

Please check the examination details below before entering your candidate information.

Candidate surname		Other names	
Centre Number		Candidate Number	

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Friday 19 May 2023

Morning (Time: 1 hour 30 minutes) **Paper reference 1MA1/1H**

Mathematics
PAPER 1 (Non-Calculator)
Higher Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, Formulae Sheet (enclosed). Tracing paper may be used.

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 not be used.**

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

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Turn over ►



Answer **ALL** questions.
Write your answers in the spaces provided.
You must write down all the stages in your working.

1 Work out $8.46 \div 0.15$

$$= 846 \div 15$$

$$\begin{array}{r} 56.4 \\ 15 \overline{) 846.0} \\ \underline{15} \\ 45 \\ \underline{45} \\ 60 \\ \underline{60} \\ 0 \end{array}$$

(Total for Question 1 is 3 marks)

2 Work out $7\frac{3}{8} - 2\frac{1}{2}$

Give your answer as a mixed number.

$$\begin{array}{r} 59 \\ \underline{8} \end{array} - \begin{array}{r} 5 \\ \underline{2} \end{array}$$

$$= \frac{59}{8} - \frac{20}{8} = \frac{39}{8} = 4\frac{7}{8}$$

(Total for Question 2 is 3 marks)



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- 3 A cube has a total surface area of 150 cm^2

Work out the volume of the cube.

$$150 \div 6 = 25$$

$$\sqrt{25} = 5 \text{ cm}$$

$$5^3$$

$$= 125$$

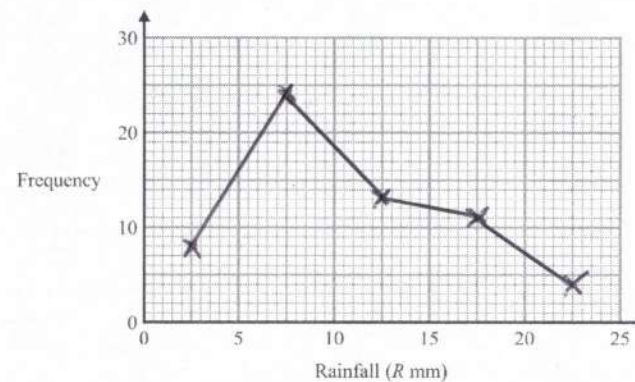
cm^3

(Total for Question 3 is 4 marks)

- 4 The table shows information about the daily rainfall in a town for 60 days.

Rainfall (R mm)	Frequency
$0 \leq R < 5$	8
$5 \leq R < 10$	24
$10 \leq R < 15$	13
$15 \leq R < 20$	11
$20 \leq R < 25$	4

Draw a frequency polygon for this information.



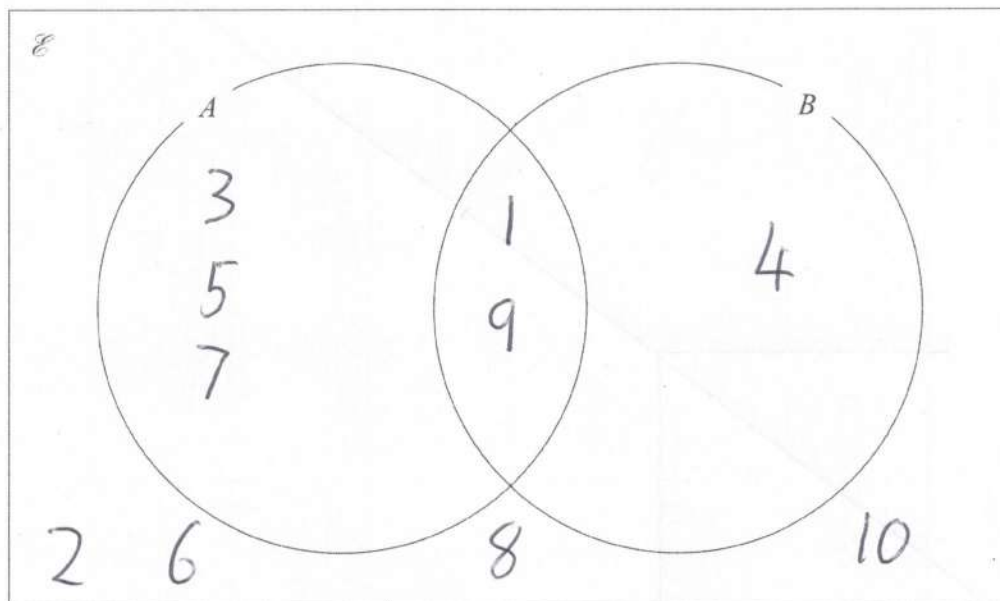
(Total for Question 4 is 2 marks)

5 $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{\text{odd numbers}\}$

$B = \{\text{square numbers}\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set $\mathcal{E}$

(b) Find the probability that this number is in the set B'

$$\frac{7}{10}$$

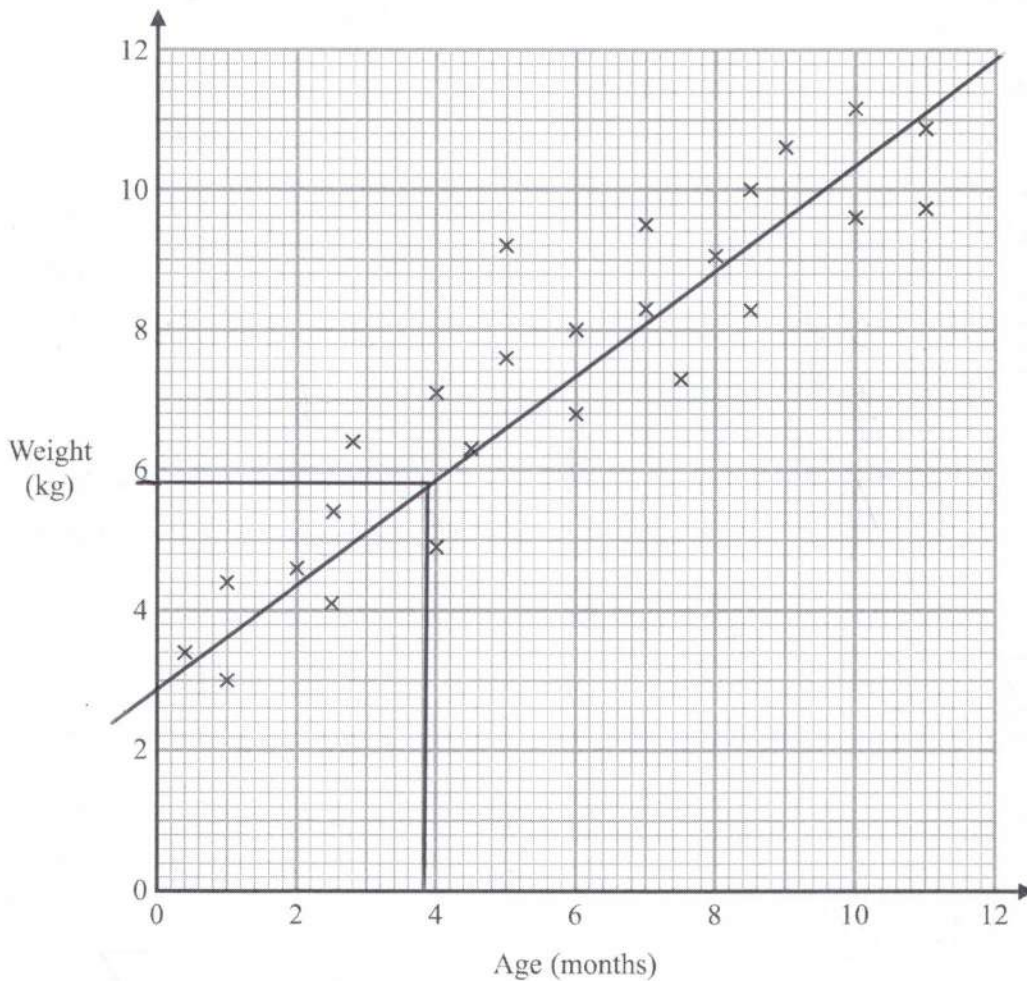
(2)

(Total for Question 5 is 5 marks)



P 7 5 1 4 8 A 0 5 2 4

- 6 The scatter graph shows information about the ages and weights of some babies.



- (a) Describe the relationship between the age and the weight of the babies.

As age increases, weight increases

(1)

Another baby has a weight of 5.8 kg

- (b) Using the scatter graph, find an estimate for the age of this baby.

3.9

months

(2)

(ms 2.5 → 4.5)

(Total for Question 6 is 3 marks)

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- 7 The price of a holiday increases by 20% $\xrightarrow{\times 5}$
This 20% increase adds £240 to the price of the holiday.

Work out the price of the holiday before the increase. $= 100\%$

$$\begin{array}{r} 240 \\ \times 5 \\ \hline 1200 \end{array}$$

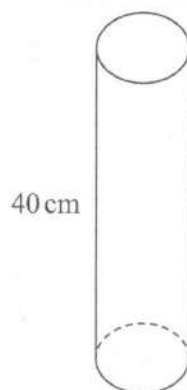
£ 1200

(Total for Question 7 is 2 marks)



P 7 5 1 4 8 A 0 7 2 4

- 8 The diagram shows a solid cylinder on a horizontal floor.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The cylinder has a
volume of 1200 cm^3
height of 40 cm .

$$A = \frac{V}{H} = \frac{1200}{40} = 30$$

The cylinder exerts a force of 90 newtons on the floor.

Work out the pressure on the floor due to the cylinder.

$$p = \frac{90}{30}$$

3

newtons/cm²

(Total for Question 8 is 3 marks)

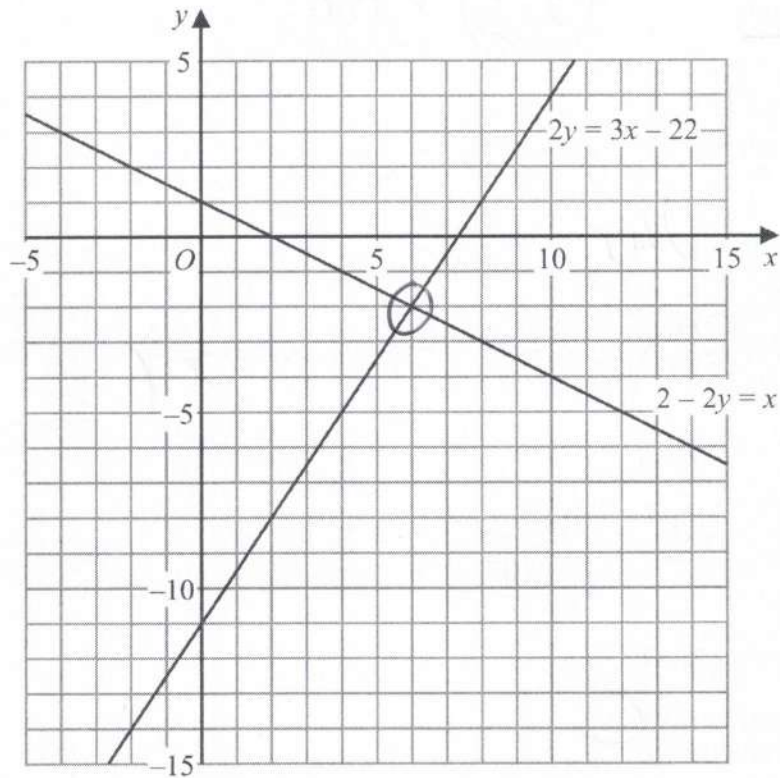


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9



Use these graphs to solve the simultaneous equations

$$\begin{aligned}2 - 2y &= x \\ 2y &= 3x - 22\end{aligned}$$

$$\begin{aligned}x &= 6 \\ y &= -2\end{aligned}$$

(Total for Question 9 is 1 mark)

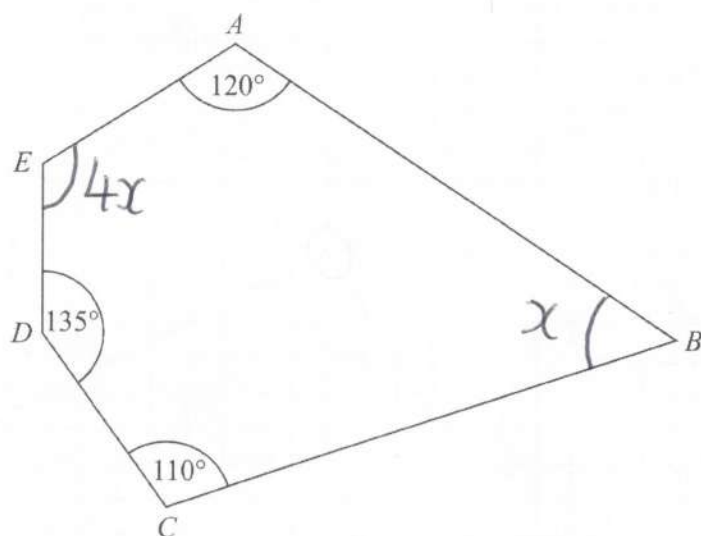


P 7 5 1 4 8 A 0 9 2 4

9

Turn over ►

10 Here is a pentagon.



Angle $AED = 4 \times \text{angle } ABC$

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

$$(5-2) \times 180 = 540$$

$$5x + 365 = 540$$

$$5x = 175$$

$$x = \frac{175}{5} = 35$$

$$AED = 35 \times 4 = 140$$

(Total for Question 10 is 4 marks)



- 11 Write $\frac{(6x^5y^3)^2}{3x^2y^7 \times 4xy^{-3}}$ in the form ax^by^c where a , b and c are integers.

$$= \frac{36x^{10}y^6}{12x^3y^4}$$

$$= 3x^7y^2$$

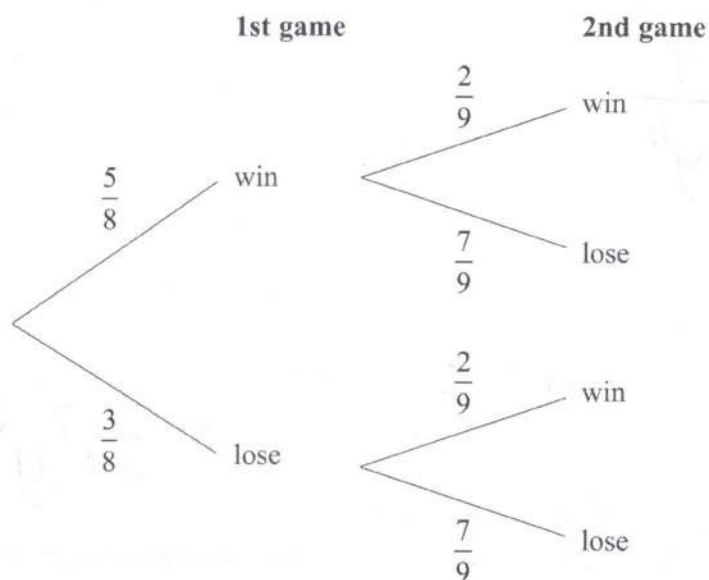
(Total for Question 11 is 3 marks)



P 7 5 1 4 8 A 0 1 1 2 4

12 Martha plays a game twice.

The probability tree diagram shows the probabilities that Martha will win or lose each game.



Find the probability that Martha will lose at least one game.

$$= 1 - \text{wins both}$$

$$= 1 - \frac{5}{8} \times \frac{2}{9}$$

$$= 1 - \frac{10}{72}$$

$$= \frac{62}{72}$$

(Total for Question 12 is 3 marks)

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13 y is directly proportional to x .

$y = 24$ when $x = 1.5$

Work out the value of y when $x = 5$

$$y = kx$$

$$24 = k \times 1.5$$

$$k = 16$$

$$y = 16x$$

$$y = 16 \times 5$$

$$y = 80$$

(Total for Question 13 is 3 marks)

14 (a) Write $\frac{1}{16}$ in the form 4^n where n is an integer.

$$4^{-2}$$

(1)

(b) Work out the value of $8^{\frac{5}{3}} - 9^{\frac{3}{2}}$

$$\sqrt[3]{8^5} - \sqrt{9^3}$$

$$= 2^5 - 27$$

$$= 32 - 27$$

$$5$$

(3)

(Total for Question 14 is 4 marks)



P 7 5 1 4 8 A 0 1 3 2 4

- 15 The equation of line L_1 is $y = 2x - 5$
The equation of line L_2 is $6y + kx - 12 = 0$

L_1 is perpendicular to L_2

Find the value of k .

You must show all your working.

$$(L_1) \quad m = 2$$

$$(L_2) \quad 6y = -kx + 12$$
$$y = -\frac{kx}{6} + 2$$

$$\therefore \text{hence} \quad -\frac{1}{2} = -\frac{k}{6}$$
$$-3 = -k$$

$$k = 3$$

(Total for Question 15 is 3 marks)

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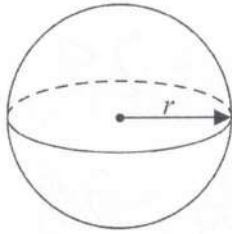


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16 Here is a sphere.



Surface area of sphere = $4\pi r^2$

$\frac{3}{8}$ of the surface area of this sphere is $75\pi\text{cm}^2$

$$\text{so } \frac{1}{8} = 25\pi$$

Find the diameter of the sphere.

Give your answer in the form $a\sqrt{b}$ where a is an integer and b is a prime number.

$$SA = \frac{8}{8} = 200\pi = 4\pi r^2$$

$$r^2 = 50$$

$$r = \sqrt{50} = \sqrt{25} \sqrt{2}$$

$$5\sqrt{2}$$

cm

(Total for Question 16 is 4 marks)



P 7 5 1 4 8 A 0 1 5 2 4

17 Make x the subject of the formula $y = \frac{4(2x-7)}{5x+3}$

$$5xy + 3y = 8x - 28$$

$$5xy - 8x = -3y - 28$$

$$x(5y - 8) = -3y - 28$$

$$x = \frac{-3y - 28}{5y - 8}$$

(Total for Question 17 is 4 marks)

18 7kg of carrots and 5 kg of tomatoes cost a total of 480p

cost of 1 kg of carrots : cost of 1 kg of tomatoes = 5 : 9

Work out the cost of 1 kg of carrots and the cost of 1 kg of tomatoes.

$$7c + 5t = 480 \text{ and } 5t = 9c$$

$$7c + 9c = 480$$

$$16c = 480$$

$$c = 30$$

$$5t = 270$$

$$t = 54$$

carrots	30	p
tomatoes	54	p

(Total for Question 18 is 4 marks)

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- 19 The menu in a restaurant has starters, main courses and desserts.

There are 5 starters.

There are 12 main courses.

There are x desserts.

There are 420 different ways to choose one starter, one main course and one dessert.

Work out the value of x .

$$5 \times 12 \times x = 420$$

$$x = 420 \div 60$$

$x =$ 7

(Total for Question 19 is 2 marks)



P 7 5 1 4 8 A 0 1 7 2 4

20 For $x \geq 0$, the functions f and g are such that

$$f(x) = 3x + 4$$

$$g(x) = \frac{\sqrt{x} + 2}{5}$$

(a) Find $g^{-1}(x)$

$$y = \frac{\sqrt{x} + 2}{5}$$

$$5y - 2 = \sqrt{x}$$

$$(5y - 2)^2 = x$$

$$g^{-1}(x) = \frac{(5x - 2)^2}{25} \quad (2)$$

(b) Solve $gf(x) = 3$

$$gf(x) = g(3x + 4) = \frac{\sqrt{3x + 4} + 2}{5} = 3$$

$$\sqrt{3x + 4} + 2 = 15$$

$$\sqrt{3x + 4} = 13$$

$$3x + 4 = 169$$

$$3x = 165$$

$$x = 55 \quad (3)$$

(Total for Question 20 is 5 marks)

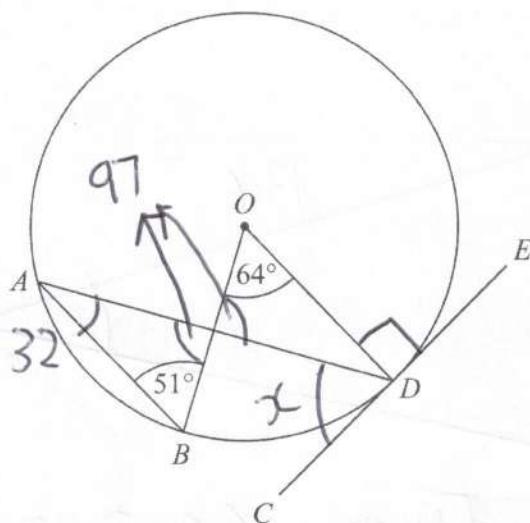
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- 21 A, B and D are points on a circle with centre O .
 CDE is the tangent to the circle at D .



Work out the size of angle ADC .

Write down any circle theorems you use.

$$\angle BAD = 32 \quad (\text{angle at centre is twice the angle on the circumference})$$

$$\angle ODE = 90 \quad (\text{tangent meets radius at a right angle})$$

$$\begin{aligned} \angle ADO &= 180 - 64 - 97 \\ &= 19 \end{aligned}$$

$$\angle ADC = 180 - 90 - 19$$

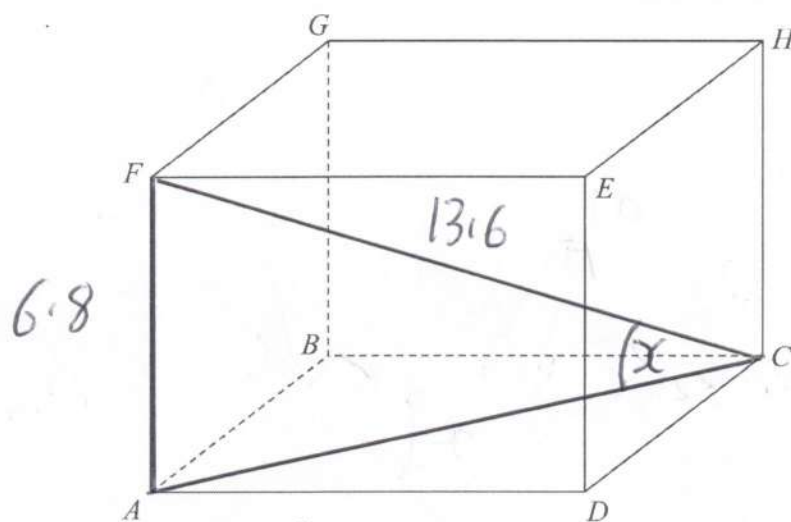
71

(Total for Question 21 is 4 marks)



P 7 5 1 4 8 A 0 1 9 2 4

22 $ABCDEFGH$ is a cuboid.



$AF = 6.8 \text{ cm}$
 $FC = 13.6 \text{ cm}$

[NOTE: $6.8 \times 2 = 13.6$]

Work out the size of the angle between FC and the plane $ABCD$.

$$\begin{aligned} \textcircled{5} \quad x &= \sin^{-1}\left(\frac{6.8}{13.6}\right) \\ &= \sin^{-1}\left(\frac{1}{2}\right) \end{aligned}$$

30

(Total for Question 22 is 2 marks)

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23 Write $\frac{3\sqrt{3}}{4-\sqrt{3}} - \frac{2}{\sqrt{3}}$ in the form $\frac{a\sqrt{3}+b}{c}$ where a, b and c are integers.

$$\frac{3\sqrt{3}}{4-\sqrt{3}} \times \frac{4+\sqrt{3}}{4+\sqrt{3}} - \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{12\sqrt{3} + 9}{16 - 3} - \frac{2\sqrt{3}}{3}$$

$$\frac{36\sqrt{3} + 27}{39} - \frac{26\sqrt{3}}{39}$$

$$= \frac{10\sqrt{3} + 27}{39}$$

(Total for Question 23 is 4 marks)



24 Find the set of possible values of x for which

$$4x^2 - 25 < 0 \quad \text{and} \quad 12 - 5x - 3x^2 > 0$$

You must show all your working.

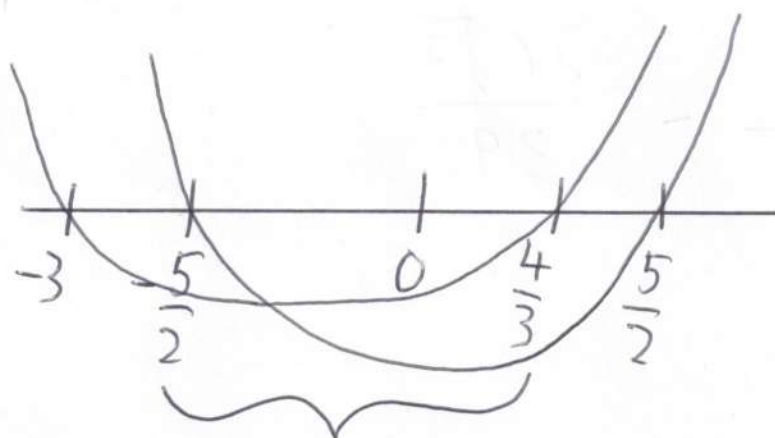
$$(2x-5)(2x+5) < 0$$

$$CV = -\frac{5}{2}$$

$$3x^2 + 5x - 12 < 0$$

$$(3x-4)(x+3) < 0$$

$$CV = -3, \frac{4}{3}$$



choose
narrowest

$$-\frac{5}{2} < x < \frac{4}{3}$$

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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