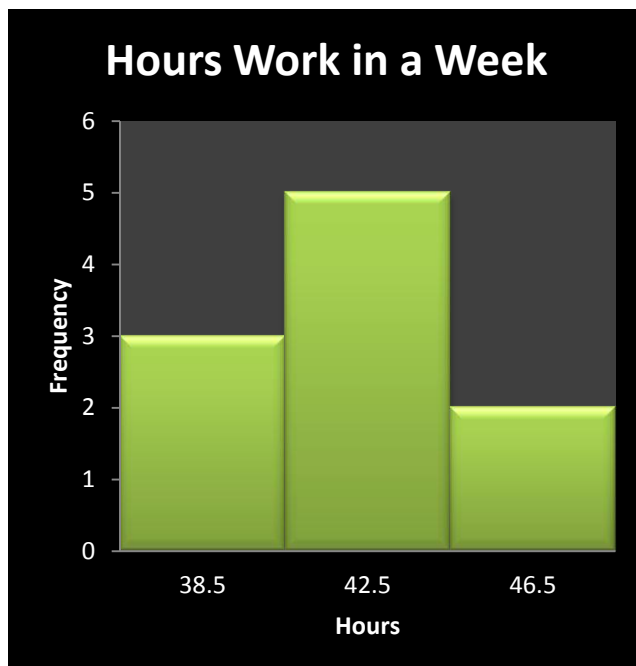# How Many Hours Do You Work in a Week?

1. Data: 41, 38, 39, 45, 47 41, 44, 41, 37, 42 (in hours)

2. Frequency Distribution Table (3 classes)
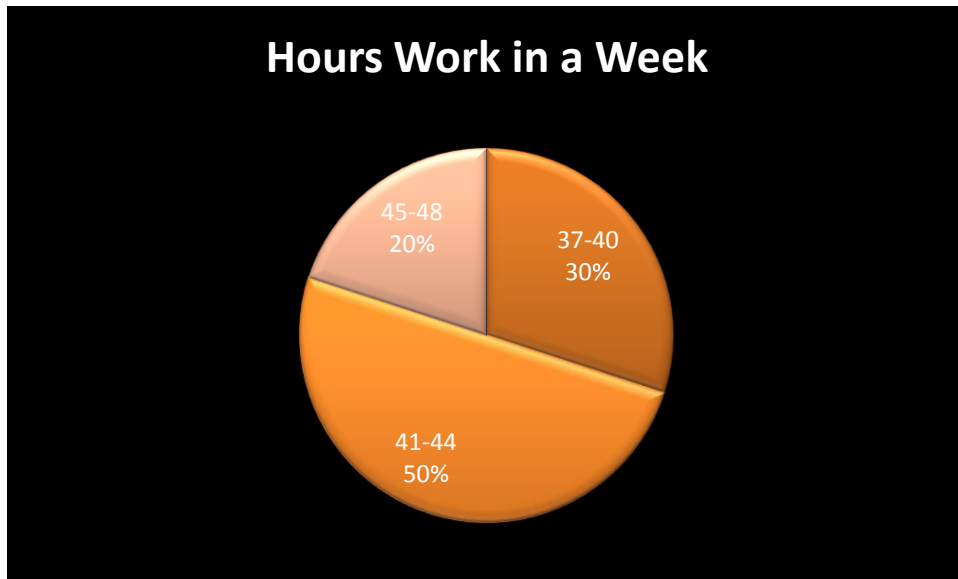
   Class width: $\dfrac{47-37}{3} = 3.33 \rightarrow 4$

Class	Frequency	Midpoint	Relative Frequency	Cumulative Frequency
37-40	3	38.5	0.30	3
41-44	5	42.5	0.50	8
45-48	2	46.5	0.20	10

3. Histogram

4. Pie Chart

Hours Work in a Week

45-48
20%

37-40
30%

41-44
50%

5. Ogive

Hours Work in a Week
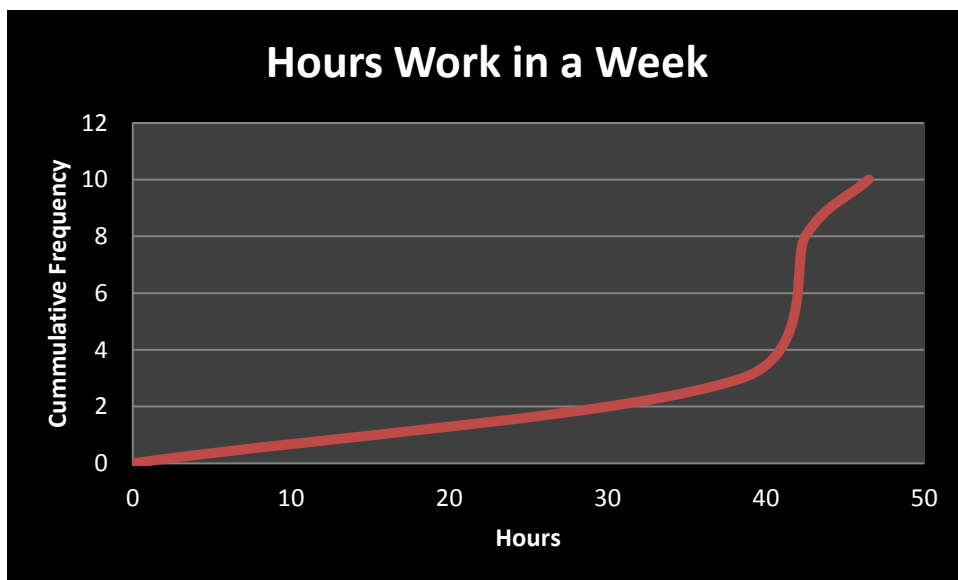
6. Mean, Median and Mode

Mean: $\dfrac{37+38+39+...+47}{10}=41.5\,\text{hrs}$

Median: 41hrs

Mode: 41hrs

7. Variance and Standard Deviation

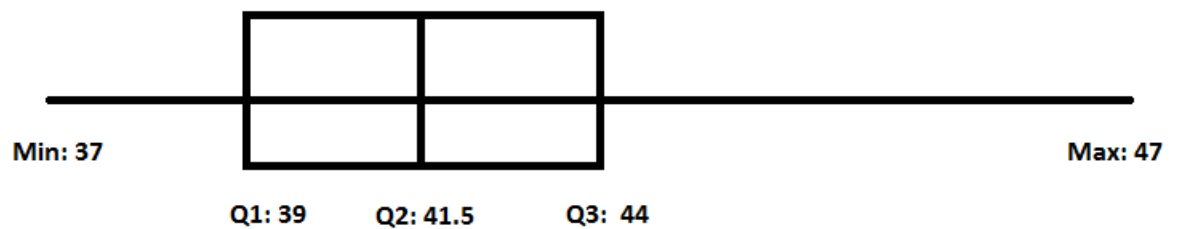| x	$x - \mu$	$(x - \mu)^2$
41	-0.5	0.25
38	-3.5	12.25
39	-2.5	6.25
45	3.5	12.25
47	5.5	30.25
41	-0.5	0.25
44	2.5	6.25
41	-0.5	0.25
37	-4.5	20.25
42	0.5	0.25
		SSx=88.5

Variance:

$$\sigma^2 = \frac{SSx}{n} = \frac{88.5}{10} = 8.85 \, \text{hrs}$$

Standard Deviation

$$\sigma = \sqrt{\frac{SSx}{n}} = \sqrt{8.85} \approx 2.97 \, \text{hrs}$$

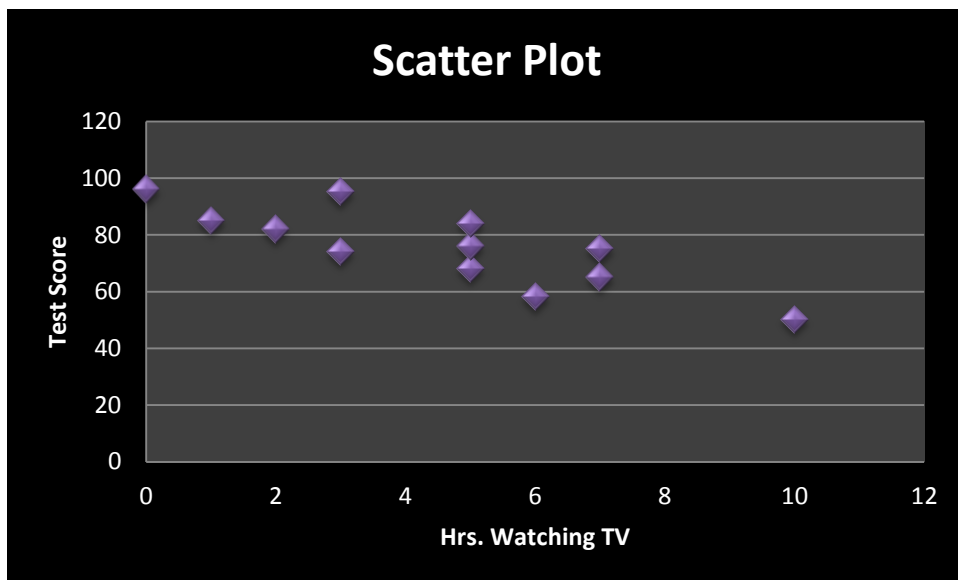8. Five number summary and Box-and-Whisker Plot

Min: 37   Q1: 39   Q2: 41.5   Q3: 44   Max: 47

Hours Spent on watching television V.S. Test Score

1. Data

Hrs. Watching TV (hrs)	Test Score(score)
0	96
1	85
2	82
3	74
3	95
5	68
5	76
5	84
6	58
7	65
7	75
10	50

2. Scatter Plot

Scatter Plot appears to show a negative correlation between the two variables.

3. Correlation Coefficient

$r = -0.83$

There is a strong negative correlation between hours spent on watching TV and test score.

4. Least Square Regression Line

$$\hat{y}(score) = 93.97 - 4.07x(hrs)$$

Slope is -4.07, for every 1 hour of TV watching, we can expect the test score to drop 4.07 point.

Y-intercept is 93.97, when one spent 0 hr watching TV, the expected test score is 93.97

5. Coefficient of Determination

$$r^2 = 0.6911$$

69.11% of the variation in the values of test score that is explained by the least square regression of the test score on hours spent on watching TV.

6. Residual (using first data point)

$$\hat{y} = 93.97 - 4.07(0) = 93.97$$
$$residual = y - \hat{y} = 96 - 93.97 = 2.03$$