

GCSE Numeracy

Calculator Allowed

Take Solutions

Intermediate Tier

40+ C

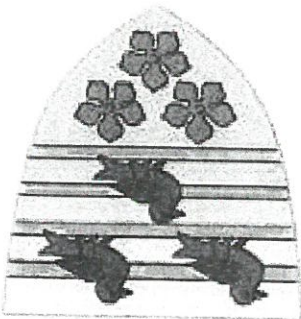
Progress Check #2

52+ B

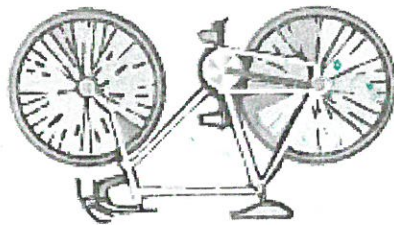
90 Minutes

Student Name: _____

Question	Topic	Grade	Maximum Mark	Awarded Mark
1	% in context	E	3	
2	% Discount	E	7	
3	Conversion Graph	D	4	
4	Unit Costs	D	6	
5	Exchange Rates	D	10	
6	Mean of Grouped Data	D	3	
7	Income Tax	C	6	
8a	Grouped Frequency Diagram	D	3	
8b	Estimating Mean	C	4	
8c	Median group	C	1	
9	Angles Parallel Lines	C	2	
10	Percentage Change	C	4	
11	Percentage Change	C	3	
12	Cumulative Frequency	B	5	
13	Box & Whisker Diagrams	B	6	
14	Reverse Percentages	B	6	
15	Upper & Lower Bounds in Measurement	B	7	



1. Daniel wants to buy a new bicycle. It is priced at £480.



Daniel can either

- pay £480 immediately, or
- pay a 15% deposit, followed by 24 monthly payments of £22.

(a) Calculate the total amount Daniel would pay using the deposit and monthly payments method.

You must show all your working.

[3]

$$\text{Deposit} = 480 \times 15\% = 72$$

$$24 \times 22 = 528$$

$$\text{Total to repay} = 528 + 72 = 600$$

You will be assessed on the quality of your written communication in this question.

Arwyn needs four new tyres fitted on his car and would also like a new spare tyre. He sees two deals advertised at the garage.

<p>"Economy Tyres" £64 each</p> <p>No matter how many tyres fitted, total fitting charge £20</p>	<p>"Top Class Tyres" Made to last longer! £95 each</p> <p>10% discount if you buy 4 or more tyres</p> <p>Free fitting</p>
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Arwyn has exactly enough money to buy four 'Top Class Tyres' and to have them fitted. Does he have enough money to buy, and have fitted, four 'Economy Tyres' with a fifth tyre as a spare?

You must show all your working.

[7]

For 4 top class tyres: $4 \times £95 = £380$
 Join 10% discount = £38
 Cost = £342

For 5 economy tyres: $5 \times £64 = £320$
 fitting = £20
 Total = £340

So you he can buy 5 economy tyres & have them fitted.

3.

Graham and Lisa go on holiday to Copenhagen, Denmark.

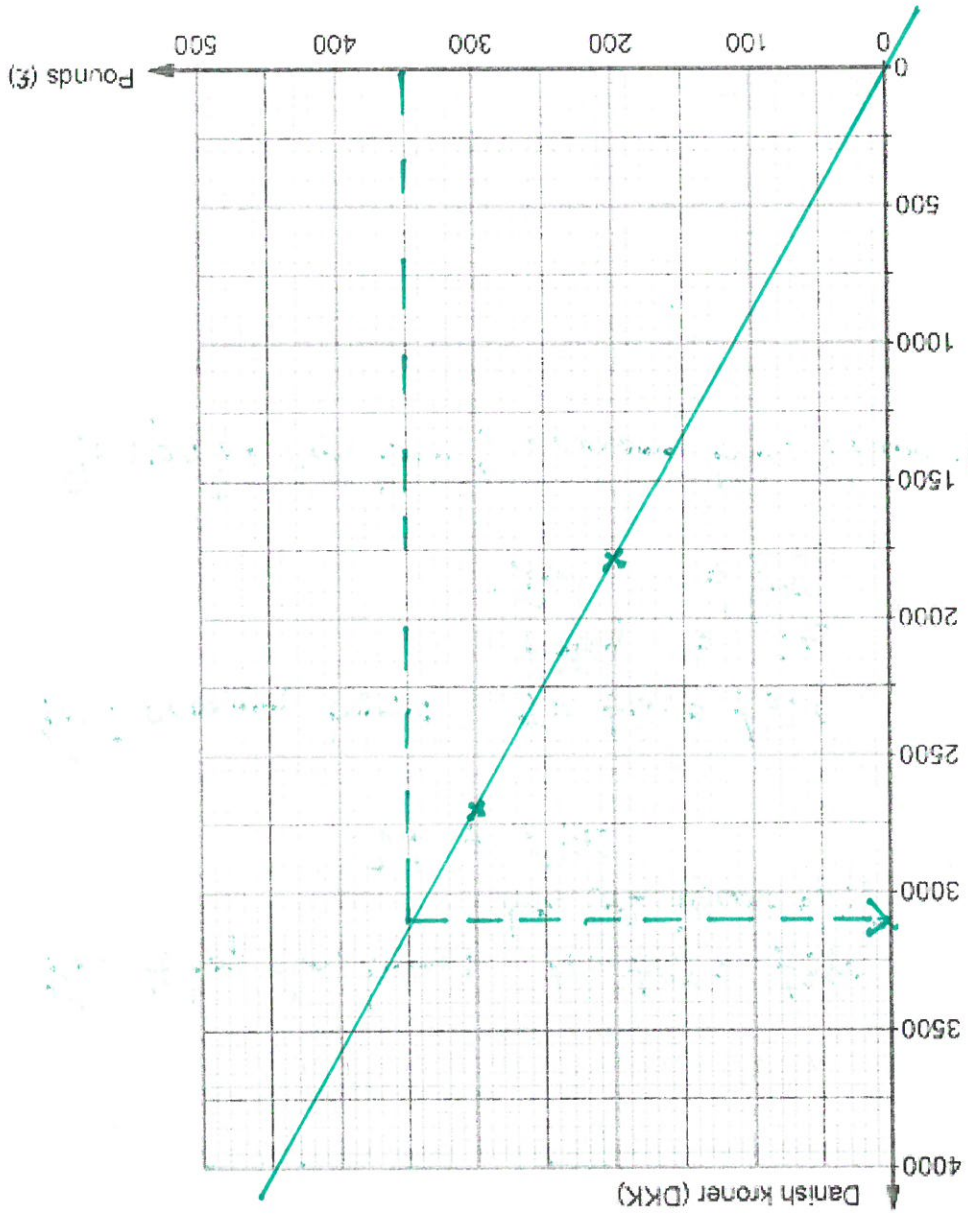
(a) They need to change currency between pounds (£) and the Danish kroner (DKK).

They both go into the same currency shop.

Graham changes £200 and receives 1800DKK.

Lisa changes £300 and receives 2700DKK.

(i) Draw a conversion graph that can be used to change pounds (£) to Danish kroner (DKK). [2]



(ii) Explain how the graph can be used to find how many Danish kroner (DKK) are equivalent to £700.

$$£350 = 3100 \text{ DKK}$$

$$\times 2 \text{ } £700 = 6200$$

Complete the following sentence:

£700 is approximately 6200 Danish kroner (DKK)

[2]

4. In Tesco, potatoes are priced as £1.80 per kg.

Sirloin steak is priced as £16.75 per kg.

After buying a 2.5 kg bag of potatoes and a sirloin steak I receive £8.80 change for a £20 note.

What was the mass of my steak?

[6]

$$\text{The } £20 \text{ cost} = 20 - 8.80 = £11.20$$

$$\text{potatoes cost } 2.5 \times £1.80 = £4.50$$

$$\text{So steak cost } £11.20 - £4.50 = £6.70$$

$$\text{Sirloin steak } ? \times £16.75 = £6.70$$

$$? = \frac{£6.70}{£16.75} = 0.4 \text{ kg}$$

or 400g.

Exchange bureau

Going on holiday? £1 buys 5.48 dirham

Selling back your dirham? £1 for 5.52 dirham

(i) Lois goes on holiday to Dubai, in the United Arab Emirates. She takes £350 in cash to buy United Arab Emirates dirham. On the day she exchanges her money, the bureau has only 5, 10, 20, 50 and 100 dirham notes.

Lois does not intend to spend more than £350, but she wants to buy as many dirham notes as she can with her cash.

How much will Lois have left from her £350 after buying the dirham? Give your answer to the nearest penny.

[6]

Max spend $350 \times 5.48 = 1918$ dirham
 Most she can buy 1915 dirham

Tim will cost $1915 \div 5.48 = 349.45$

(ii) Kenny exchanged £1000 for dirham. He then cancelled his holiday and exchanged all his dirham back to pounds. How much money did Kenny lose?

[4]

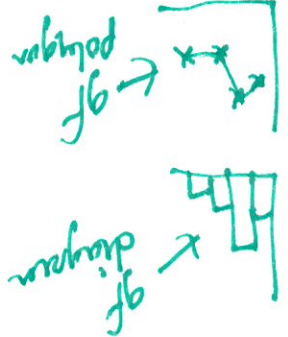
buy $1000 \times 5.48 = 5480$ dirham
 sell $5480 \div 5.52 = 992.75$

So Kenny left $1000 - 992.75 = 7.25$

A survey of 240 primary school pupils was carried out to find the amount of time they spent each week doing their homework. Here are the results of the survey.

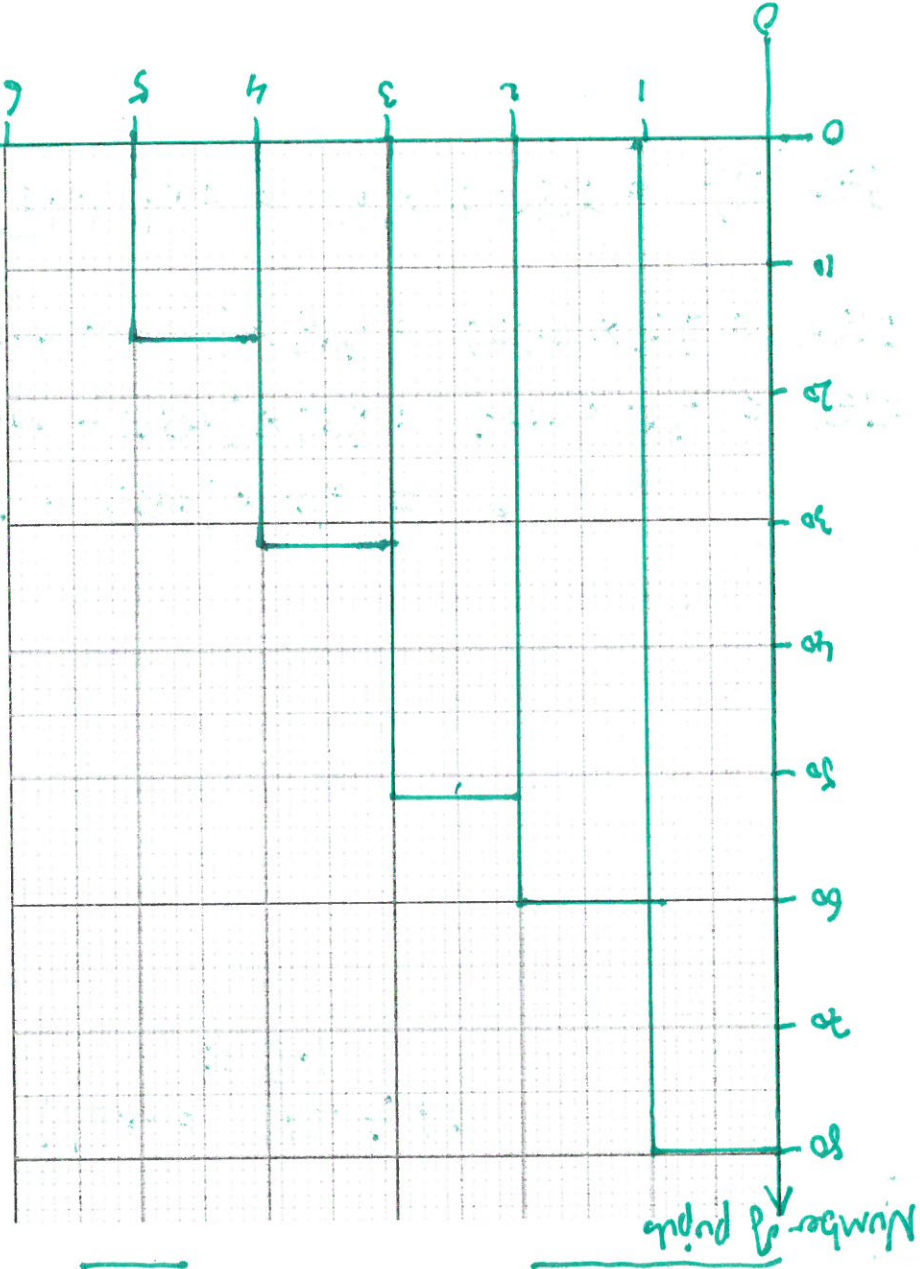
Time taken, t , in hours	Number of pupils
$0 < t \leq 1$	$80 \times 0.5 = 40$
$1 < t \leq 2$	$60 \times 1.5 = 90$
$2 < t \leq 3$	$52 \times 2.5 = 130$
$3 < t \leq 4$	$32 \times 3.5 = 112$
$4 < t \leq 5$	$16 \times 4.5 = 72$

+



[3]

(a) Draw a grouped frequency diagram of the data.



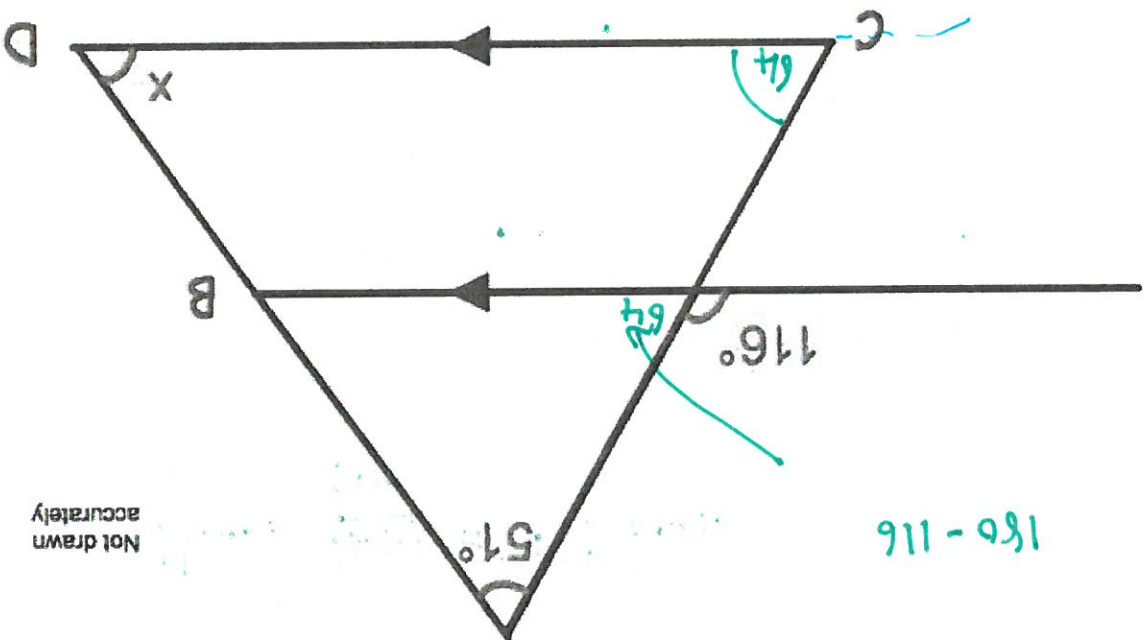
(b) Calculate an estimate of the mean time that pupils spent each week doing their homework. [4]

$$\text{Mean: } \frac{4444}{240} = 1.85 \text{ hours.}$$

(c) Write down the class interval that contains the median. [1]

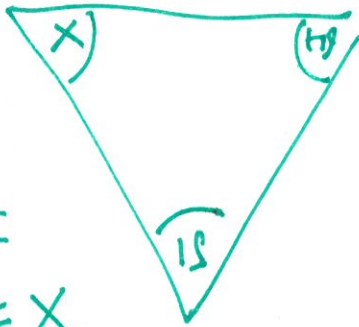
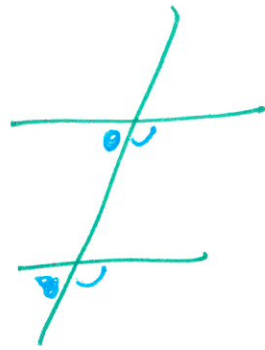
$$120^{\text{th}} \text{ value } 1 < t \leq 2$$

9. In the diagram, AB is parallel to CD.



Work out the size of angle x.

You must show your workings.



$$x = 180 - 51 - 64 = 65$$

[2]

[4]

Show clearly whether the following statement is true or false.

If you increase a positive number by 10% and then decrease that new value by 10%, you get back to your original number.

Let the number = 5

10% increase, multiplier = $100 + 10 = 110\%$
 $5 \times 110\% = 5.5$

10% decrease, multiplier = $100 - 10 = 90\%$

$5.5 \times 90\% = 4.95$

4.95 \neq 5 so false.

A company offers its workers a choice on how much their salary will increase next year. Each worker can receive either a £500 increase or a 2% increase on their present salary. Janet is currently on a salary of £24,000 per year.

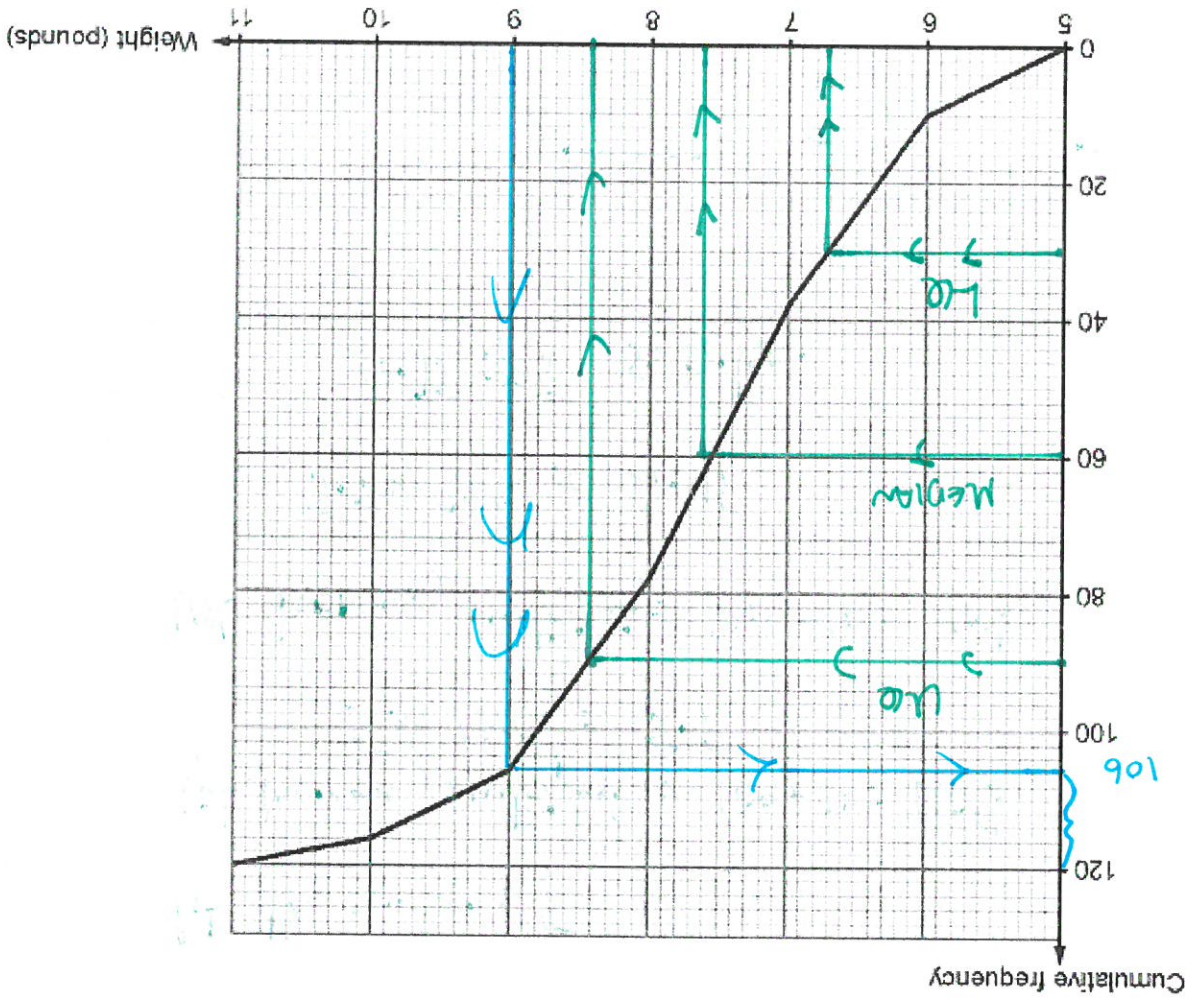
Which option should Janet choose? You must show the calculations that support your answer.

$24000 \times 2\% = 480$

So she is better off accepting £500 increase

[3]

The birth weights of 120 babies were recorded. The cumulative frequency diagram shows the distribution of the weights.



(a) Write down an estimate of the median weight of the 120 babies.

$120 \div 2 = 60^{\text{th}} \text{ baby}$
 7.6 lb

(b) Calculate an estimate of the interquartile range of the weights of the 120 babies.

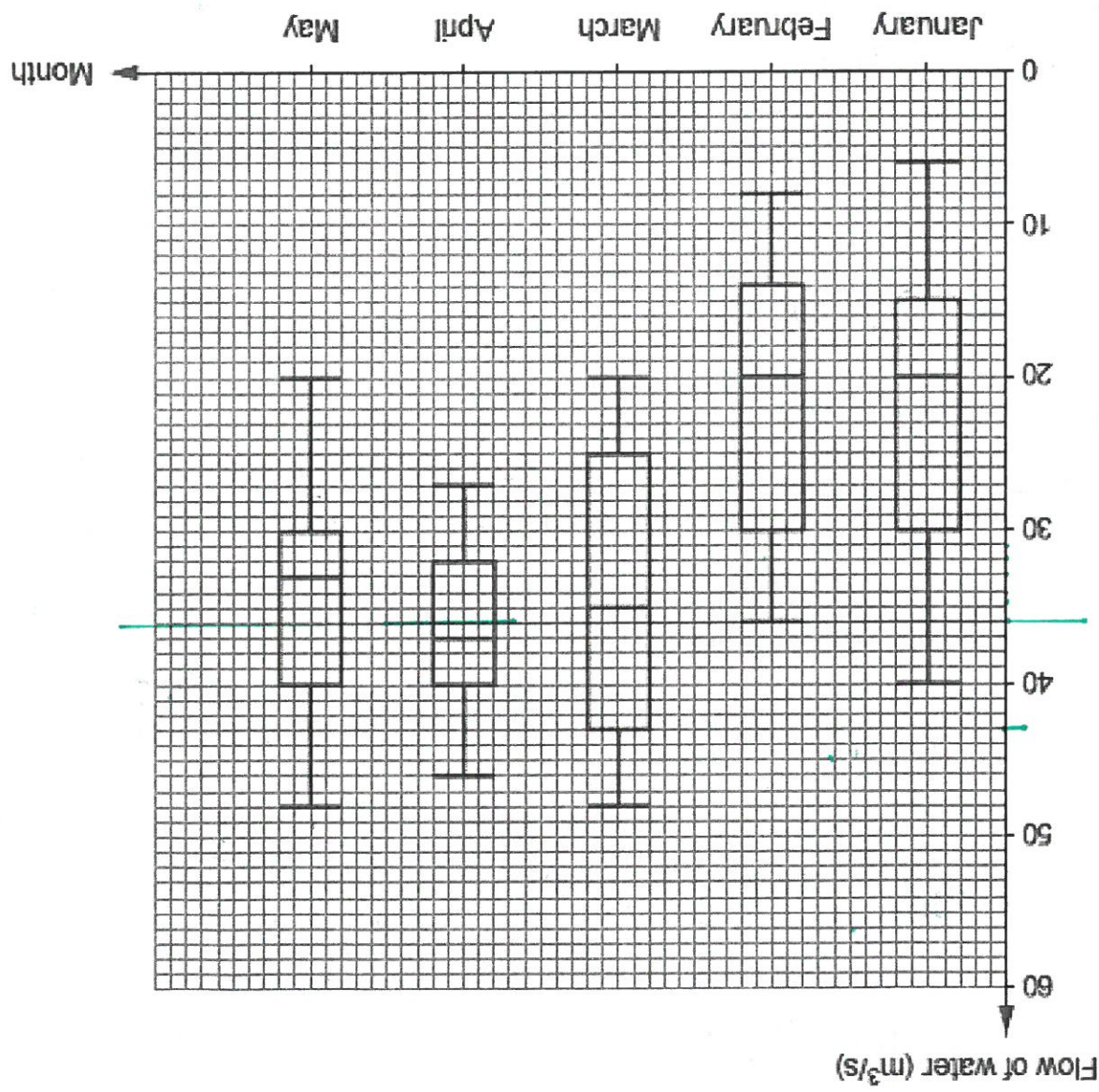
$LQ3 = 9.2$
 $LQ1 = 6.5$
 $IQR = 9.2 - 6.5 = 2.7 \text{ lb}$

(c) Write down an estimate of the number of babies whose weights were greater than 9 pounds.

14 babies

[2]

The following box and whisker plots show the flow of water through a drain, measured in m^3/s . The flow of water was measured at 11 a.m. each day for the first 5 months of the year.



(a) In which of the five months was the median flow of water the greatest?

April

[1]

25% of the results in January show the flow of water was less than 6 m ³ /s.	TRUE	<input type="radio"/> FALSE
The units, m ³ /s, measure the volume of water passing through the drain each second.	<input checked="" type="radio"/> TRUE	FALSE
The mean flow of water in April was certainly greater than 36 m ³ /s.	<input checked="" type="radio"/> TRUE	FALSE
The month with the greatest difference between the lower quartile and the median was May.	<input checked="" type="radio"/> TRUE	<input checked="" type="radio"/> FALSE

(d) Circle either TRUE or FALSE for each of the following statements. [2]

(ii) 25% of the results in March show the flow of water was greater than 43 m³/s. [1]

(i) Both the upper quartiles and medians in the months of Feb. and Jan. were the same. [1]

(c) Iona is writing some statements for a report on the flow of water through the drain. Complete each of the statements given below.

(b) In which of the five months was the range of the flow of water the greatest? [1]

January

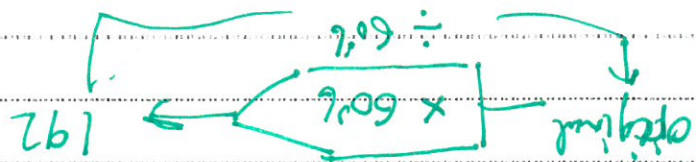
14.

A shop has reduced the price of a bicycle by 40% of its original price.

The sale price of the bicycle is £192.

Calculate the original price of the bicycle.

Reduced by 40%, multiplier: $100 - 40 = 60\%$



$$192 \div 60\% = \pounds 320$$

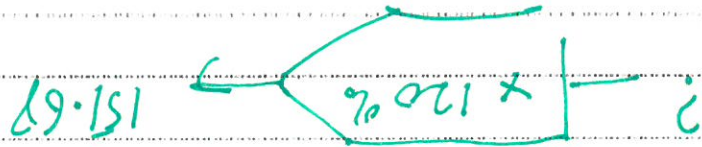
[3]

15.

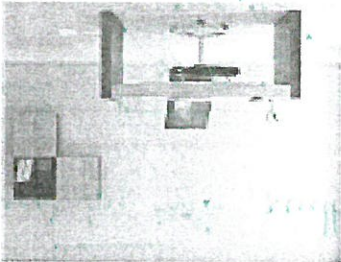
The bill for repairing a washing machine came to £151.68, inclusive of VAT at 20%. What was the cost before VAT was added?

[3]

Increasing by 20%, multiplier: $100 + 20 = 120\%$



$$151.68 \div 120\% = \pounds 126.40$$

	<p>Stylish computer desk</p> <p>Made of laminate wood.</p> <p>Non-scratch top.</p> <p>Length is exactly 2000mm</p>
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Luc wants this new desk for his bedroom.

The desk is to fit on the straight wall between his wardrobe and his bookcase.

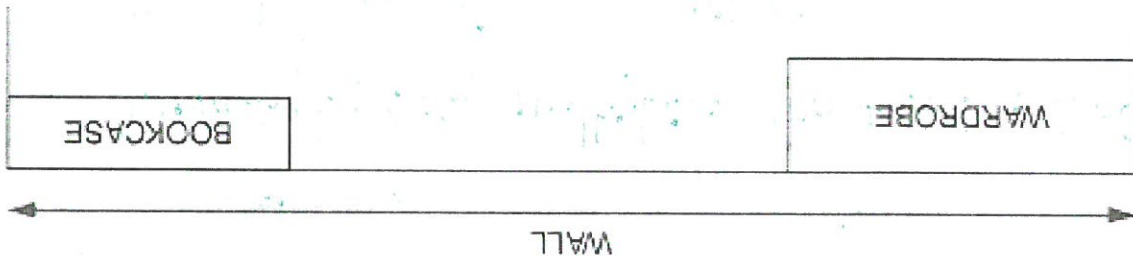


Diagram not drawn to scale

- Luc has measured the length of
- the wall, which is 600 cm, correct to the nearest 10 cm.
 - the bookcase, which is 147 cm, correct to the nearest 1 cm.
 - the wardrobe, which is 250 cm, correct to the nearest 1 cm.

(a) What is the greatest possible length of the wall?

Circle your answer.

- 600 cm 605 cm 645 cm 610 cm 650 cm

[1]

(b) What is the least possible length of the wardrobe?

Circle your answer.

- 249 cm 249.45 cm 249.49 cm 249.5 cm 250 cm

[1]

$$250 \pm 0.5$$

$$250 - 0.5 = 249.5$$

(c) Can Luc be certain that this desk will fit in the space available?

You must

- show all your calculations,
- give the greatest or least bounds of any measurements used in calculations or comparisons,
- give a reason for your answer.

[5]

Worst case scenario: Minimum length of wall 595 cm
Max length worktop 250.5 cm
Max length bookcase 147.5 cm

lengthy desk: 2000 mm = 200 cm

~~Smallest~~ gap would be: $595 - 250.5 - 147.5 = 197$ cm

So no, Luc can't be certain on the gap could be up to 3cm too narrow!

