PREDICTED PAPER

Centre Number ☐☐☐☐☐   Candidate Number ☐☐☐☐

Surname _____

Forename(s) _____

Signature _____

GCSE
MATHEMATICS

Higher Tier   Paper 1 Non-Calculator

H

Friday 20 May 2022   Morning   Time allowed: 1 hour 30 minutes

Student Self Reflection

Topics I need to *revise*

Topics I need to *learn*

Silly Mistakes?

Target mark for next time

For teacher use	
Pages	Mark
2-3	
4-5	
6-7	
8-9	
10-11	
12-13	
14-15	
16-17	
18-19	
20-21	
22-23	
24	
TOTAL	

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

1 Circle the decimal that is closest in value to 3.019

Circle your answer.

[1 mark]

3.2   3.01   3.025   3.19

2 What is 1.4cl as a fraction of 80ml

Circle your answer.

[1 mark]

$\dfrac{7}{4}$ $\dfrac{7}{40}$ $\dfrac{4}{7}$ $\dfrac{40}{7}$

3 A transformation is performed on shape A giving the image B.

Shape A and the image B are **not** congruent.

What was the type of transformation?

Circle your answer.

[1 mark]

Rotation   Reflection   Translation   Enlargement

Video Solutions

4   Simplify $3b + 2b \times b - b^2$

Circle your answer.

[1 mark]

$4b^2$ $3b + b^2$ $5b^3 - b^2$ $6b^3 - b^2$

5   Dan can paint 4 fence panels every 2 hours.
Liz can paint 1 fence panel every 15 minutes.

A garden has 21 fence panels.

Working together, how long will it take Dan and Liz to paint the panels?

Give your answer in hours.

[3 marks]

Answer _____ hours

9

Turn over ▶

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6 (a) Work out $\left(\dfrac{2}{3}\right)^2 + \dfrac{1}{4}$

[3 marks]

Answer _____

6 (b) Write $2^{20} \div (2^3)^4$ as a single power of 2.

[2 marks]

Answer _____

6 (c) Write 0.0042 in standard form.

[1 mark]

Answer _____

6 (d) Work out $(4 \times 10^3) \times (3 \times 10^5)$ giving your answer in standard form.

[2 marks]

Answer _____

Video Solutions

7 Solve $\dfrac{x}{4} + 9 = 3$

[2 marks]

$x =$ _____

8 The cost of a calculator is £3.60

The cost of a pen is 80p

Write the cost of a calculator to the cost of a pen.

[2 marks]

Give your answer in simplest form.

Answer _____ : _____

12

Turn over ▶

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9   ABCDEF is a regular hexagon.

Using only ruler and compasses, show the region inside the hexagon that is
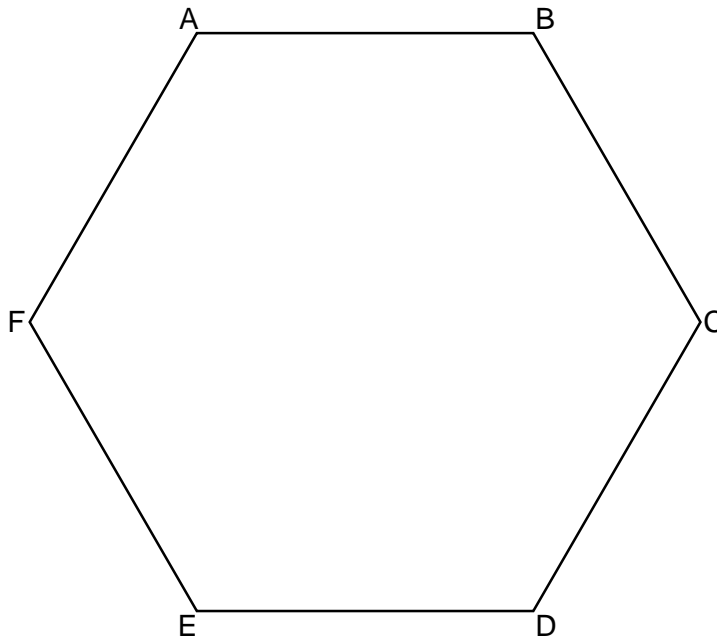
      less than 5.5 cm from E

      and

      closer to point C than point D

Label the region R.

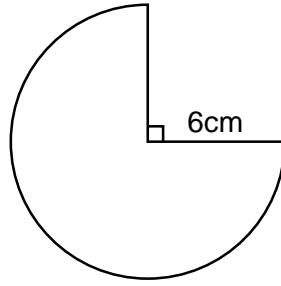Show all your construction lines.

[3 marks]

Video Solutions

10 The diagram shows a sector of a circle of radius 6cm.

6cm

Not drawn accurately

Calculate the area of the sector.

Give your answer in terms of π. **[3 marks]**
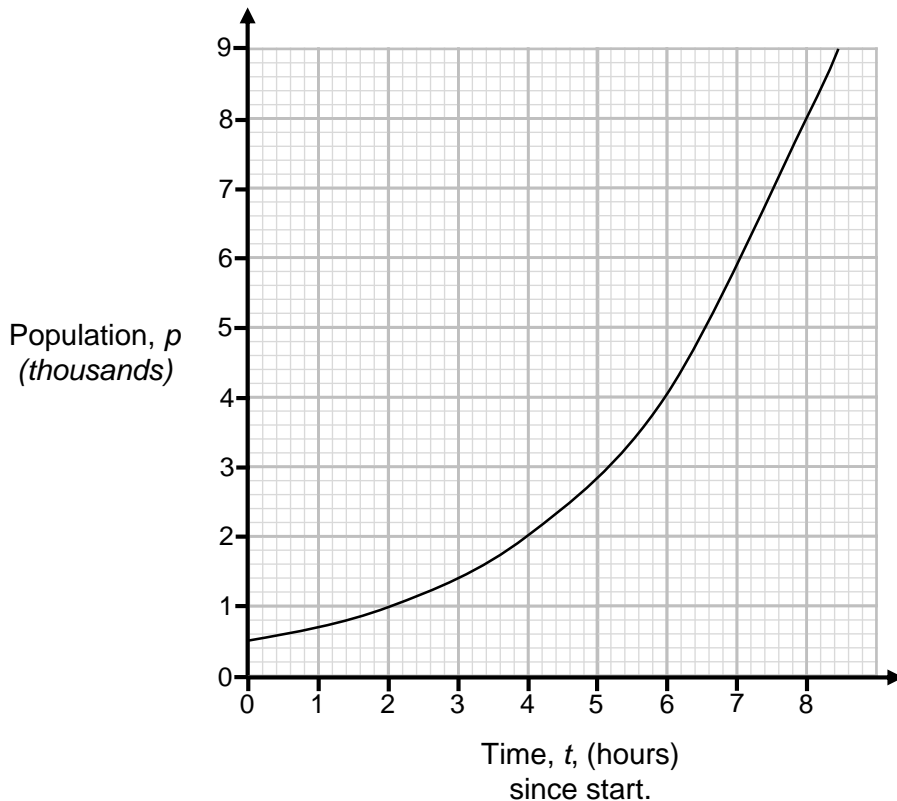
Answer ───────────────────────

6

Turn over ▶

Video Solutions

11 The population, p, of bacteria in a sample is recorded at different times.

t represents the number of hours since the timing started.

At the start the population was 500.

11 (a) Use your graph to calculate how many bacteria were in the sample after 5 hours.

[2 marks]

Answer _____

11 (b) What type of graph is shown above.

[1 mark]

Circle your answer.

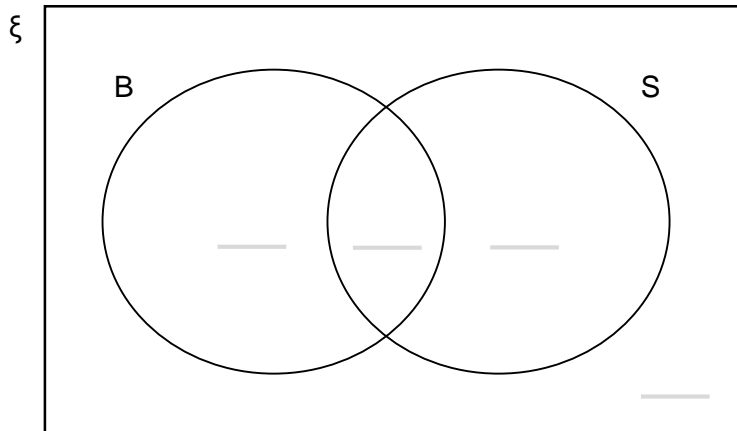Exponential   Reciprocal   Cubic   Quadratic

12   The Venn Diagram below show information about 200 students.

Each of the students was asked if they have any brothers or sisters.

$\frac{3}{8}$ of the students had brothers and sisters.

In total 105 students had sisters.

The number of students with brothers was 15 less than the number who had sisters.

Complete the Venn Diagram.

[4 marks]

7

Video Solutions

13 (a)   Factorise $x^2 - 36$ **[1 mark]**

Answer _____

13 (b)   Simplify fully

$$\frac{2x^2 - 19x + 42}{x^2 - 36}$$

[3 marks]

Answer _____

13 (c)   Here is an identity

$$6(ax + 4) + 10 \equiv 3x - 2b$$

Work out the values of a and b
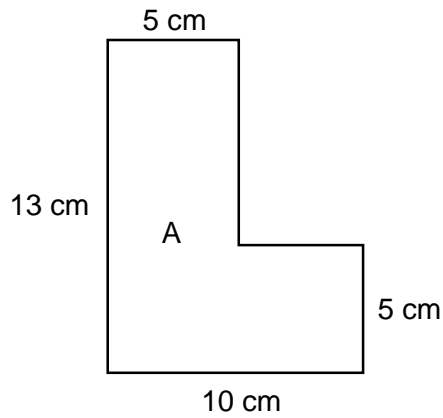
[3 marks]

$a =$ _____ $b =$ _____

14   Shape A below is the 2D cross-section of a prism.

The prism has length 5cm

Not drawn
accurately

5 cm

13 cm

A

5 cm

10 cm

14 (a)   Write down how many of the faces of the prism will be squares.

[1 mark]

Answer _____

14 (b)   Write down how many of the faces of the prism will **not** be squares.

[1 mark]

Answer _____

9

Turn over ▶

Video Solutions

15 a is increased by 10% to give b.

       b is then increased by 20% to give c.

       Write down a single decimal multiplier for the overall increase from a to c

[2 marks]

Answer _____

16   Which one of the following equations represents a straight line graph?

       Circle your answer.

[1 mark]

$$y = 2x^2 + 4 \qquad\qquad x + y = 3^2$$

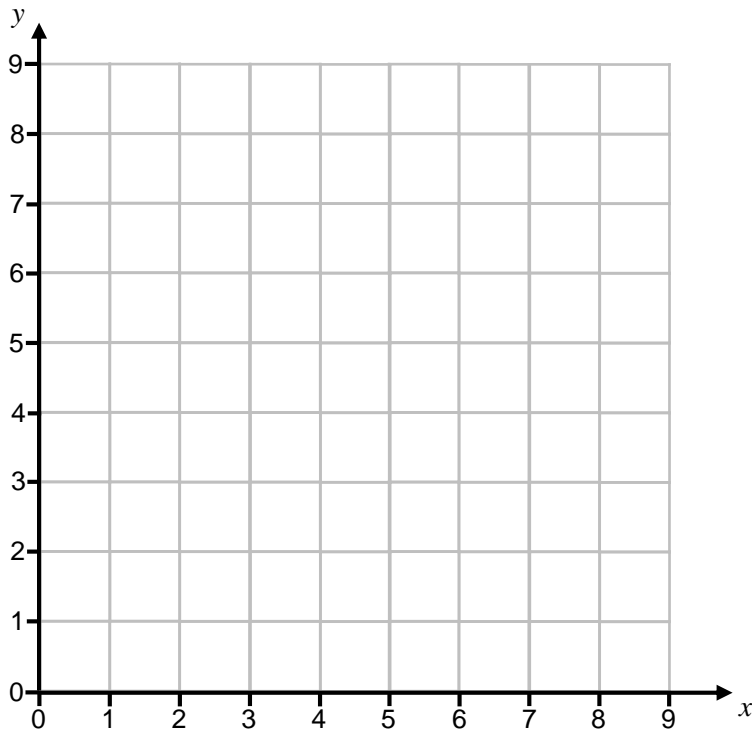$$y = \frac{1}{x - 2} \qquad\qquad y = 20 - \frac{1}{x}$$

   Video Solutions

17 On the grid, identify the region represented by

$x > 2$ $\qquad$ $y > 1$ $\qquad$ $x + y \leq 8$

Label the region R.

[3 marks]

Video Solutions

18   Convert $0.4\dot{7}$ to a fraction.

[3 marks]

_____

Answer _____

19   The first term of an arithmetic sequence is equal to $3a + b$

The fourth term of the sequence is equal to $15a - 5b$

Write an expression for the 5ᵗʰ term of the sequence.

[3 marks]

$3a + b$ …….   ……. $15a - 5b$

Answer _____

20 Rafa takes a journey in two parts shown in the diagram below.

[3 marks]

20 miles   40 miles

A   B   C

Not drawn accurately

The distance between A and B is 20 miles.

The distance between B and C is 40 miles.

Rafa travels at 30mph between A and B and then 50mph between B and C.

Calculate how long his journey from A to C took in minutes.

Answer _____

21 Rearrange $t = \dfrac{4}{a} + \sqrt{n}$ to make a the subject
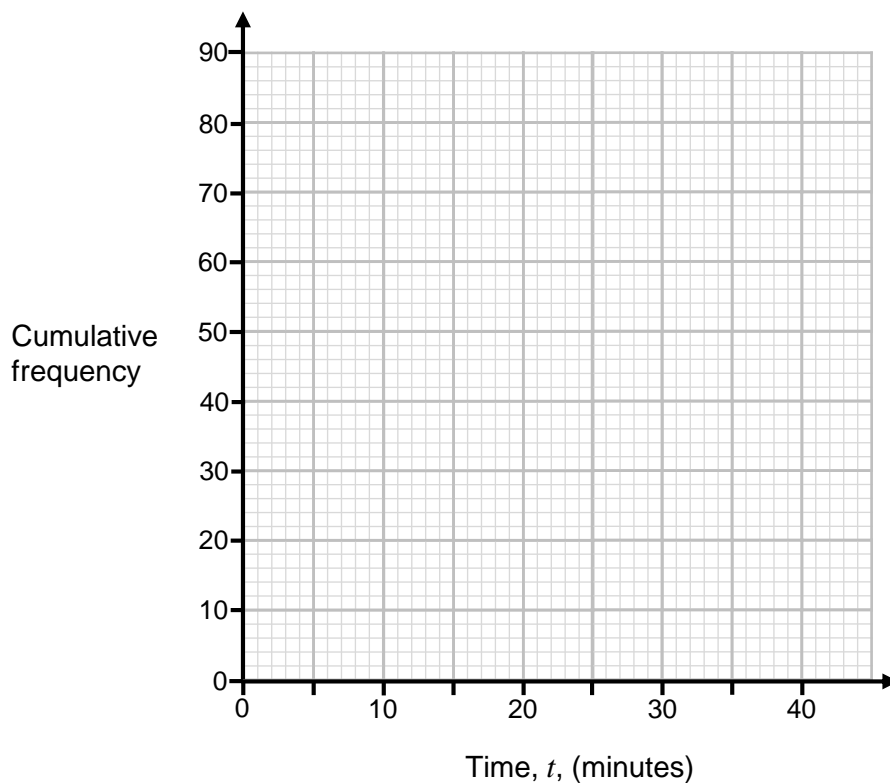
[3 marks]

Answer _____

Turn over ▶

Video Solutions

22 Here is some information about how long 80 people spent shopping.

Time, t, (minutes)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 20$	32
$20 < t \leq 30$	18
$30 < t \leq 40$	10

22 (a) Draw a cumulative frequency graph of the information.

[3 marks]

Cumulative frequency

Time, t, (minutes)

Video Solutions

22 (b) Those who shopped for less than 25 minutes spent an average of £5.00 each.

Calculate an estimate for the total amount of money spent by these shoppers.

[2 marks]

Answer _____

Turn over for next question

5

Turn over ▶

Video Solutions

Do not write outside the box

23 On her journey to work Helen passes through two sets of traffic lights.

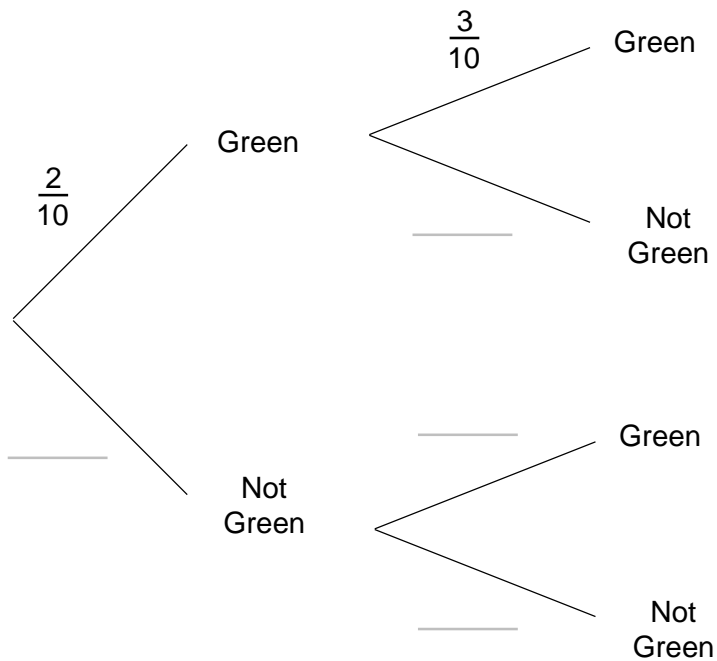The probability that the first set of traffic lights is green is $\frac{2}{10}$

The probability that the second set of traffic lights is green is $\frac{3}{10}$

23 (a) Complete the tree diagram

[2 marks]

First Traffic Lights   **Second Traffic Lights**

$\frac{2}{10}$ Green

$\frac{3}{10}$ Green

_____ Not Green

_____ Not Green

_____ Green

_____ Not Green

23 (b) Calculate the probability that **at least** one of the traffic lights is green on Helen's way to work.

[3 marks]

Answer _____

Turn over for next question

5

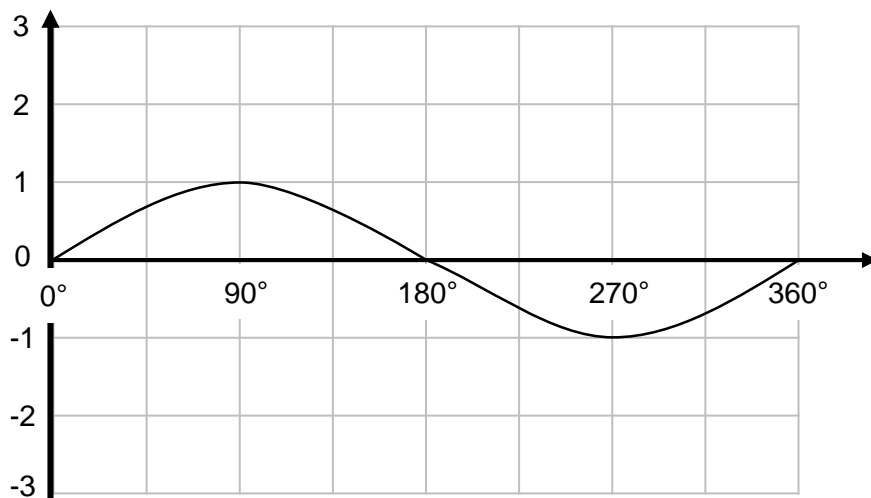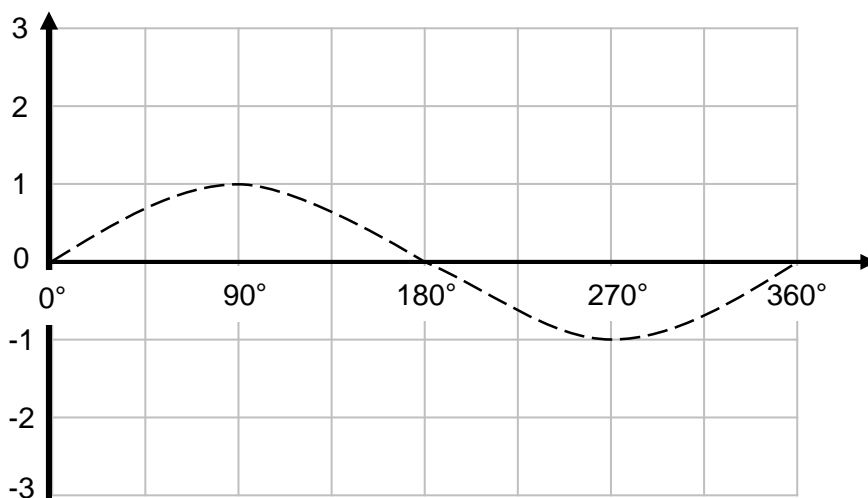**Turn over ▶**

Video Solutions

24   Here is the graph of $y = \sin x$ for $0° \leqslant x \leqslant 360°$

In parts (a) and (b) the graph of $y = \sin x$ is shown as a dashed line.

24 (a)   On the grid below sketch the graph of $y = \sin 2x$ for $0° \leqslant x \leqslant 360°$
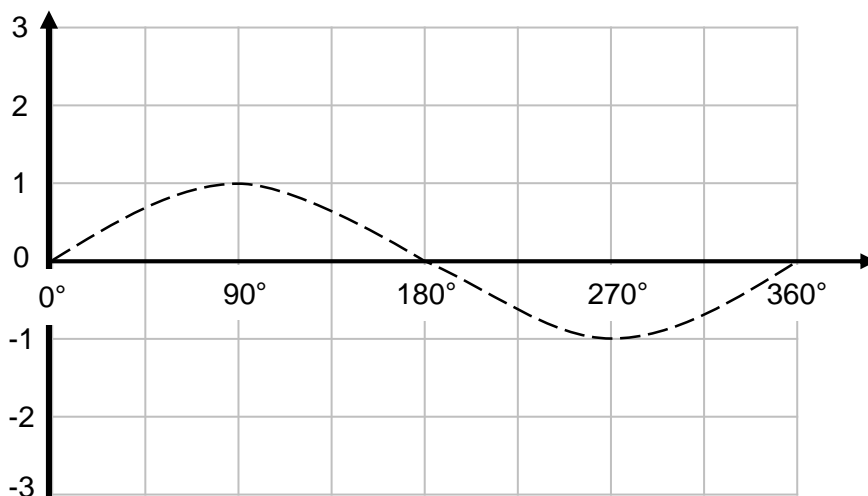
[1 mark]

Video Solutions

24 (b) On the grid below sketch the graph of $y = 2\sin x$ for $0° \leqslant x \leqslant 360°$

[1 mark]

Turn over for next question

2

Turn over ▶

Video Solutions

25 PQRS is a parallelogram.

$\overrightarrow{PS}$ = **a**

$\overrightarrow{PQ}$ = **b**

M is the midpoint of line *SR*

QY : YR = 2 : 3

X is in the line *PQ*
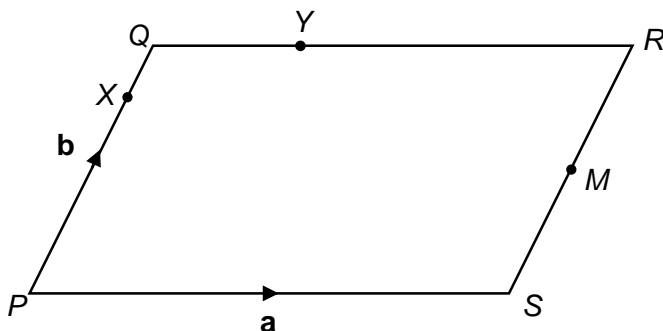
Not drawn
accurately

25 (a) Write down vector $\overrightarrow{PM}$ in terms of **a** and **b**

[1 mark]

Answer _____

Video Solutions

25 (b) Vectors $\overrightarrow{PM}$ and $\overrightarrow{XY}$ are parallel.

Work out the ratio $PX : XQ$

[4 marks]

$PX : XQ = $ _____ : _____

Video Solutions

26   Work out $9 \sin 60° - \dfrac{5}{\sqrt{3}}$

Give you answer in the form $\dfrac{a}{b}\sqrt{3}$ where a and b are integers

[4 marks]

Answer _____

END OF QUESTIONS

4