



**PREDICTED  
PAPER**



Video Solutions

Centre Number  Candidate Number

Surname \_\_\_\_\_

Forename(s) \_\_\_\_\_

Signature \_\_\_\_\_

# GCSE MATHEMATICS

# H

Higher Tier Paper 1 Non-Calculator

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	
<b>TOTAL</b>	

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

Do not write  
outside the  
box

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]

$\frac{7}{4}$

$\frac{7}{40}$

$\frac{4}{7}$

$\frac{40}{7}$

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

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

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

[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 \_\_\_\_\_

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

[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 \_\_\_\_\_ : \_\_\_\_\_

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

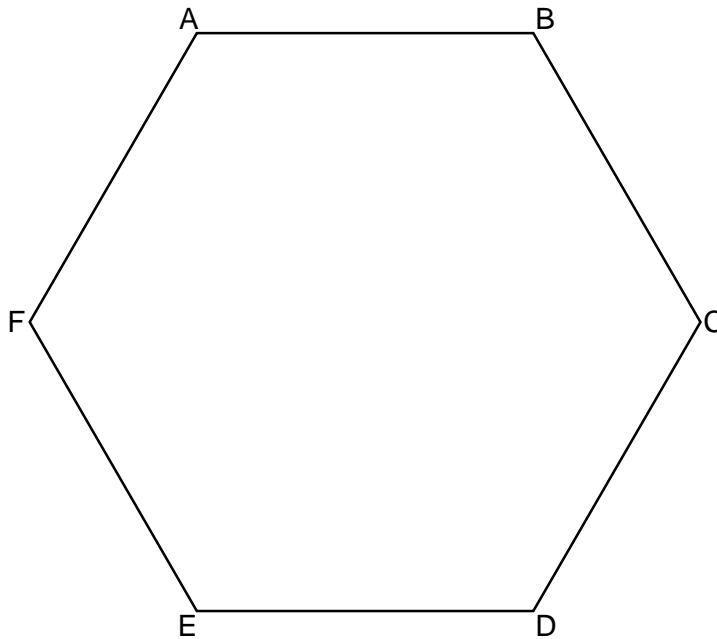
and

closer to point C than point D

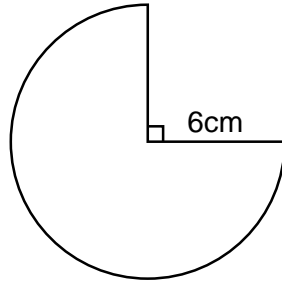
Label the region R.

Show all your construction lines.

[3 marks]



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



Not drawn  
accurately

Calculate the area of the sector.

Give your answer in terms of  $\pi$ .

**[3 marks]**

---

---

---

---

---

---

---

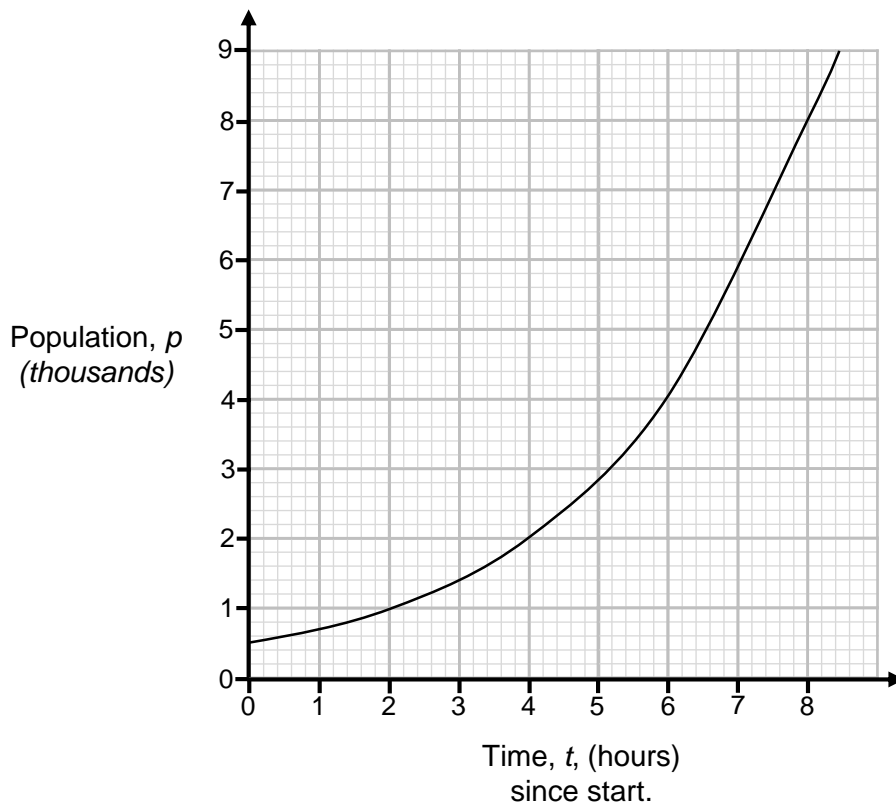
---

---

Answer \_\_\_\_\_

- 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



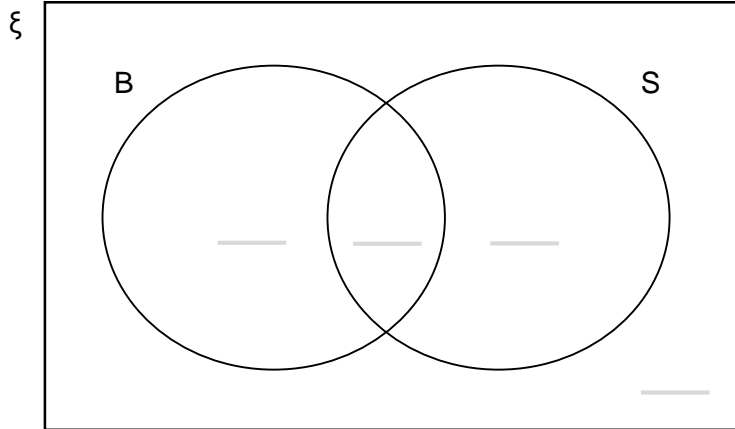
12 The Venn Diagram below show information about 200 students.

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]

---



---



---



---



---



---



---



---

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]

---

---

---

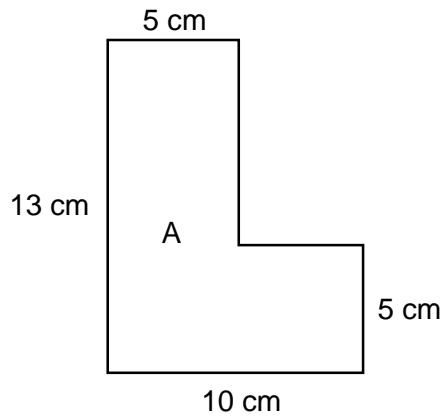
---

---

$a =$  \_\_\_\_\_  $b =$  \_\_\_\_\_

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

The prism has length 5cm



Not drawn  
accurately

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 \_\_\_\_\_

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]

$$y = 2x^2 + 4$$

$$x + y = 3^2$$

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

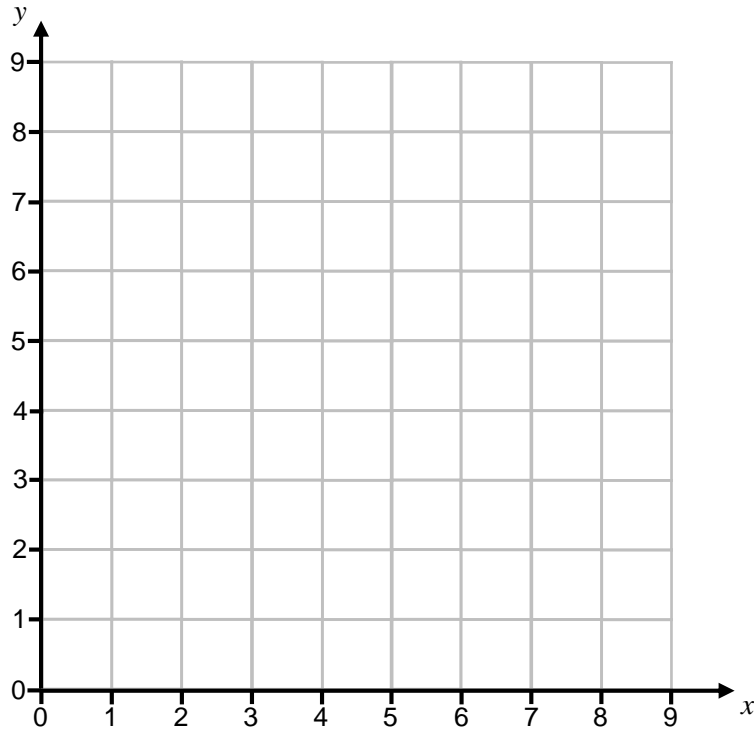
$$y = 20 - \frac{1}{x}$$

17 On the grid, identify the region represented by

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

Label the region R.

[3 marks]



6
---

Turn over ►

18 Convert  $0.\dot{4}7$  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 5<sup>th</sup> term of the sequence.

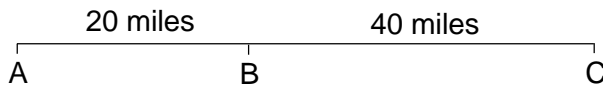
[3 marks]

$3a + b$       .....      .....       $15a - 5b$

Answer \_\_\_\_\_

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

[3 marks]

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  $t = \frac{4}{a} + \sqrt{n}$  to make  $a$  the subject

[3 marks]

---



---



---



---



---



---



---



---

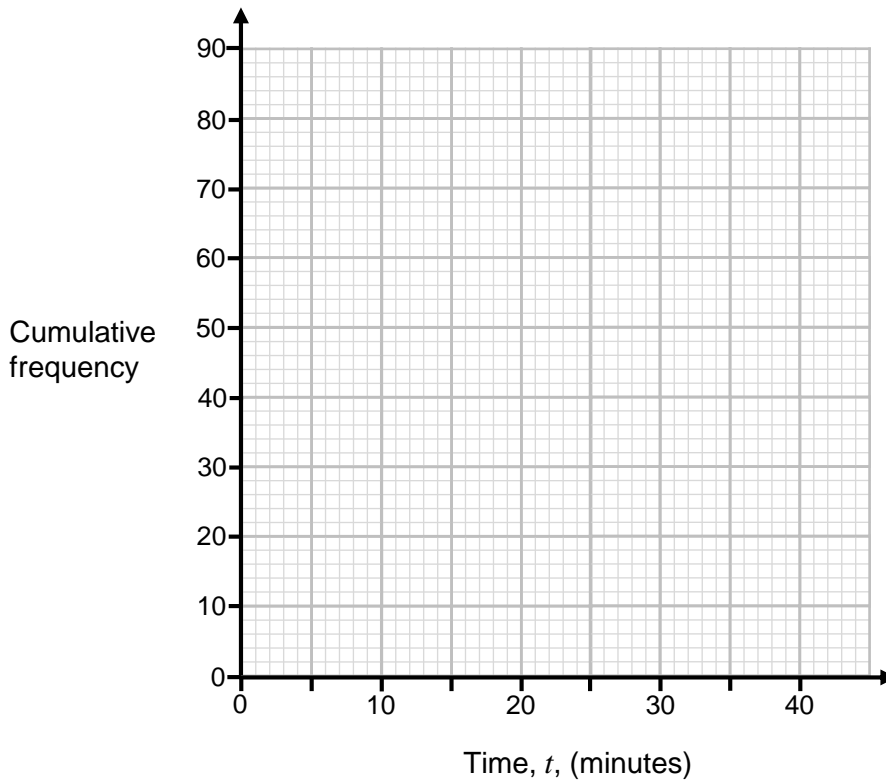
Answer \_\_\_\_\_

**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]**





**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**

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  $\frac{2}{10}$

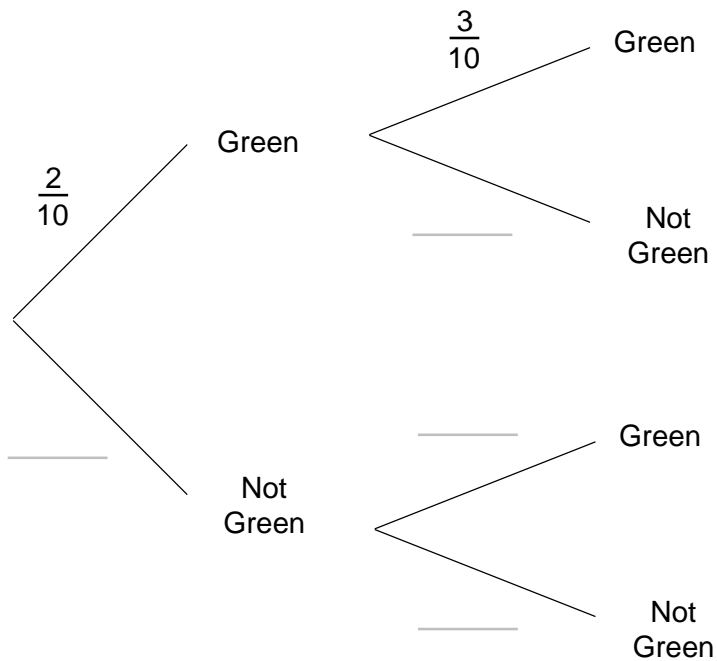
The probability that the second set of traffic lights is green is  $\frac{3}{10}$

23 (a) Complete the tree diagram

[2 marks]

First Traffic Lights

Second Traffic Lights



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

**[3 marks]**

---

---

---

---

---

---

---

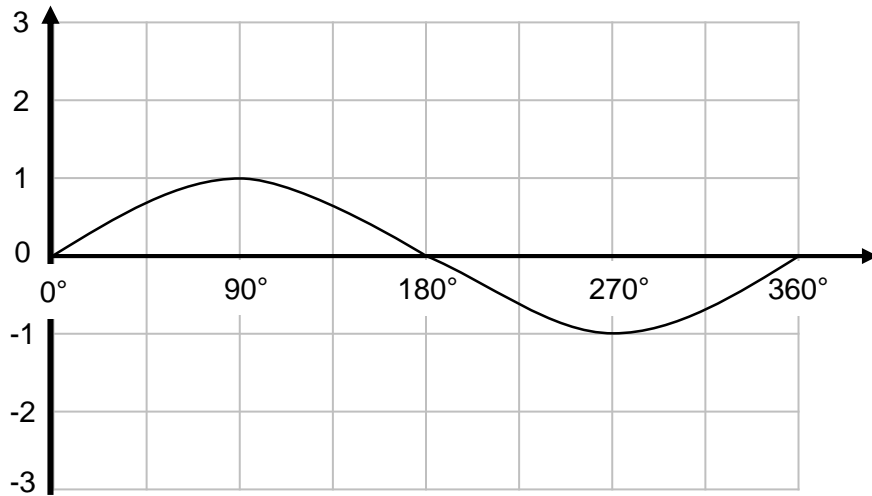
---

---

Answer \_\_\_\_\_

**Turn over for next question**

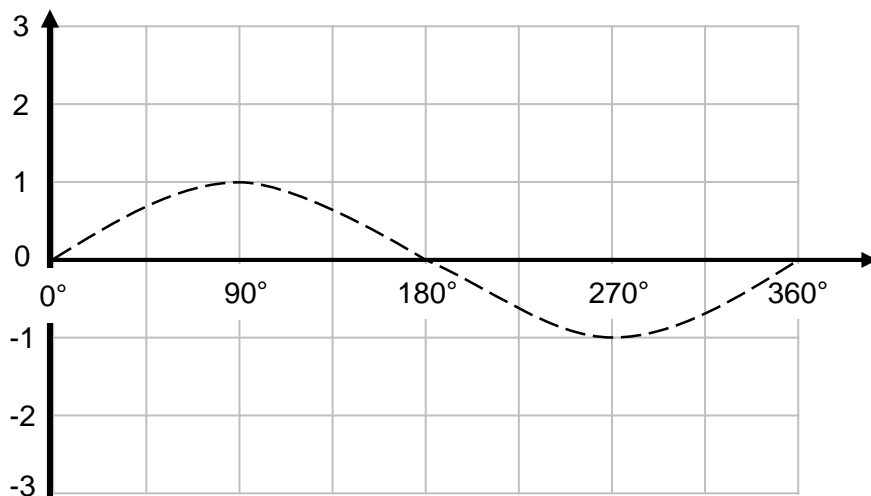
24 Here is the graph of  $y = \sin x$  for  $0^\circ \leq x \leq 360^\circ$



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

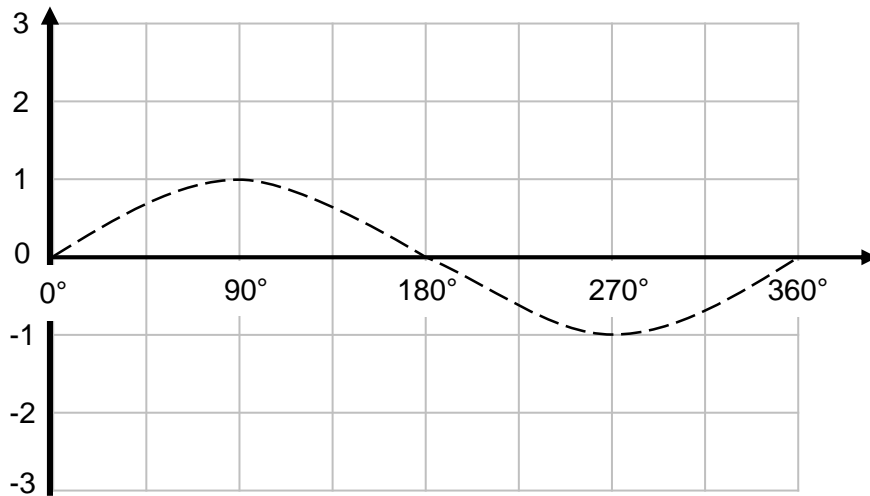
24 (a) On the grid below sketch the graph of  $y = \sin 2x$  for  $0^\circ \leq x \leq 360^\circ$

[1 mark]



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

[1 mark]



Turn over for next question

25 PQRS is a parallelogram.

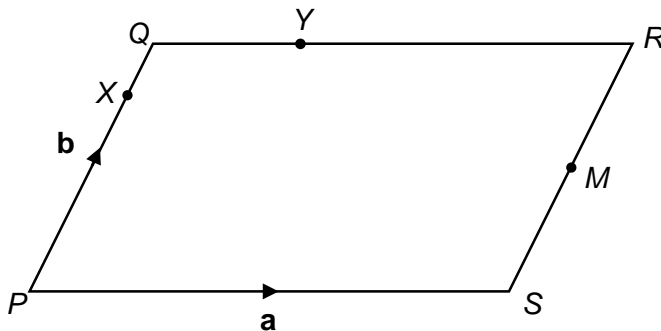
$$\vec{PS} = \mathbf{a}$$

$$\vec{PQ} = \mathbf{b}$$

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  $\vec{PM}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$

[1 mark]

Answer \_\_\_\_\_

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

Work out the ratio  $PX : XQ$

**[4 marks]**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

$PX : PQ = \underline{\hspace{2cm}} : \underline{\hspace{2cm}}$

26 Work out  $9 \sin 60^\circ - \frac{5}{\sqrt{3}}$

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

[4 marks]

---

---

---

---

---

---

---

---

---

---

Answer \_\_\_\_\_

**END OF QUESTIONS**