Measures of location and spread 2A

1 a 700 g, as this is the most often occurring.

b 500 + 700 + 400 + 300 + 900 + 700 + 700 = 4200

$\frac{4200}{7} = 600\,\text{g}$

c 300 400 500 **700** 700 700 900

700 g is the median (the middle value).

d It will increase the mean, as 650 > 600 (the old mean).

The mode will be unchanged.

It will decrease the median. There will now be an *even* number of values, so we take the middle *pair*: 650 and 700. The new median will be half-way between these: 675.

2 a $\frac{256.2}{6} = 42.7$

b It will increase the mean, as the new piece of data (52) is greater than the old mean (42.7).

3 a The mean visibility for May = $\frac{\sum h}{n}$ = $\frac{724000}{31}$ = 23354.8 (to 1 d.p.)

The mean visibility for June = $\frac{\sum h}{n}$ = $\frac{632000}{30}$ = 21066.7 (to 1 d.p.)

b The mean visibility for May and June = $\frac{\sum h}{n}$ = $\frac{724000+632000}{31+30}$ = $\frac{1356000}{61}$ = 22229.5 (to 1 d.p.)

4 a 8 minutes. Everything else occurs only once, but there are two 8's.

b $\frac{102}{10} = 10.2$ minutes

c 5 6 7 8 **8 9** 10 11 12 26

The median is 8.5 minutes.

d The median would be reasonable. The mean is affected by the extreme value of 26.

In this case the mode is close to the median, so would be acceptable; but this would not always be the case.

5 a 2 breakdowns

b The median is the 18.5th value = 1

5 **c** (8 × 0) + (11 × 1) + (12 × 2) + (3 × 3) + (1 × 4) + (1 × 5) = 53

The mean $= \frac{53}{36} = 1.47$ breakdowns

d The median, since this is the lowest value

6 (5 × 8) + (6 × 57) + (7 × 29) + (8 × 3) + (9 × 1) = 618 petals

8 + 57 + 29 + 3 + 1 = 98 celandines

The mean $= \frac{618}{98} = 6.31$ petals (to 2 d.p.)

7 The mean = $\frac{1\times 7 + 2\times p + 3\times 2}{7 + p + 2}$

$$1.5 = \frac{7 + 2p + 6}{p + 9}$$

$$= \frac{2p + 13}{p + 9}$$

$1.5p + 13.5 = 2p + 13$

$0.5 = 0.5p$

$p = 1$