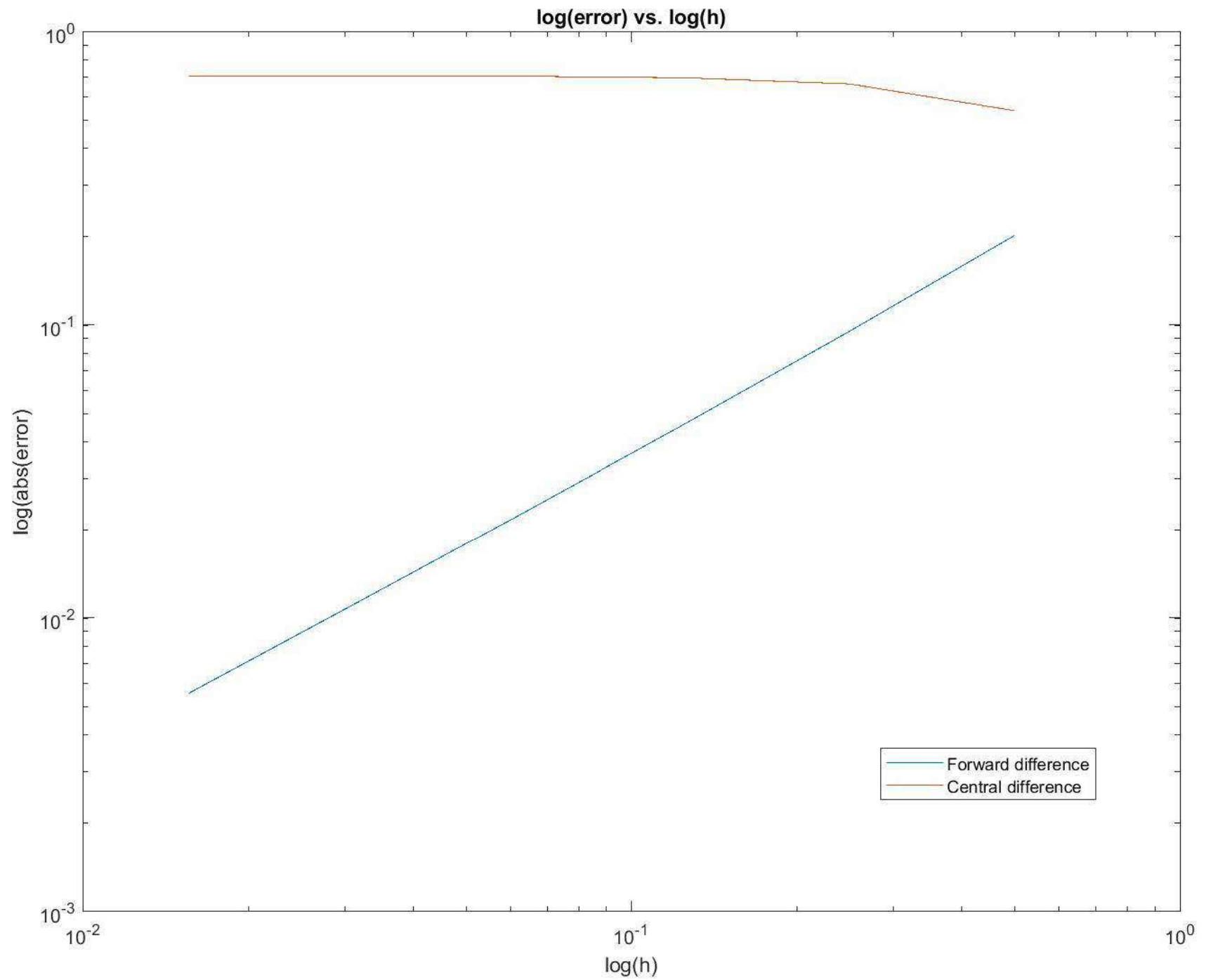
```
h = 3.12500000e-02, error = -7.06416360e-01, error / h = -2.26053235e+01, error / h^2 = -7.23370352e+02, error / h^3 = -2.31478513e+04
```

```
h = 1.56250000e-02, error = -7.06934155e-01, error / h = -4.52437859e+01, error / h^2 = -2.89560230e+03, error / h^3 = -1.85318547e+05
```

```
Forward difference is more accurate since error is proportional to h and central difference involves twice as much h as forward difference
```

```
>>
```

PROBLEM 6a - PLOT



PROBLEMS 8(a, b, c) - OUTPUT

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```
>> rootFind
```

```
BISECTION
```

n = 1	xn (approximation) = 2.500000000000000e+00	f(xn) (residual) = 1.250000000000000e+00	p-xn (error) = 2.639320225002102e-01
n = 2	xn (approximation) = 2.250000000000000e+00	f(xn) (residual) = 6.250000000000000e-02	p-xn (error) = 1.393202250021020e-02
n = 3	xn (approximation) = 2.125000000000000e+00	f(xn) (residual) = -4.843750000000000e-01	p-xn (error) = 1.110679774997898e-01
n = 4	xn (approximation) = 2.187500000000000e+00	f(xn) (residual) = -2.148437500000000e-01	p-xn (error) = 4.856797749978981e-02
n = 5	xn (approximation) = 2.218750000000000e+00	f(xn) (residual) = -7.714843750000000e-02	p-xn (error) = 1.731797749978981e-02
n = 6	xn (approximation) = 2.234375000000000e+00	f(xn) (residual) = -7.568359375000000e-03	p-xn (error) = 1.692977499789805e-03
n = 7	xn (approximation) = 2.242187500000000e+00	f(xn) (residual) = 2.740478515625000e-02	p-xn (error) = 6.119522500210195e-03
n = 8	xn (approximation) = 2.238281250000000e+00	f(xn) (residual) = 9.902954101562500e-03	p-xn (error) = 2.213272500210195e-03
n = 9	xn (approximation) = 2.236328125000000e+00	f(xn) (residual) = 1.163482666015625e-03	p-xn (error) = 2.601475002101950e-04
n = 10	xn (approximation) = 2.235351562500000e+00	f(xn) (residual) = -3.203392028808594e-03	p-xn (error) = 7.164149997898051e-04

```
FIXED POINT, G1
```

n = 1	xn (approximation) = 2.000000000000000e+00	f(xn) (residual) = -1.000000000000000e+00	p-xn (error) = 2.360679774997898e-01
n = 2	xn (approximation) = 2.500000000000000e+00	f(xn) (residual) = 1.250000000000000e+00	p-xn (error) = 2.639320225002102e-01
n = 3	xn (approximation) = 2.000000000000000e+00	f(xn) (residual) = -1.000000000000000e+00	p-xn (error) = 2.360679774997898e-01
n = 4	xn (approximation) = 2.500000000000000e+00	f(xn) (residual) = 1.250000000000000e+00	p-xn (error) = 2.639320225002102e-01
n = 5	xn (approximation) = 2.000000000000000e+00	f(xn) (residual) = -1.000000000000000e+00	p-xn (error) = 2.360679774997898e-01
n = 6	xn (approximation) = 2.500000000000000e+00	f(xn) (residual) = 1.250000000000000e+00	p-xn (error) = 2.639320225002102e-01
n = 7	xn (approximation) = 2.000000000000000e+00	f(xn) (residual) = -1.000000000000000e+00	p-xn (error) = 2.360679774997898e-01
n = 8	xn (approximation) = 2.500000000000000e+00	f(xn) (residual) = 1.250000000000000e+00	p-xn (error) = 2.639320225002102e-01
n = 9	xn (approximation) = 2.000000000000000e+00	f(xn) (residual) = -1.000000000000000e+00	p-xn (error) = 2.360679774997898e-01
n = 10	xn (approximation) = 2.500000000000000e+00	f(xn) (residual) = 1.250000000000000e+00	p-xn (error) = 2.639320225002102e-01

```
FIXED POINT, G2
```

n = 1	xn (approximation) = 2.083333333333334e+00	f(xn) (residual) = -6.59722222222214e-01	p-xn (error) = 1.527346441664563e-01
n = 2	xn (approximation) = 2.303240740740741e+00	f(xn) (residual) = 3.049179098079549e-01	p-xn (error) = 6.717276324095067e-02
n = 3	xn (approximation) = 2.201601437471422e+00	f(xn) (residual) = -1.529511105237669e-01	p-xn (error) = 3.446654002836747e-02
n = 4	xn (approximation) = 2.252585140979345e+00	f(xn) (residual) = 7.413981736093334e-02	p-xn (error) = 1.651716347955468e-02
n = 5	xn (approximation) = 2.227871868525700e+00	f(xn) (residual) = -3.658693743180486e-02	p-xn (error) = 8.196108974089622e-03
n = 6	xn (approximation) = 2.240067514336302e+00	f(xn) (residual) = 1.790246878481749e-02	p-xn (error) = 3.999536836511997e-03
n = 7	xn (approximation) = 2.234100024741363e+00	f(xn) (residual) = -8.797079450643786e-03	p-xn (error) = 1.967952758427316e-03
n = 8	xn (approximation) = 2.237032384558244e+00	f(xn) (residual) = 4.313889562341799e-03	p-xn (error) = 9.644070584537978e-04
n = 9	xn (approximation) = 2.235594421370796e+00	f(xn) (residual) = -2.117583135774481e-03	p-xn (error) = 4.735561289934687e-04
n = 10	xn (approximation) = 2.236300282416055e+00	f(xn) (residual) = 1.038953134124832e-03	p-xn (error) = 2.323049162646917e-04

```
NEWTONS METHOD
```

n = 1	xn (approximation) = 2.250000000000000e+00	f(xn) (residual) = 6.250000000000000e-02	p-xn (error) = 1.393202250021020e-02
n = 2	xn (approximation) = 2.236111111111111e+00	f(xn) (residual) = 1.929012345680548e-04	p-xn (error) = 4.313361132135540e-05
n = 3	xn (approximation) = 2.236067977915804e+00	f(xn) (residual) = 1.860473552994790e-09	p-xn (error) = 4.160143340925515e-10
n = 4	xn (approximation) = 2.236067977499790e+00	f(xn) (residual) = 8.881784197001252e-16	p-xn (error) = 0.000000000000000e+00
n = 5	xn (approximation) = 2.236067977499790e+00	f(xn) (residual) = 8.881784197001252e-16	p-xn (error) = 0.000000000000000e+00
n = 6	xn (approximation) = 2.236067977499790e+00	f(xn) (residual) = 8.881784197001252e-16	p-xn (error) = 0.000000000000000e+00

```
n = 7   xn (approximation) = 2.236067977499790e+00   f(xn) (residual) = 8.881784197001252e-16   |p-xn| (error) = 0.000000000000000e+00
n = 8   xn (approximation) = 2.236067977499790e+00   f(xn) (residual) = 8.881784197001252e-16   |p-xn| (error) = 0.000000000000000e+00
n = 9   xn (approximation) = 2.236067977499790e+00   f(xn) (residual) = 8.881784197001252e-16   |p-xn| (error) = 0.000000000000000e+00
n = 10  xn (approximation) = 2.236067977499790e+00   f(xn) (residual) = 8.881784197001252e-16   |p-xn| (error) = 0.000000000000000e+00
>>
```

PROBLEM 9d - OUTPUT

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```
>> finiteDif9
r = 0.000000000e+00
r = 1.59578504e+00
r = 1.74669836e+00
r = 1.85498261e+00
r = 1.92182278e+00
r = 1.95835402e+00
r = Inf
r = NaN
r = NaN
r = NaN

    r = 0 as expected
>>
```