# Mock Grade 6

# Maths Booklet 3

Paper 2H
Calculator

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**1** Make $h$ the subject of the formula $d = \sqrt{\frac{3h}{2}}$

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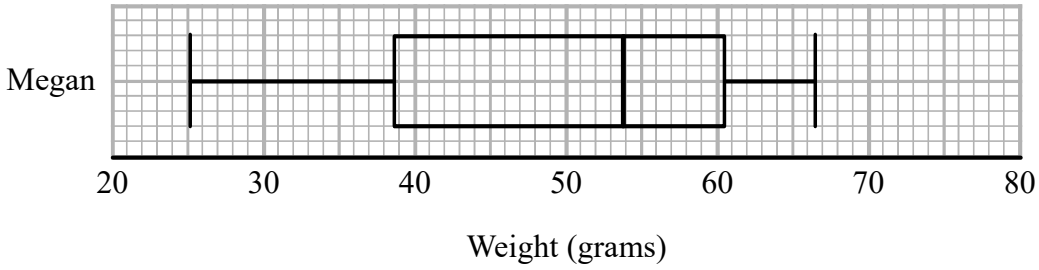
**(Total for Question 1 is 2 marks)**

**2** Megan grows potatoes.

The box plot below shows information about the weights of Megan's potatoes.




Megan says that half of her potatoes weigh less than 50 grams each.

(a) Is Megan correct?
Give a reason for your answer.

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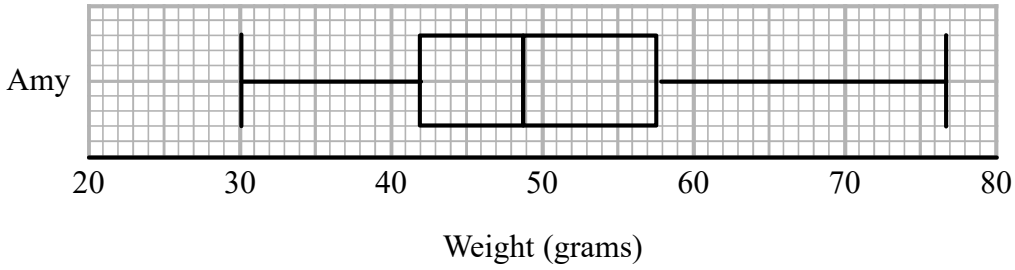
**(1)**

Amy also grows potatoes.

The box plot below shows information about the weights of Amy's potatoes.




(b) Compare the distribution of the weights of Megan's potatoes with the distribution of the weights of Amy's potatoes.

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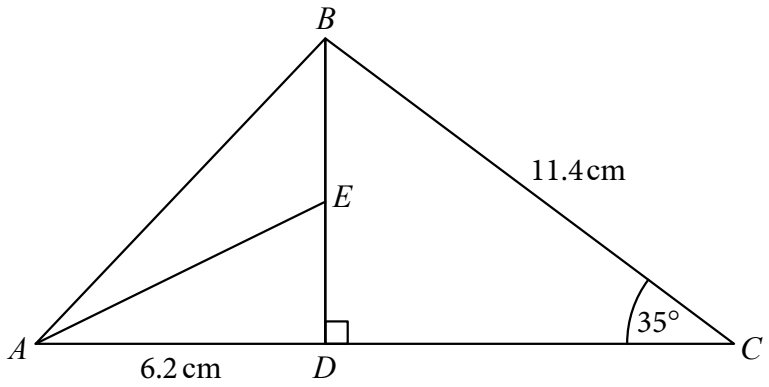
**(2)**

**(Total for Question 2 is 3 marks)**

**3** The diagram shows triangle *ABC*.




*ADC* and *DEB* are straight lines.

*AD* = 6.2 cm
*BC* = 11.4 cm
*E* is the midpoint of *DB*.

Angle *CDB* = 90°
Angle *DCB* = 40°

Work out the size of angle *EAD*.
Give your answer correct to 1 decimal place.
You must show all your working.

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**(Total for Question 3 is 4 marks)**

**4** The functions f and g are such that

$$f(x) = 6(x^2 - 8) \text{ and } g(x) = \frac{x}{3} + 5$$

(a) Find the value of f(4)

.....

**(1)**

(b) Find $g^{-1}(x)$

$g^{-1}(x) =$ .....

**(2)**

(c) Show that $gf(x) = 2x^2 - 11$

**(2)**

**(Total for Question 4 is 5 marks)**

**5** The population of a city increased by 3.7% for the year 2014

At the beginning of 2015 the population of the city was 1 340 000

Lin assumes that the population will continue to increase at a constant rate of 3.7% each year.

(a) Use Lin's assumption to estimate the population of the city at the beginning of 2017
Give your answer correct to 3 significant figures.

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**(3)**

(b) (i) Use Lin's assumption to work out the year in which the population of the city will reach 2 000 000

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(ii) If Lin's assumption about the rate of increase of the population is too high, how might this affect your answer to (b)(i)?

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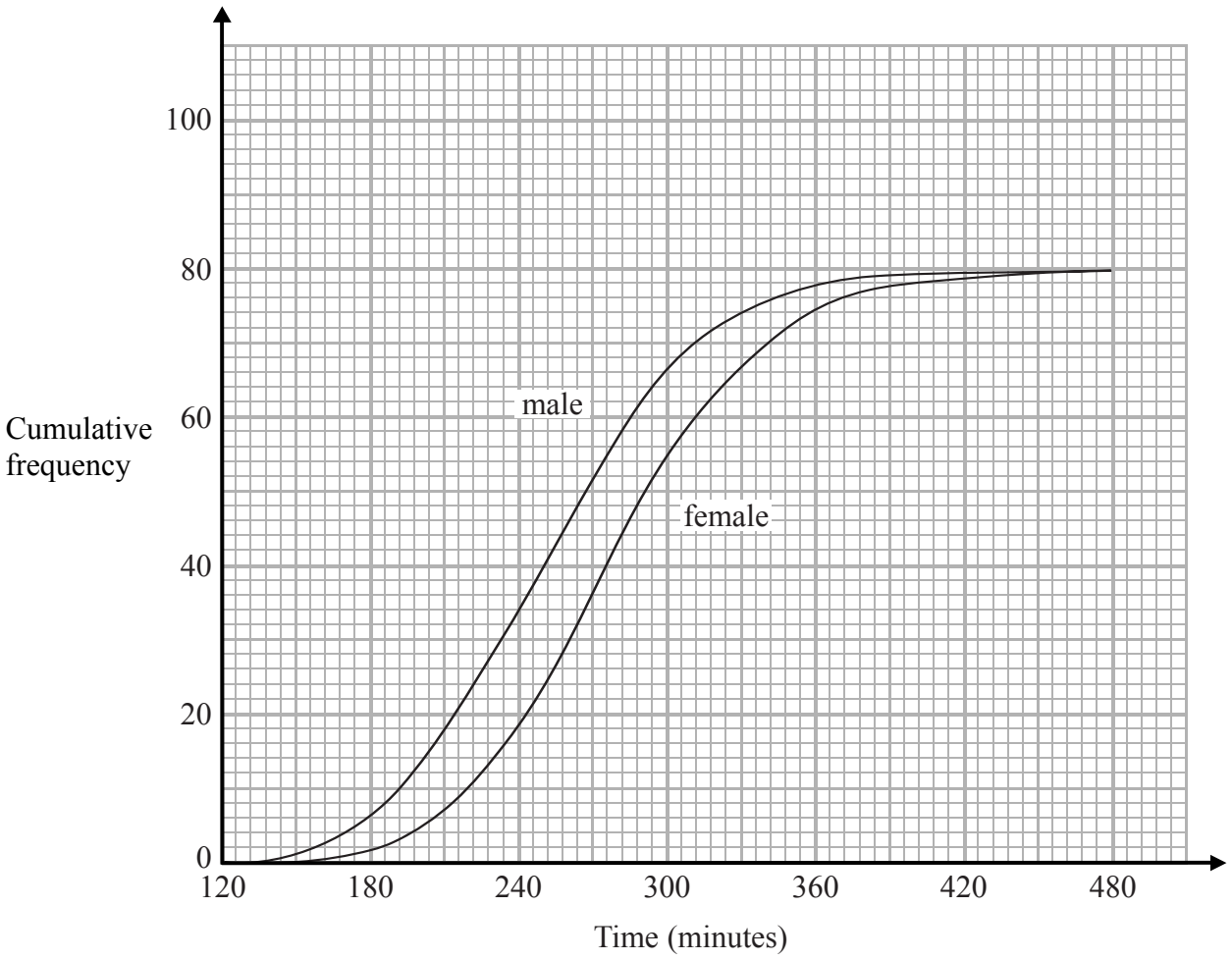
**(3)**

**(Total for Question 5 is 6 marks)**

**6** The cumulative frequency graphs show information about the times taken by 80 male runners and by 80 female runners to finish the London marathon.




A male runner is chosen at random.

(a) Find an estimate for the probability that this runner took less than 5 hours to finish the London marathon.

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**(2)**

(b) Use medians and interquartile ranges to compare the distribution of the times taken by the male runners with the distribution of the times taken by the female runners.

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**(4)**

**(Total for Question 6 is 6 marks)**

**7** Marie has 18 cards.
Each card has a different symbol on it.

Marie gives one card to Shelley and one card to Pauline.

(a) In how many different ways can Marie do this?

**(2)**

There are 15 boys and 18 girls in David's class.
David is going to pick three different students from his class and write their names in a list in order.

The order will be

| | | |
|---|---|---|
| boy<br>girl<br>boy | **or** | girl<br>boy<br>girl |

(b) How many different lists can David write?

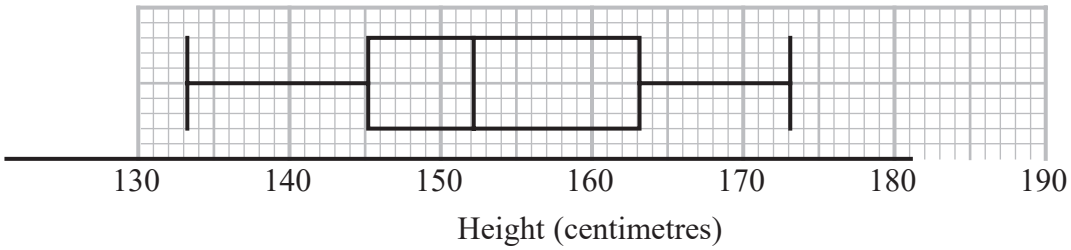
**(3)**

**(Total for Question 7 is 5 marks)**

**8** Aisha recorded the heights, in centimetres, of some girls.
She used her results to work out the information in this table.

| | |
|---|---|
| Least height | 133 cm |
| Lower quartile | 145 cm |
| Interquartile range | 17 cm |
| Median | 152 cm |
| Range | 38 cm |

Aisha drew this box plot for the information in the table.
The box plot is **not** fully correct.




Write down the two things Aisha should do to make the box plot fully correct.

1 .....

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2 .....

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**(Total for Question 8 is 2 marks)**