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|---|---|

| Centre Number | Candidate Number |
|---|---|

# Mathematics

FOR FULL VIDEO SOLUTIONS SCAN THE QR CODE

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Higher Tier

Predicted Paper 3H – 10th June 2024

Total Marks

**Instructions**

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used where indicated, but not otherwise.**
- If your calculator does not have a $\pi$ button, take the value of $\pi$ to be 3.142 unless the question instructs otherwise.

**Disclaimer: No-one can ever be sure what will definitely appear on the GCSE Maths Papers. I have put this paper together based on common topics we often see on Paper 3, now that we've seen Paper 1&2. I hope you find it helpful!**

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**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

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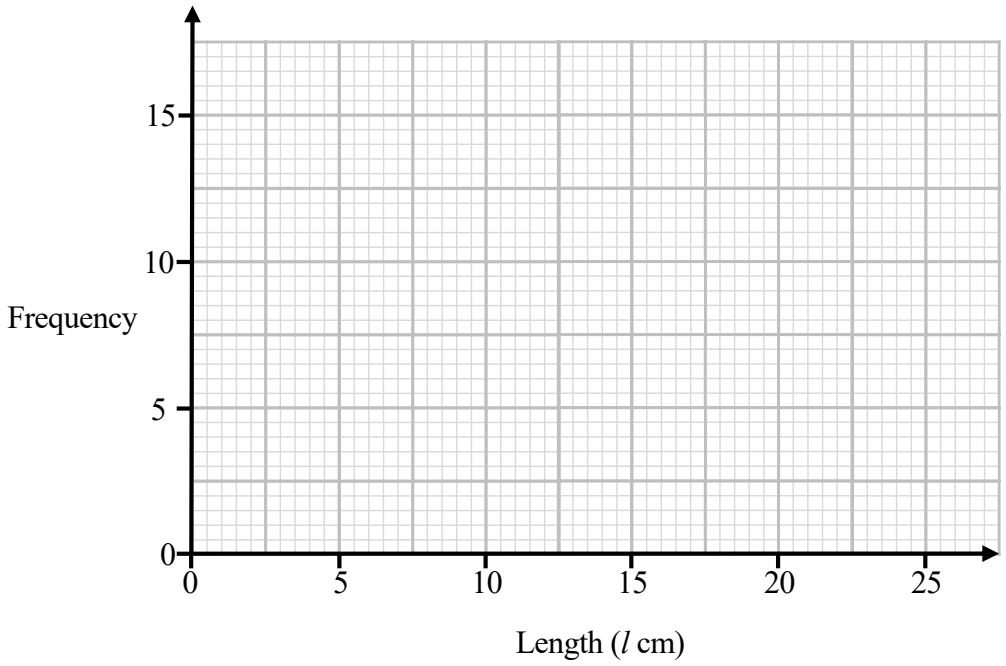
**1** The frequency table gives information about the length of 45 fish.

| **Length ($l$ cm)** | **Frequency** |
|---|---|
| $0 < l \leq 5$ | 3 |
| $5 < l \leq 10$ | 9 |
| $10 < l \leq 15$ | 12 |
| $15 < l \leq 20$ | 15 |
| $20 < l \leq 25$ | 6 |

On the grid, draw a frequency polygon for the information in the table.




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

**2** (a) Write 534000 in standard form.

VIDEO SOLUTIONS

.....

**(1)**

(b) Write $9.8 \times 10^{-7}$ as an ordinary number.

.....

**(1)**

(c) Work out the value of $(3.08 \times 10^{-3}) \times (1.92 \times 10^{6})$
Give your answer in standard form correct to 3 significant figures.

.....

**(2)**

**(Total for Question 2 is 4 marks)**

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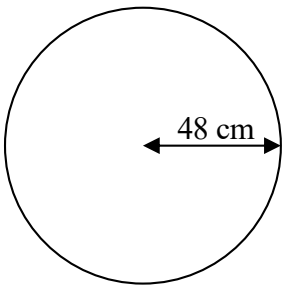
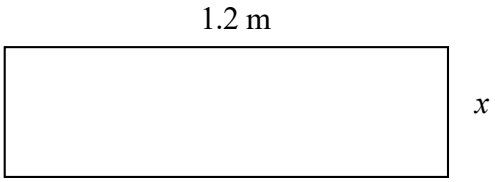
**3** Shown below are a circle and a rectangle.



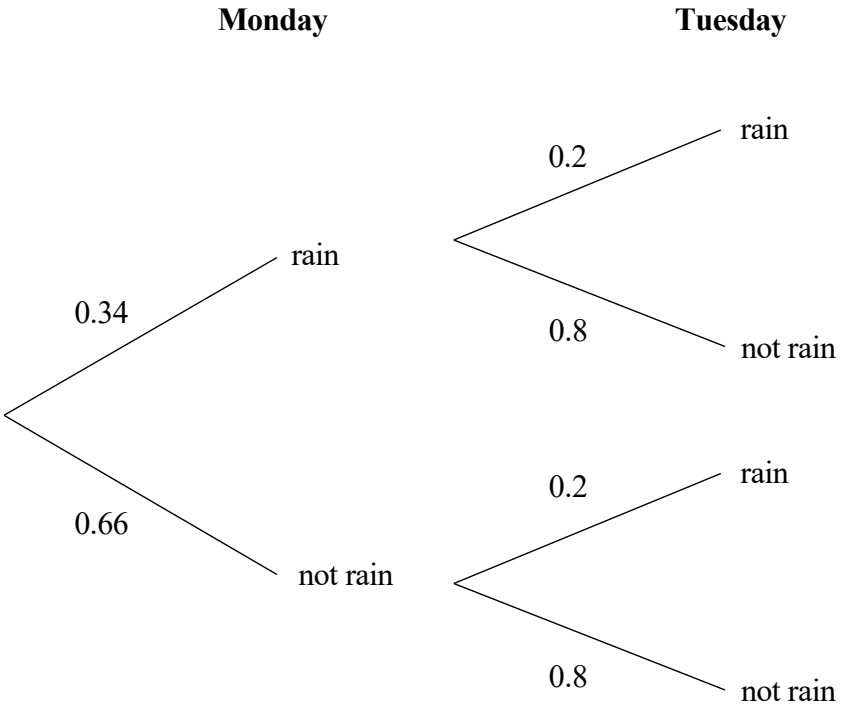




The circumference of the circle is equal to the perimeter of the rectangle.
Calculate the value of $x$.
Give your answer to 1 decimal place.

.....cm

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

**4** The probability tree diagram shows the probabilities that it will rain on Monday and Tuesday.

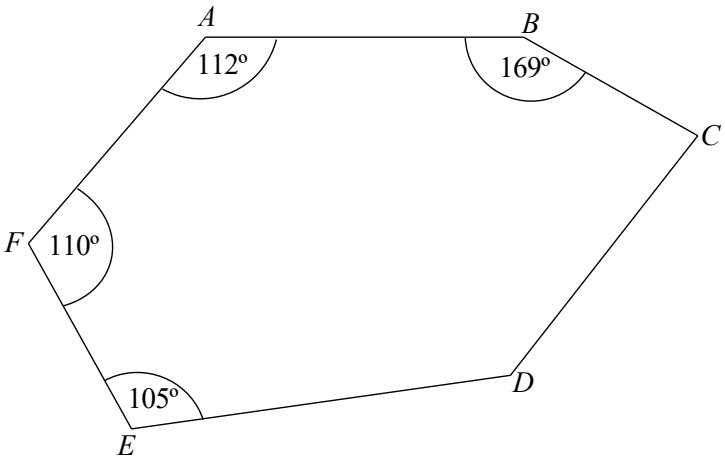




Calculate the probability that it will rain on at least one of these two days.

.....

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

**5** *ABCDEF* is a hexagon




VIDEO SOLUTIONS

Angle *CDE* is 3 × Angle *BCD*

Work out the size of angle *CDE*
You must show all your working.

°

.....

**(Total for Question 5 is 3 marks)**

**6** There are 12 pencils in a packet.

Caleb has 5 packets of pencils. He also has 6 extra pencils.

Write the number of pencils in one packet to the total number of pencils Caleb has.

Give your answer in the form 1 : *n*

.....

**(Total for Question 6 is 2 marks)**

**7** Hamish cooked 20 cakes. The total cost of making the cakes was £20.45

Hamish sold the 20 cakes for £3.50 each

Calculate the percentage profit Hamish made on the cakes

VIDEO SOLUTIONS

.....%

**(Total for Question 7 is 3 marks)**

**8** (a) Expand and simplify $5(3x + 2) - 2(x - 2)$

.....

**(2)**

(b) Simplify $(16a^6b^5)^{\frac{1}{2}}$

.....

**(2)**

(c) Factorise fully $10x^2y + 25xy^3$

.....

**(2)**

**(Total for Question 11 is 6 marks)**

**9** Make $x$ the subject of $\quad t = \dfrac{3(x+7)}{x-1}$

VIDEO SOLUTIONS

.....

**(Total for Question 9 is 3 marks)**

**10** Jack is going to choose a password for his mobile phone.
The password is made using four digits with each digit using a number from 0 – 9.
The first digit is a prime number.
The second digit is a square number.
The third digit is an even number.
The fourth digit is less than 7.

Work out the number of different four digit passwords that Jack could use.

.....

**(Total for Question 10 is 3 marks)**

**11**

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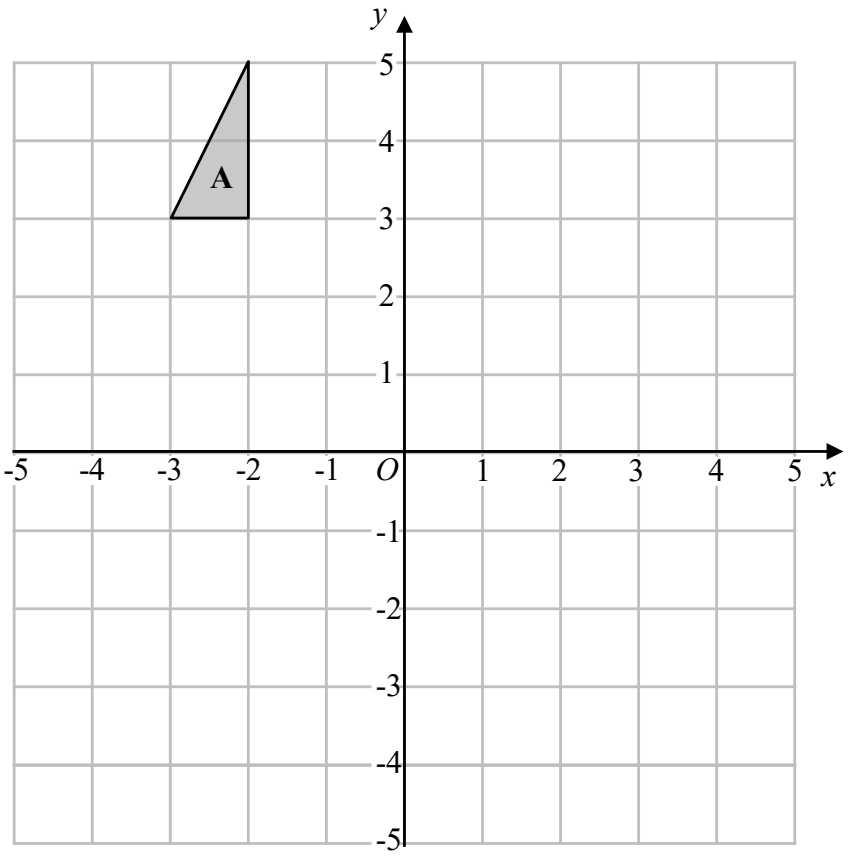



Enlarge Triangle A by scale factor –1.5 centre (–1, 2)

**(Total for Question 11 is 2 marks)**

**12** Given that $a : b = 4 : 3$ and $b : c = 4 : 5$

find the ratio $a : b : c$

Give your answer in its simplest form.

.....

**(Total for Question 12 is 3 marks)**

**13** Janet invests £3000 in a savings account.
The savings account pays compound interest at a rate of 2.14% for the first year.
It then pays $x$% interest for each following year.
After 4 years, Jean has £3204.17 in her savings account.

Work out the value of $x$.
Give your answer to 1 decimal place

VIDEO SOLUTIONS

.....

**(Total for Question 13 is 3 marks)**

**14** 10 $cm^3$ of liquid **A** is mixed with liquid **B** to make 150g of liquid **C**

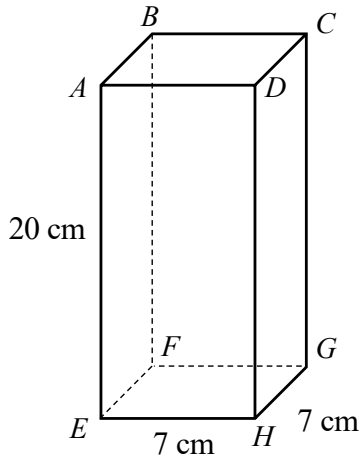
Liquid **A** has a density of 1.4 $g/cm^3$
Liquid **B** has a density of 1.1 $g/cm^3$

Find the density of liquid **C**.
Give your answer correct to 2 decimal places.

..... $g/cm^3$

**(Total for Question 14 is 3 marks)**

**15** *ABCDEFGH* is a cuboid




Calculate the angle that the line *EC* makes with the plane *EFGH*
Give your answer correct to 1 decimal place

o

.....

**(Total for Question 15 is 3 marks)**

**16** Here are the first terms of a sequence.

0 3 10 21 36

VIDEO SOLUTIONS

(a) Find an expression, in terms of $n$, for the $n$th term of this sequence.

.....

**(3)**

(b) Find the 25th term of this sequence.

.....

**(1)**

**(Total for Question 16 is 4 marks)**

**17** The line $\mathbf{L_1}$ has the equation $3y - 4x = 5$

The line $\mathbf{L_2}$ is perpendicular to line $\mathbf{L_1}$ and goes through the point (8, -2)

Find the equation of the line $\mathbf{L_2}$

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.....

**(Total for Question 17 is 3 marks)**

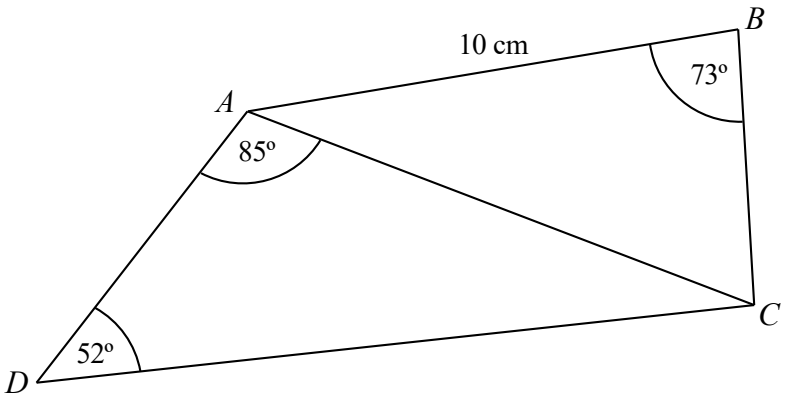
**17** Simplify fully $\dfrac{3x^2 - 17x + 10}{2x^2 - 50}$

.....

**(Total for Question 18 is 3 marks)**

**18**

VIDEO SOLUTIONS




The length of AB:BC is in the ratio 4:3

Calculate the length of AD
Give your answer to 3 significant figures

..... cm

**(Total for Question 18 is 5 marks)**

**19**

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$$t = \frac{a - 2b}{b^2}$$

$a$ = 42.1 correct to 1 decimal place
$b$ = 7.52 correct to 2 decimal places

By considering bounds, work out the value of $t$ to a suitable degree of accuracy.
Give a reason for your answer.

.....

**(Total for Question 19 is 5 marks)**

**20** The shape below is made up of a cone and hemisphere.

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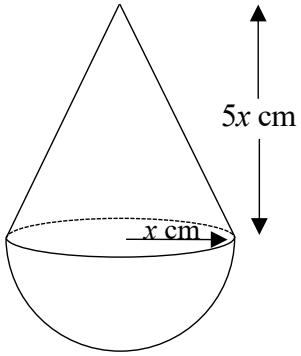
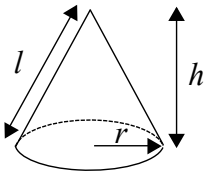
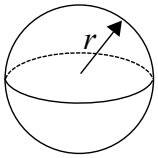



Volume of a cone $= \frac{1}{3}\pi r^2 h$




Volume of a Sphere $= \frac{4}{3}\pi r^3$




$x$ is the radius of the cone and the radius of the hemisphere.
The total volume of the shape is 540 $cm^3$

Calculate the value of $x$.
Give your answer to 3 significant figures.

..... cm

**(Total for Question 20 is 4 marks)**

**21** $f(x) = 3(x^2 - 5)$

$g(x) = 2x + 7$

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(a) Find $gf(-3)$

.....

**(2)**

(b) Solve $fg(x) = 9$

Give your answers correct to 3 significant figures.

.....

**(4)**

**(Total for Question 21 is 6 marks)**

**22**

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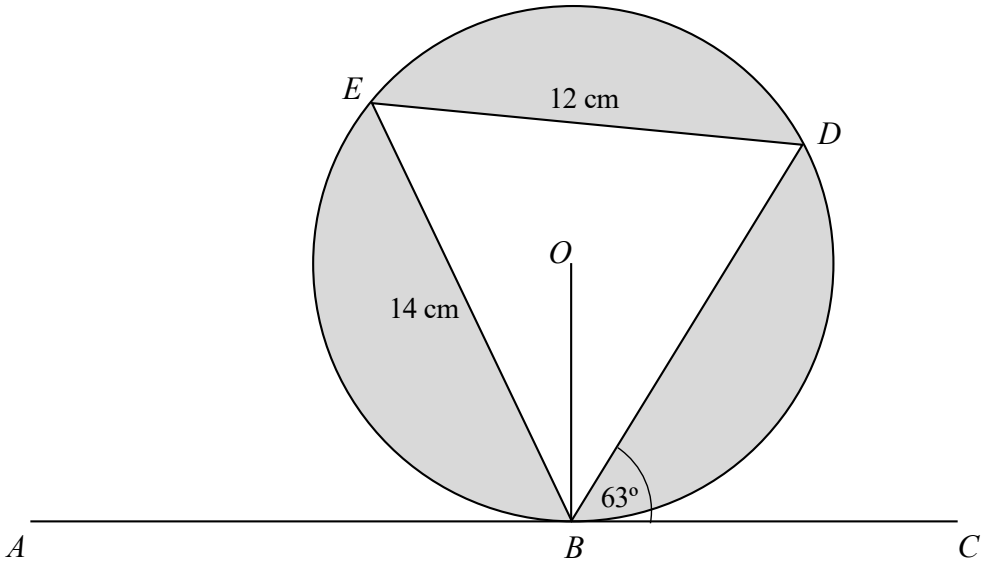


The points *B*, *E* and *D* lie on the circumference of a circle.
*OB* is the radius of the circle
*ABC* is a tangent to the circle at the point *B*.
*DE* = 12 cm
*BE* = 14 cm
Angle *DBC* = 63°

Calculate the shaded area of the circle
Give your answer to 3 significant figures

..... $cm^2$

**(Total for Question 22 is 5 marks)**

**TOTAL FOR PAPER IS 80 MARKS**