

1. Recreate the following dataframe by creating vectors and using the data.frame function:

	<b>Age</b>	<b>Weight</b>	<b>Sex</b>
<b>Sam</b>	22	150	M
<b>Frank</b>	25	165	M
<b>Amy</b>	26	120	F

```
Name <- c("Sam","Frank","Amy")
Age <- c(22,25,26)
Weight <- c(150,165,120)
Sex <- c("M", "M", "F")
namecol <- c("Age","Weight","Sex")
Dataframe <- data.frame(Age,Weight,Sex)
colnames(Dataframe) <- namecol
row.names(Dataframe) <- Name
Dataframe
```

2. Check if mtcars is a dataframe using is.data.frame()  
`is.data.frame(mtcars)`
3. Use as.data.frame() to convert a matrix into a dataframe:

	<b>V1</b>	<b>V2</b>	<b>V3</b>	<b>V4</b>	<b>V5</b>
<b>1</b>	1	6	11	16	21
<b>2</b>	2	7	12	17	22
<b>3</b>	3	8	13	18	23
<b>4</b>	4	9	14	19	24
<b>5</b>	5	10	15	20	25

```
mat1 <- matrix(1:25,nrow = 5)
clnames <- c("V1","V2","V3","V4","V5")
colnames(mat1)<-clnames
mat1
as.data.frame(mat1)
```

- Set the built-in data frame mtcars as a variable df. We'll use this df variable for the rest of the exercises.

```
df <- mtcars
df
```

- Display the first 6 rows of df

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
<b>Mazda RX4</b>	21	6	160	110	3.9	2.62	16.46	0	1	4	4
<b>Mazda RX4 Wag</b>	21	6	160	110	3.9	2.875	17.02	0	1	4	4
<b>Datsun 710</b>	22.8	4	108	93	3.85	2.32	18.61	1	1	4	1
<b>Hornet 4 Drive</b>	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1
<b>Hornet Sportabout</b>	18.7	8	360	175	3.15	3.44	17.02	0	0	3	2
<b>Valiant</b>	18.1	6	225	105	2.76	3.46	20.22	1	0	3	1

```
head(df)
```

- What is the average mpg value for all the cars?

```
mean(df$mpg)
```

- Select the rows where all cars have 6 cylinders (cyl column)

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
<b>Mazda RX4</b>	21	6	160	110	3.9	2.62	16.46	0	1	4	4
<b>Mazda RX4 Wag</b>	21	6	160	110	3.9	2.875	17.02	0	1	4	4
<b>Hornet 4 Drive</b>	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1
<b>Valiant</b>	18.1	6	225	105	2.76	3.46	20.22	1	0	3	1
<b>Merc 280</b>	19.2	6	167.6	123	3.92	3.44	18.3	1	0	4	4
<b>Merc 280C</b>	17.8	6	167.6	123	3.92	3.44	18.9	1	0	4	4
<b>Ferrari Dino</b>	19.7	6	145	175	3.62	2.77	15.5	0	1	5	6

```
df[df$cyl==6,]
```

8. Select the columns am, gear, and carb.

	am	gear	carb
<b>Mazda RX4</b>	1	4	4
<b>Mazda RX4 Wag</b>	1	4	4
<b>Datsun 710</b>	1	4	1
<b>Hornet 4 Drive</b>	0	3	1
<b>Hornet Sportabout</b>	0	3	2
<b>Valiant</b>	0	3	1
<b>Duster 360</b>	0	3	4
<b>Merc 240D</b>	0	4	2
<b>Merc 230</b>	0	4	2

```
df[, c('am','gear','carb')]
```

9. Create a new column called performance, which is calculated by hp/wt.

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb	performance
<b>Mazda RX4</b>	21	6	160	110	3.9	2.62	16.46	0	1	4	4	41.98473
<b>Mazda RX4 Wag</b>	21	6	160	110	3.9	2.875	17.02	0	1	4	4	38.26087
<b>Datsun 710</b>	22.8	4	108	93	3.85	2.32	18.61	1	1	4	1	40.08621
<b>Hornet 4 Drive</b>	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1	34.21462
<b>Hornet Sportabout</b>	18.7	8	360	175	3.15	3.44	17.02	0	0	3	2	50.87209
<b>Valiant</b>	18.1	6	225	105	2.76	3.46	20.22	1	0	3	1	30.34682

```
df$performance <- df$hp / df$wt
head(df)
```

10. Your performance column will have several decimal place precision. Figure out how to use round() (check help(round)) to reduce this accuracy to only 2 decimal places.

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb	performance
<b>Mazda RX4</b>	21	6	160	110	3.9	2.62	16.46	0	1	4	4	41.98
<b>Mazda RX4 Wag</b>	21	6	160	110	3.9	2.875	17.02	0	1	4	4	38.26
<b>Datsun 710</b>	22.8	4	108	93	3.85	2.32	18.61	1	1	4	1	40.09
<b>Hornet 4 Drive</b>	21.4	6	258	110	3.08	3.215	19.44	1	0	3	1	34.21
<b>Hornet Sportabout</b>	18.7	8	360	175	3.15	3.44	17.02	0	0	3	2	50.87
<b>Valiant</b>	18.1	6	225	105	2.76	3.46	20.22	1	0	3	1	30.35

```
df$performance <- round(df$hp / df$wt, 2)
head(df)
```

11. What is the average mpg for cars that have more than 100 hp AND a wt value of more than 2.5.

```
mean(nrow(subset(df, mpg >= 100 | wt > 2.5)))
```

12. What is the mpg of the Hornet Sportabout?

```
df[["Hornet Sportabout", 'mpg']]
```