

AQA

GCSE

Mathematics

SET A – Paper 1 Higher Tier

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Materials

Time allowed: 1 hour 30 minutes

For this paper you must have:

- mathematical instruments

You may **not** use a calculator.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the space provided.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may use additional paper, graph paper and tracing paper.

Name:

Answer **all** questions in the spaces provided.

- 1 (a) Solve the inequality $5x + 3 < -2$

Circle your answer.

[1 mark]

$$x > -1$$

$$x < \frac{1}{5}$$

$$x > \frac{1}{5}$$

$$x < -1$$

- 1 (b) Circle the inequality which does **not** satisfy **all** the integers $-2, -1, -0, 1$ and 2 .

[1 mark]

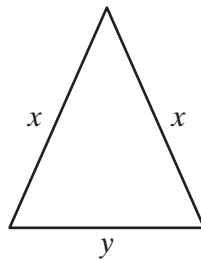
$$-3 < x < 3$$

$$-2 \leq x \leq 2$$

$$-2 \leq x < 2$$

$$-2 \leq x < 3$$

- 2 When $x = y$, what is the mathematical name for the triangle?



Circle your answer.

[1 mark]

Isosceles

Equilateral

Scalene

Right-angled

- 3 (a) What is the value of $8^{\frac{2}{3}}$?

Circle your answer.

[1 mark]

16

8

6

4

2

- 3 (b) Which expressions are equivalent to the value of 4?

Tick **two** boxes.

[1 mark]

$8^{\frac{1}{2}}$ ☐

$16^{\frac{1}{2}}$ ☐

$16^{\frac{1}{4}}$ ☐

$32^{\frac{1}{8}}$ ☐

$64^{\frac{1}{3}}$ ☐

- 4 Andy's snooker cue is $58\frac{3}{4}$ inches long.

He cuts off the bottom and it now measures $37\frac{2}{5}$ inches.

What is the precise length of the piece that he has cut off?

[2 marks]

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Answer inches

- 5 Write 54 as a product of its prime factors.

[2 marks]

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Answer

6 Dave needs 40 tennis balls for his coaching session.

The sports shop sells individual balls for 48p each or packs of 3 balls for £1.25

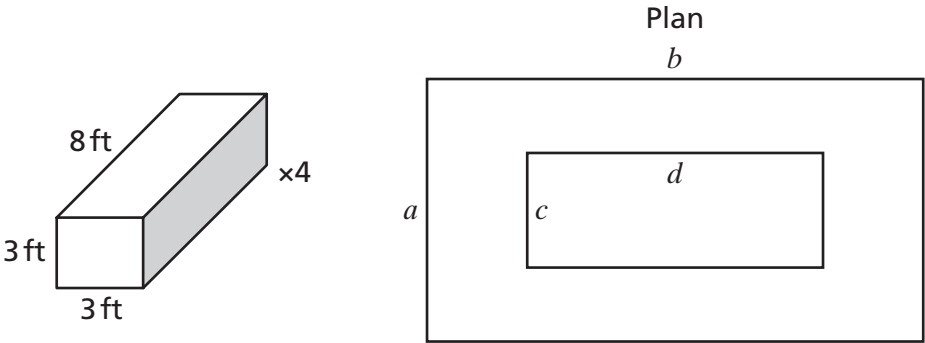
What is the least amount Dave could spend to get 40 tennis balls?

[4 marks]

Answer £

7 Four identical cuboids measuring 3 ft × 3 ft × 8 ft are pushed together to form a rectangular shape with a hollow centre.

The plan of the shape is shown.



Write down the lengths of a , b , c and d .

[2 marks]

$a =$ ft

$b =$ ft

$c =$ ft

$d =$ ft

- 8 Rachel is at the gym for two hours.

She spends $\frac{2}{5}$ of her time on the weights.

The rest of her time is spent running and cycling in the ratio of 4 : 5

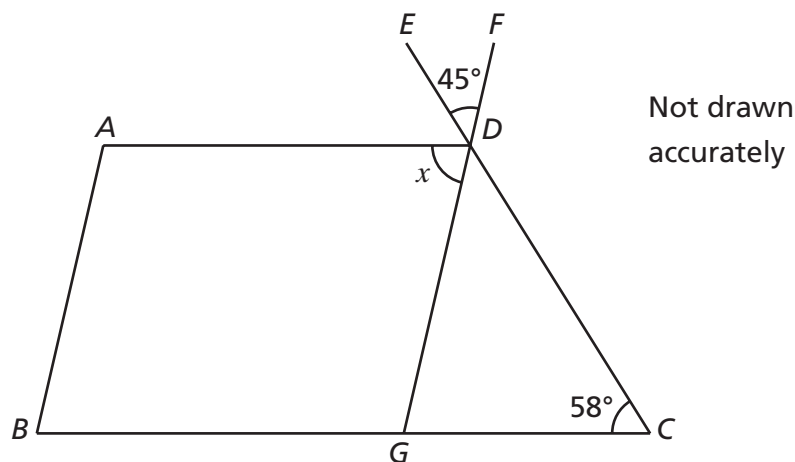
How many minutes does she spend cycling?

[4 marks]

Answer minutes

- 9 Shape $ABCD$ is a trapezium.

CDE and GDF are both straight lines.



Work out the size of angle x .

Give reasons for any angles you write down or calculate.

[3 marks]

Answer $x =$ $^{\circ}$

- 10 (a) A plectrum is a tool used to pluck the strings of musical instruments such as guitars.

A machine can make 53 plectrums in 5.8 minutes.

Estimate the number of plectrums the machine can make in a day.

[2 marks]

Answer _____

- 10 (b) State any assumptions that you have made.

[1 mark]

- 11 (a) Given the formula $v^2 = u^2 + 2as$

Find the value of v when $u = 4$, $a = 3$ and $s = -2$.

[3 marks]

$v =$ _____

11 (b) Make a the subject of the formula $v^2 = u^2 + 2as$

[2 marks]

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$a =$

12 Look at the following vector statement.

$$\begin{pmatrix} 4 \\ 3 \end{pmatrix} - \begin{pmatrix} a \\ 2b \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$$

Work out the values of a and b .

[2 marks]

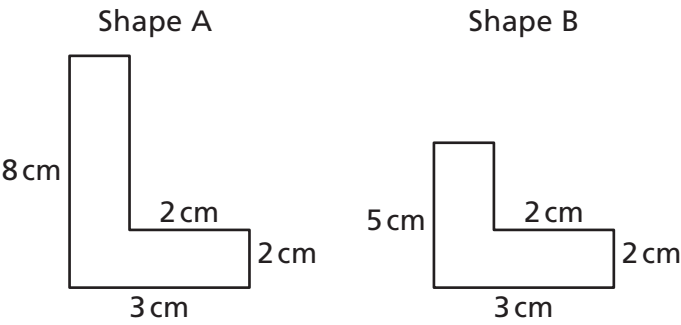
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$a =$

$b =$

13 A machine makes two 'L' shapes as shown.



Ibrahim says, 'To make the two shapes congruent, we need to increase the area of shape B by 25%'.

Is Ibrahim correct?

You **must** show your working.

[6 marks]

Answer

- 14** Ethan, Benjamin and Josue toss a bottle and try to land it upright.

Here are the results.

	Ethan	Benjamin	Josue
Number of tries	10	25	50
Number of lands	1	3	4

- 14 (a)** Who is the best at the game?

Give a reason to support your claim.

[2 marks]

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- 14 (b)** Whose results give you the best understanding of their ability?

Give a reason for your decision.

[2 marks]

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- 15** Find the n th term for the following sequence.

–1 5 15 29 47 ...

[2 marks]

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Answer

16 Claire, Michelle and Dorata each have some marbles.

Michelle has 4 times as many as Claire. Dorata has 12 more than Claire.

Together, Claire and Michelle have the same amount as Dorata.

How many marbles does Claire have?

[3 marks]

Answer

17 Nathan asks his classmates whether or not they walk to school.

	Walks	Doesn't walk	Total
Boys	7		13
Girls			
Total	11	15	

17 (a) Complete the table.

[2 marks]

17 (b) When Nathan asks a girl if she walks to school, what is the probability that she will say 'No'?

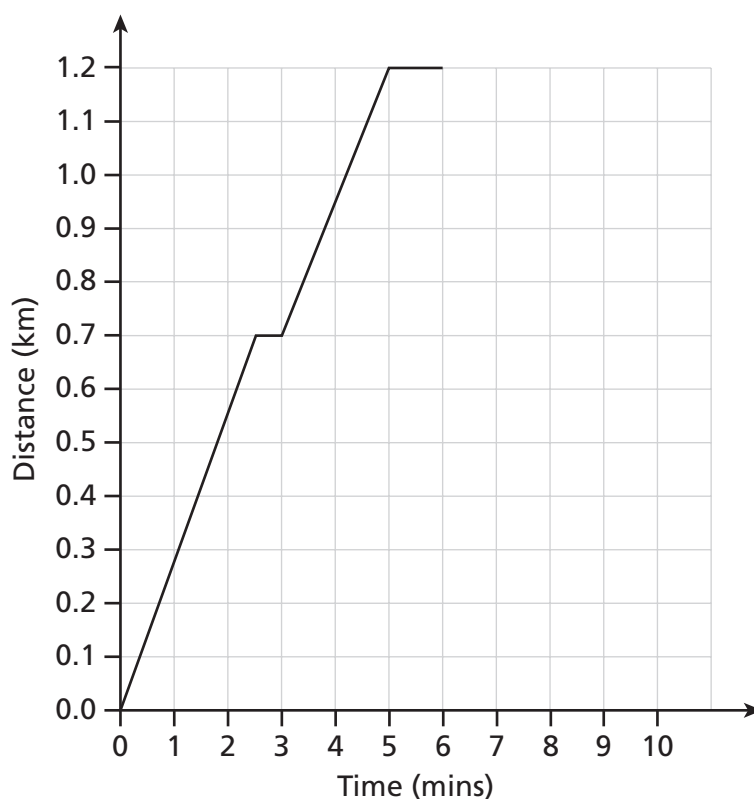
[1 mark]

Answer

- 18** Tim cycles up the road to test out his new bike.

He stops on the way to adjust his brakes and then rests at the end of the road before cycling back.

The graph shows the first part of his journey.



- 18 (a)** How long did he spend adjusting his brakes?

[1 mark]

Answer

- 18 (b)** What is his average speed from home to the end of the road?

[2 marks]

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Answer m/s

18 (c) He cycles back at 6 m/s.

Complete the graph to show the journey home.

[3 marks]

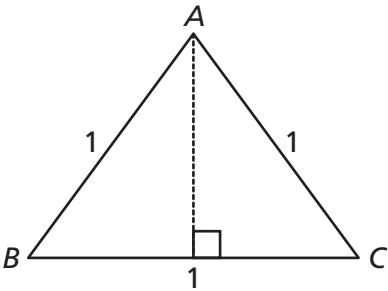
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19 Use the equilateral triangle ABC to write down the exact value of $\cos 60^\circ$.

[1 mark]



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$\cos 60^\circ =$

20 Expand and simplify $(x + 2)(x + 3)(x - 1)$

[3 marks]

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Answer

21 $f(x) = x^2$

$fg(x) = x^2 - 2x + 1$

Write down the function $g(x)$

[2 marks]

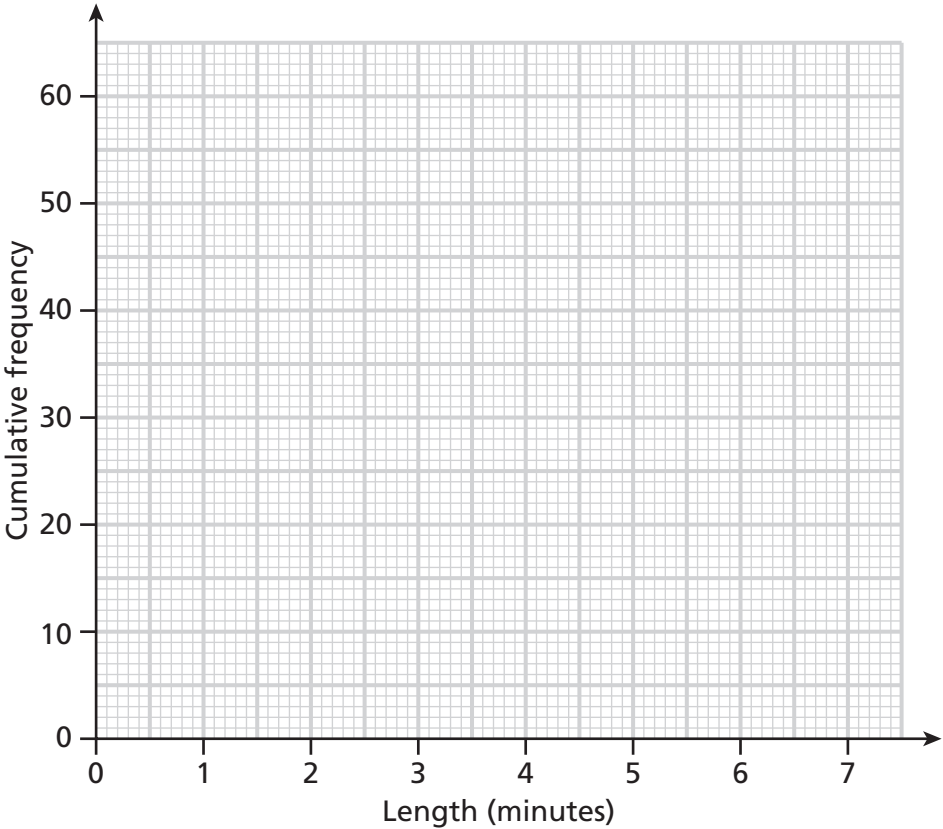
$g(x) =$

22 The table shows the length of songs on the top five albums in the UK charts.

length, l (mins)	Frequency
$0 < l \leq 1$	3
$1 < l \leq 2$	5
$2 < l \leq 3$	7
$3 < l \leq 4$	18
$4 < l \leq 5$	17
$5 < l \leq 6$	7
$6 < l \leq 7$	3

22 (a) Show this information on the cumulative frequency graph.

[3 marks]



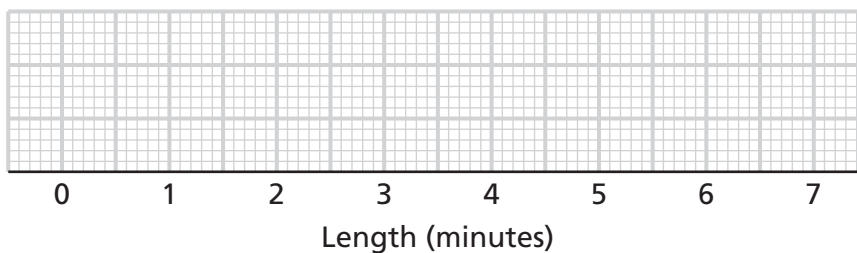
22 (b) Use the graph to estimate the median length of song.

[1 mark]

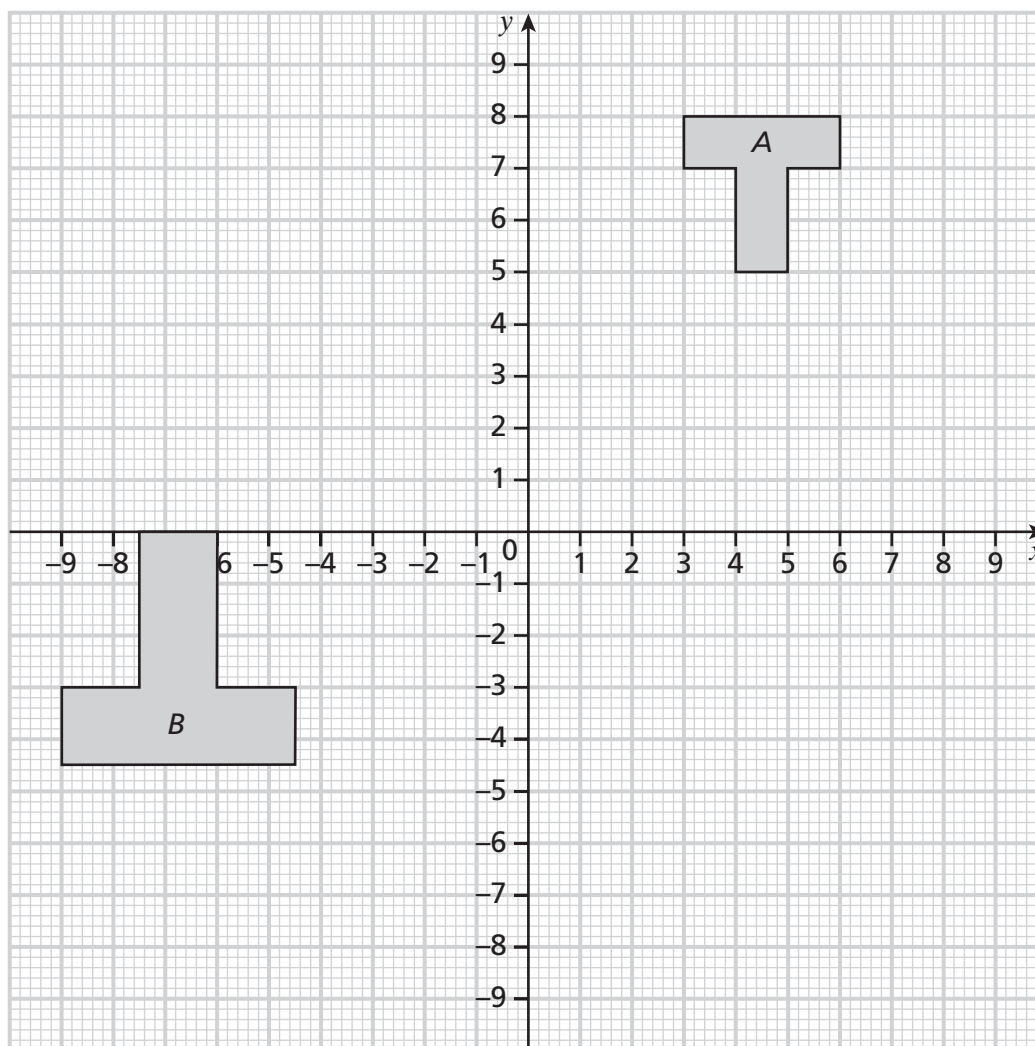
Answer minutes

22 (c) Draw a box plot to illustrate the data.

[2 marks]



23



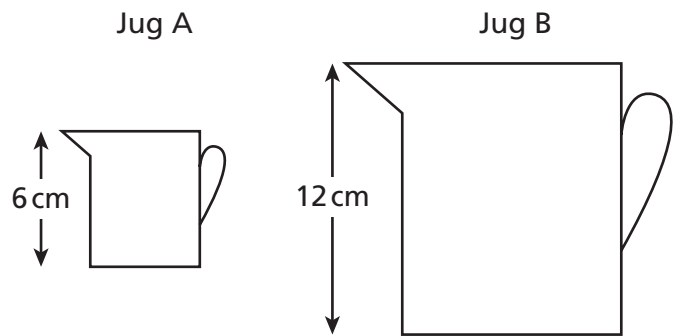
Describe the single transformation which maps shape *A* onto shape *B*. [3 marks]

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24 Two measuring jugs are mathematically similar.



Jug A holds 300 ml.

How much will Jug B hold?

Give your answer in litres.

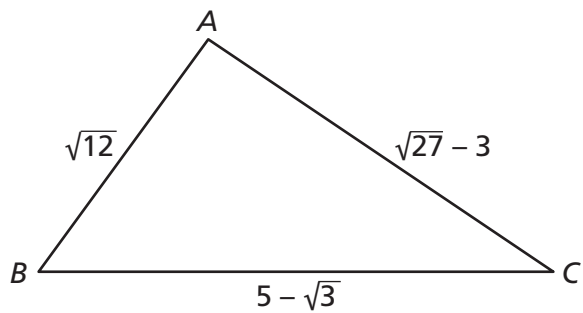
[3 marks]

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Answer litres

25 Show that the perimeter of the triangle can be written in the form $a\sqrt{b} + c$ [2 marks]



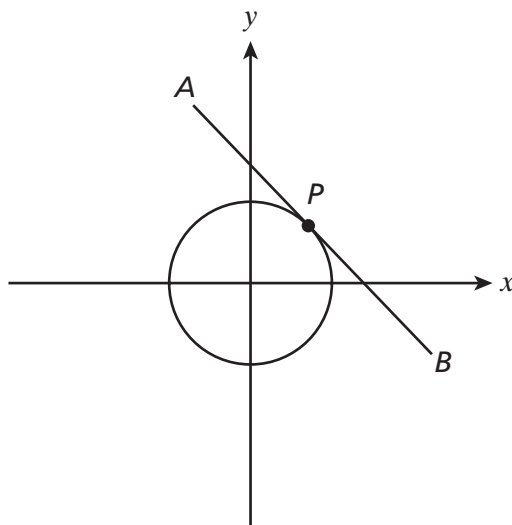
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26 The diagram shows a circle with centre $(0, 0)$.

A tangent AB touches the circle at the point $P(7, 10)$.



Find the equation of the line AB .

[4 marks]

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Answer

END OF QUESTIONS