1. [2 marks] Find the mean and median of the following sample:
6, 29, 8, 25, 16, 12

$$\bar{x} = \frac{(6+29+8+25+16+12)}{6}$$

$$\bar{x} = 16$$

ordered data set: 6, 8, 12, 16, 25, 29

$$\text{median} = \frac{12+16}{2}$$

$$\text{median} = 14$$

2. [3 marks] The mean of a population is 35 and the standard deviation is 5. What percentage of measurements will fall between 28 and 42?

$\mu = 35, \ \sigma = 5$

$$\mu + k\sigma = 42$$

$$35 + k(5) = 42$$

$$k(5) = 7$$

$$k = 1.4$$

$$1 - \frac{1}{k^2} = 1 - \frac{1}{1.4^2}$$

$$\approx 0.49$$

At least 49% of measurements fall between 28 and 42.

3. [3 marks] A student scored 83 on a math test, which had a mean of 73 and a standard deviation of 5. The student scored 79 on a coding test, which had a mean of 73 and a standard deviation of 2.

a) Calculate the student's z-score for the math test.

$$z = \frac{x-\mu}{\sigma} = \frac{83-73}{5} = 2$$

b) Calculate the student's z-score for the coding test.

$$z = \frac{x-\mu}{\sigma} = \frac{79-73}{2} = 3$$

c) On which test did the student do better relative to the class?

The coding test

4. [3 marks] A password is 4 symbols long and can use numbers 0,1,...,9 as well as the four special characters #, $, %, &.

a) How many possible passwords are there?

14 symbols in total

$14 \times 14 \times 14 \times 14 = 38,416$

b) How many passwords contain only numbers?

$10 \times 10 \times 10 \times 10 = 10,000$

c) How many passwords contain at least one special character?

(total #) − (# with only numbers)

$= 38,416 - 10,000$

$= 28,416$

5. [3 marks] Forty students were polled on whether they are left-handed or right-handed and whether they prefer a laptop or tablet. Consider the data below.

	Prefers Laptop	Prefers Tablet
Left-Handed	3	5
Right-Handed	11	21

total = 40

Find the probability that a student:

a) prefers a tablet

$\frac{5+21}{40} = \frac{26}{40} = 0.65$

b) prefers a laptop and is right-handed

$\frac{11}{40} = 0.275$

c) prefers a laptop or is left-handed

$\frac{3+11+5}{40} = \frac{19}{40} = 0.475$

6. [2 marks] Find k so that the following is a probability distribution:

X	$P(X)$
1	0.21
2	0.17
3	k
4	0.39

$0.21 + 0.17 + k + 0.39 = 1$

$k + 0.77 = 1$

$k = 0.23$

7. [4 marks] A population has a mean of 35, a median of 31, a range of 20 and a standard deviation of 5.

a) Find the new mean if every measurement is increased by 2.

$35 + 2 = 37$

b) Find the new standard deviation if every measurement is increased by 2.

5 (no change)

c) Find the new median if every measurement is multiplied by 3.

$3(31) = 93$

d) Find the new range if every measurement is multiplied by 3.

$3(20) = 60$