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Q1

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr   1.0.1
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.5.0
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(ggplot2)

cdf <- pnorm(11950, 12000, 200)
cdf
```

```
## [1] 0.4012937
```

Q2

```
prob2 <- qnorm(0.05, 12000, 200)
prob2
```

```
## [1] 11671.03
```

Q3

```
prob3 <- dbinom(3,6,0.5)
prob3
```

```
## [1] 0.3125
```

Q4

```
mtcars$mpg
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
mtcars[["mpg"]]
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

Q5

```
dplyr::select(mtcars,mpg)
```

```
##                      mpg
## Mazda RX4           21.0
## Mazda RX4 Wag       21.0
## Datsun 710          22.8
## Hornet 4 Drive      21.4
## Hornet Sportabout   18.7
## Valiant             18.1
## Duster 360          14.3
## Merc 240D           24.4
## Merc 230            22.8
## Merc 280            19.2
## Merc 280C           17.8
## Merc 450SE          16.4
## Merc 450SL          17.3
## Merc 450SLC         15.2
## Cadillac Fleetwood  10.4
## Lincoln Continental 10.4
## Chrysler Imperial   14.7
## Fiat 128            32.4
## Honda Civic         30.4
## Toyota Corolla      33.9
## Toyota Corona       21.5
## Dodge Challenger    15.5
## AMC Javelin         15.2
## Camaro Z28          13.3
## Pontiac Firebird    19.2
## Fiat X1-9           27.3
## Porsche 914-2       26.0
## Lotus Europa        30.4
## Ford Pantera L      15.8
## Ferrari Dino        19.7
## Maserati Bora       15.0
## Volvo 142E          21.4
```

```
print("select returns column as a dataframe")
```

```
## [1] "select returns column as a dataframe"
```

```
dplyr::pull(mtcars,mpg)
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
print("pull returns column as a vector")
```

```
## [1] "pull returns column as a vector"
```

Q6

```r
sum((1:10)^2)
```

```
## [1] 385
```

Q7

```r
(1:10) %*% t(1:10)
```

```
##       [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]
##  [1,]    1    2    3    4    5    6    7    8    9    10
##  [2,]    2    4    6    8   10   12   14   16   18    20
##  [3,]    3    6    9   12   15   18   21   24   27    30
##  [4,]    4    8   12   16   20   24   28   32   36    40
##  [5,]    5   10   15   20   25   30   35   40   45    50
##  [6,]    6   12   18   24   30   36   42   48   54    60
##  [7,]    7   14   21   28   35   42   49   56   63    70
##  [8,]    8   16   24   32   40   48   56   64   72    80
##  [9,]    9   18   27   36   45   54   63   72   81    90
## [10,]   10   20   30   40   50   60   70   80   90   100
```

Q8

```r
MnSd <- function(x, ...){
  mea <- mean(x, ...)
  sdx <- sd(x, ...)
  c("Mean" = mea , "Std" = sdx)
}

MnSd(mtcars$mpg, na.rm = TRUE)
```

```
##      Mean       Std
## 20.090625  6.026948
```

Q9

```r
library(janitor)
```

```
##
## Attaching package: 'janitor'

## The following objects are masked from 'package:stats':
##
##     chisq.test, fisher.test
```

```r
tabyl(mtcars, cyl, gear) %>% adorn_totals(c("row", "col"))
```

```
##    cyl  3  4 5 Total
##      4  1  8 2    11
##      6  2  4 1     7
##      8 12  0 2    14
##  Total 15 12 5    32
```

Q10

```
tabyl(mtcars, cyl, gear) %>% adorn_totals(c("row", "col")) %>% adorn_percentages(c("all"))
```

```
##    cyl       3     4       5   Total
##      4 0.03125 0.250 0.06250 0.34375
##      6 0.06250 0.125 0.03125 0.21875
##      8 0.37500 0.000 0.06250 0.43750
##  Total 0.46875 0.375 0.15625 1.00000
```