# Measures of Location and Spread

Jack Maguire

## Question 1

### a

$2.75, 5.50$

### b

$$= \frac{\sum MF}{\sum F}$$
$$= \frac{(0.5 * 1) + (1.5 * 6) + (2.25 * 60) + (2.75 * 280) + (3.25 * 820) + (3.75 * 320) + (4.5 * 10) + (5.5 * 3)}{1 + 6 + 60 + 280 + 820 + 320 + 10 + 3}$$
$$= \frac{4841}{1500}$$
$$= 3.23 \text{ kg}$$

### d

$$\text{Q2} = \frac{n}{2} = \frac{1500}{2} = 750$$
$$\text{Q2} \rightarrow 3.0 + \frac{750 - 1 - 6 - 60 - 280}{820} * (3.5 - 3) \qquad = 3.0 + \frac{403}{820} * 0.5 = 3.25 \text{ kg}$$

## Question 2

### a

**Q1**

$$= \frac{n+1}{4} = \frac{11+1}{4} = 3$$
$$\rightarrow 35$$

**Q2/Median**

$$= \frac{n+1}{2} = \frac{11+1}{2} = 6$$
$$\rightarrow 53$$

**Q3**

$$= \frac{3(n+1)}{4} = \frac{33+3}{4} = 9$$
$$\rightarrow 60$$

### b

$$\text{IQR} = Q_3 - Q_1 = 25$$

**Lower Bound**

$$= Q_3 + 1.5 * \text{IQR} = 60 + 1.5 * 25 = 97.5$$

**Upper Bound**

$$= Q_1 - 1.5 * \text{IQR} = 35 - 1.5 * 25 = -2.5$$

The only value that is outside these bounds is 110.

c

## Question 3

a

$$30\% = \frac{30n}{100} = \frac{30 * 100}{100} = 30$$
$$\rightarrow 20.5 + \frac{0.5}{30} * (30.5 - 20.5) = 20.7$$

b

$$70\% = \frac{70n}{100} = \frac{70 * 100}{100} = 70$$
$$\rightarrow 30.5 + \frac{10}{24} * (40.5 - 30.5) = 34.7$$