

AQA

GCSE

Mathematics

SET A – Paper 2 Higher Tier

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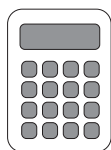
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Materials

Time allowed: 1 hour 30 minutes

For this paper you must have:

- calculator
- mathematical instruments



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 Write 350 ml to 1.2 litres as a ratio in its simplest form.

Circle your answer.

[1 mark]

5 : 24

7 : 24

35 : 12

350 : 120

- 2 A film is 137 minutes long.

It starts at 7:14 pm

What time does it end?

Circle your answer.

[1 mark]

8:21 pm

9:29 pm

9:31 pm

8:51 pm

- 3 Which of the following is **not** a Pythagorean triple?

Circle your answer.

[1 mark]

(3, 4, 5)

(5, 12, 13)

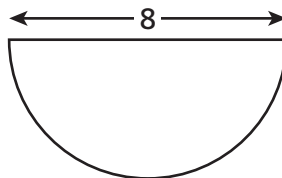
(6, 8, 10)

(7, 10, 12)

- 4 Work out the area of the semicircle.

Circle your answer.

[1 mark]



4π

8π

16π

32π

64π

- 5 Which word best describes $x^2 + 2x + 1 = (x + 1)^2$?

Circle your answer.

[1 mark]

Formula

Equation

Identity

Expression

- 6 Simplify $\frac{x^5 \times x^{-1}}{x^2}$

Circle your answer.

[1 mark]

x^2

x^3

x^4

x^6

x^8

- 7 (a) Doug is going to measure the height of some students in order to analyse any differences between boys and girls.

Which of the following statements best describe Doug's data?

Tick **two** boxes.

[1 mark]

Primary

☐

Secondary

☐

Discrete

☐

Continuous

☐

Controversial

☐

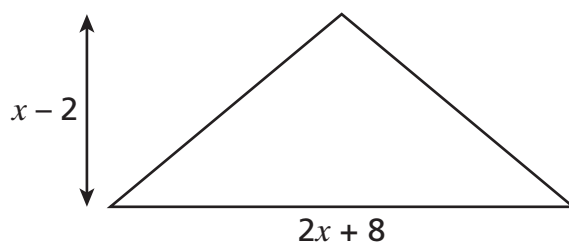
- 7 (b) Doug is going to select the students from his class at random.

Describe how he could do this.

[1 mark]

8 Show that the area of the triangle can be written as $x^2 + 2x - 8$

[2 marks]



9 Louise and Anita work in a café.

Louise takes 42 seconds to make a latte.

Anita takes 70 seconds to toast a teacake.

Louise says, 'I can make x lattes in the time it takes you to toast y teacakes'.

Find the values of x and y .

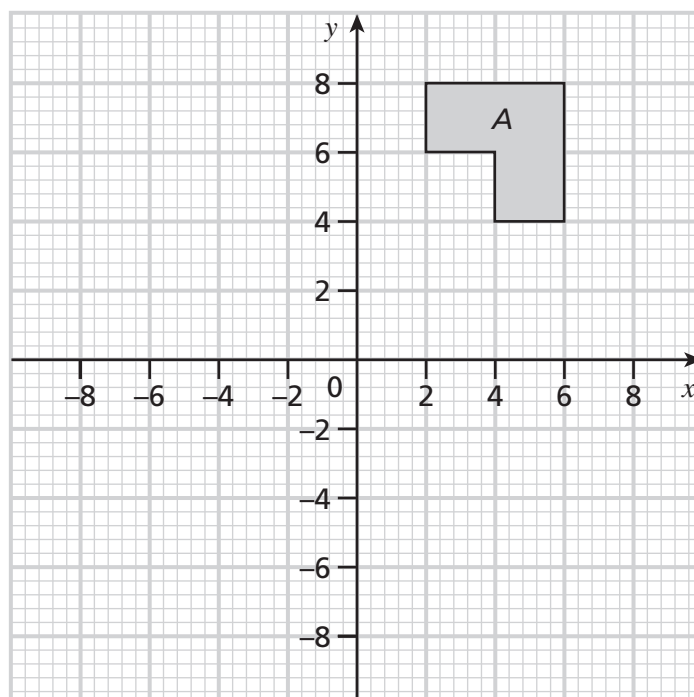
[3 marks]

$x =$

$y =$

- 10 Translate shape A with the vector $\begin{pmatrix} -2 \\ -4 \end{pmatrix}$ and label the new shape B .

[2 marks]



- 11 (a) Emma buys a house for £202 000.

The house increases in value at 1.5% per annum.

How many years will it be until the value of the house exceeds £215 000?

[2 marks]

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Answer years

- 11 (b) Cathy wants to build a new driveway and have a loft conversion on her house.

She is told that:

a new driveway will add 6% on to the value of her house

a loft conversion will add a **further** 18% on to the value of her house.

Cathy says, 'My house will be worth £180 000 if I have all of the work done'.

What is the current value of her house?

Give your answer to 3 significant figures.

[3 marks]

Answer £

- 12 (a) Given that $3.2 \times 10^7 \times A = 2.176 \times 10^4$

Write down the value of A as an ordinary number.

[3 marks]

$A =$

12 (b) A spider exerts a downward force of $1.15 \times 10^{-3}\text{N}$

Each of its feet has an area of $2.3 \times 10^{-5}\text{ m}^2$

$Force = Pressure \times Area$

Find the pressure applied to each of the spider’s feet.

[2 marks]

Answer = N/m²

13 There are 20 students in Anand’s class.

He copies down this table from the board to show the heights of everyone in the class.

He has made one error in the frequency column.

Height, h (cm)	Frequency
$140 < h \leq 150$	3
$150 < h \leq 160$	6
$160 < h \leq 170$	6
$170 < h \leq 180$	4

The teacher says, ‘An estimate for the mean height is 161 cm’.

Which class interval has an incorrect frequency?

You must show working to back up your answer.

[4 marks]

Answer

14 Solve $x^2 + 2x - 15 = 0$

[2 marks]

$x =$

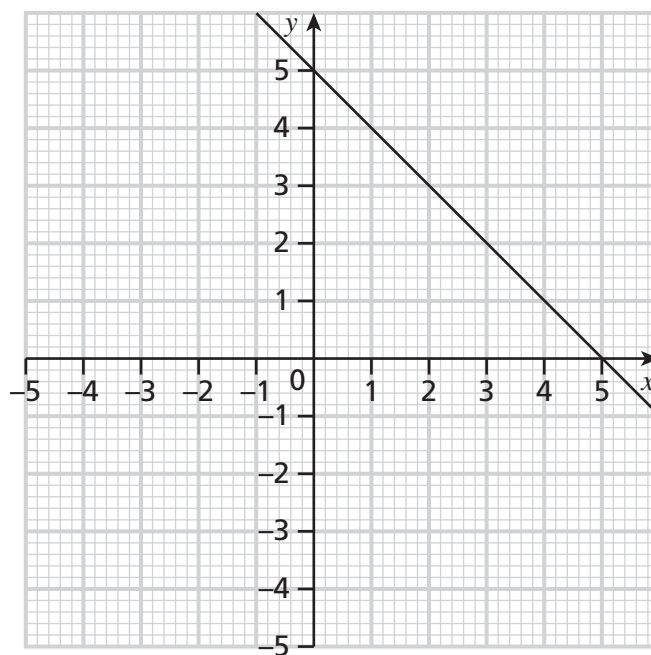
$x =$

15 (a) By plotting the graph of $3y = 5x + 3$, solve the simultaneous equations

$$3y = 5x + 3$$

$$x + y = 5$$

[4 marks]



$x =$

$y =$

- 15 (b) Find the equation of the line which is parallel to $x + y = 5$ and goes through the point (3, 4).

[2 marks]

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Answer

- 16 Each time you pot a ball in snooker, you get to have another shot.

The probability that Craig pots a ball is 0.23

- 16 (a) Work out the probability that Craig has exactly three shots on his next turn.

[2 marks]

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Answer

- 16 (b) The probability that Ed will pot two balls in a row is 0.0961

What is the probability that Ed will miss any given ball that he goes for?

[2 marks]

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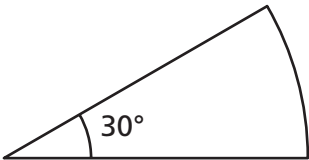
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Answer

17 The area of this sector of a circle is $2.5\pi \text{ cm}^2$.



Find the radius of the circle.
Give your answer to 2 decimal places.

[3 marks]

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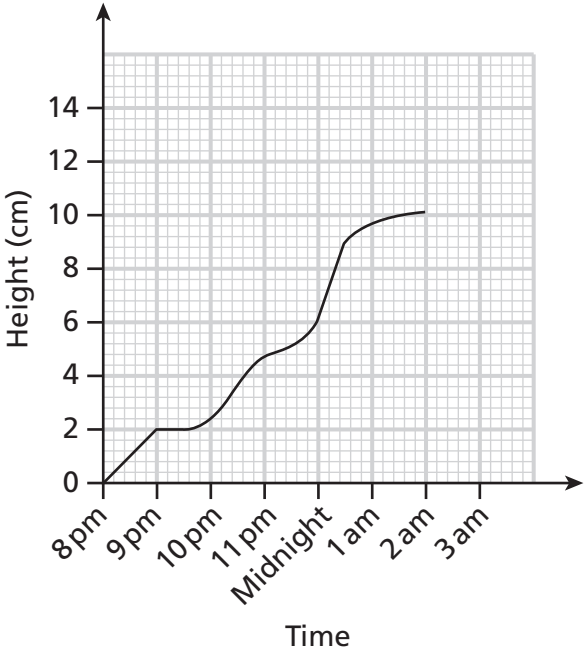
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Answer cm

18 The graph shows the height of water in a container which is left out overnight in the rain.



18 (a) At what time was the rainfall the heaviest?

[1 mark]

Answer

18 (b) Estimate the rate of rainfall at 10:30 pm.

[2 marks]

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Answer cm/hour

19 y is directly proportional to the cube root of x .

(a) Use the table to find an equation for y in terms of x .

[2 marks]

x	0	8	64
y	0	5	10

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Answer

(b) Find the value of x when $y = 15$.

[2 marks]

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$x =$

- 20 A restaurant claims to have 455 different combinations when you buy a three-course meal.

The restaurant serves five different starters.

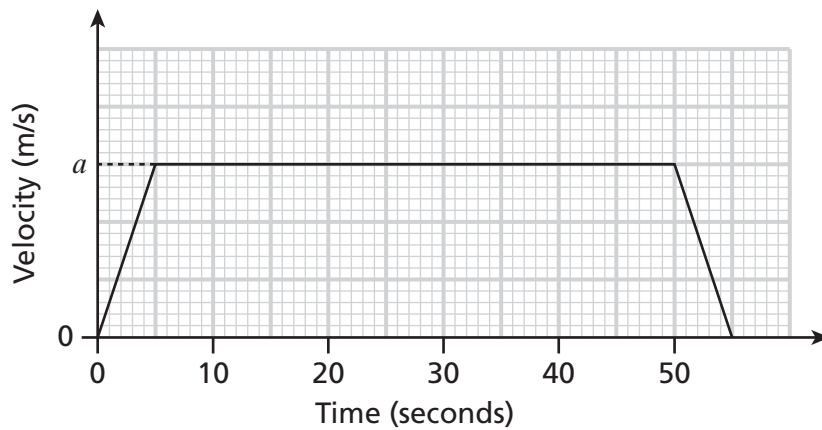
What is the total number of mains and desserts that the restaurant serves?

[2 marks]

Answer

- 21 (a) Majid completes a 400 m sprint in 50 seconds.

The velocity time graph shows his run.



Find the value of a .

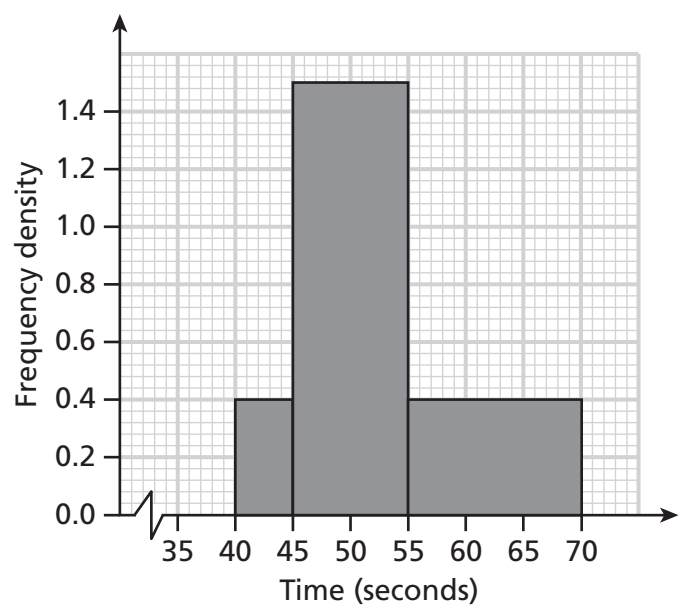
Give your answer to 2 decimal places.

[2 marks]

$a =$

 m/s

21 (b) The histogram shows the time that it took all of the runners to complete the 400m sprint.



How many runners took part in the competition?

[3 marks]

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Answer

22 (a) Find the turning point of the graph of $y = 4x^2 - 5x + 12$

[4 marks]

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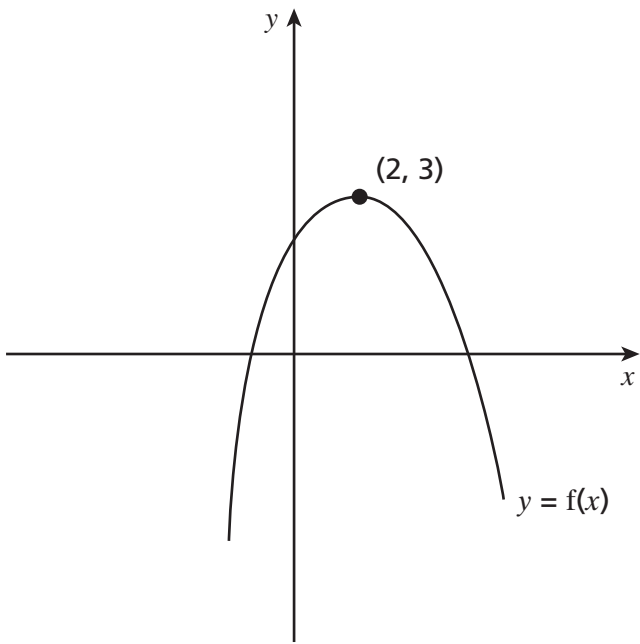
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Answer (..... ,)

22 (b) The graph of $y = f(x)$ is shown with a maximum point of $(2, 3)$.



Find the turning point of the graph of $y = f(x - 3)$

[2 marks]

Answer (..... ,)

23 An Olympic pool is 50m long to the nearest centimetre.

Jenny can swim four lengths in 2 minutes and 15 seconds to the nearest second.

By considering bounds, give Jenny’s speed to a suitable degree of accuracy.

[4 marks]

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Answer m/s

- 24 Prove that the product of three consecutive even numbers is always divisible by 8.

[3 marks]

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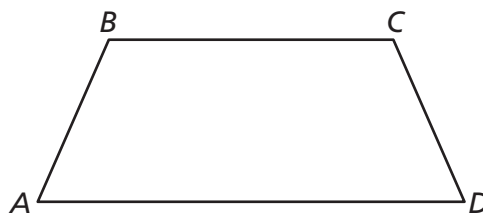
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- 25 $ABCD$ is an isosceles trapezium.

Point E is on a straight line with BC such that $ABED$ is a trapezium containing two right angles.



$$\overrightarrow{AB} = \mathbf{a}$$

$$\overrightarrow{AD} = \mathbf{b}$$

$$BC : AD = 3 : 4$$

Write the vector \overrightarrow{AE} in terms of \mathbf{a} and \mathbf{b} .

[4 marks]

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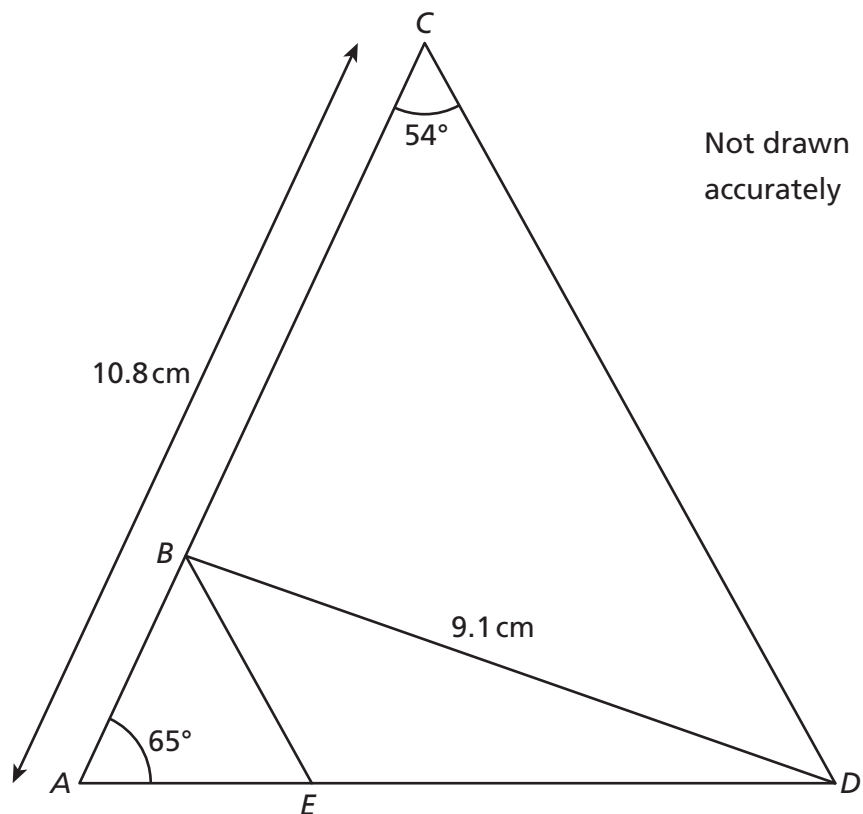
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Answer

26 Shape ACD is a triangle.

$AC = 10.8$ cm



Find the area of triangle BCD .

Give your answer to 1 decimal place.

[5 marks]

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Answer

END OF QUESTIONS