Please check the examination details below before entering your candidate information

Candidate surname: Solved by Mr. Pabitra | Other names:

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Wednesday 5 November 2025

Morning (Time: 2 hours)

Paper reference **4MA1/1H**

Mathematics A

PAPER 1H

Higher Tier



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- 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.
- Check your answers if you have time at the end.

Solved by Mr. Pabitra | Math Tonic

Turn over ▶

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M:1/1/1/1/

P 7 9 7 8 5 A 0 1 2 8

Pearson

International GCSE Mathematics

Formulae sheet – Higher Tier

Arithmetic series

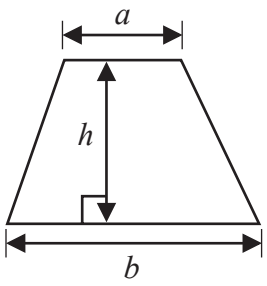
Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

The quadratic equation

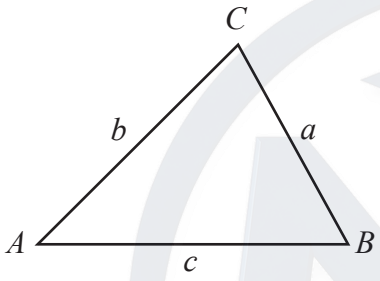
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Area of trapezium $= \frac{1}{2}(a+b)h$



Trigonometry



In any triangle ABC

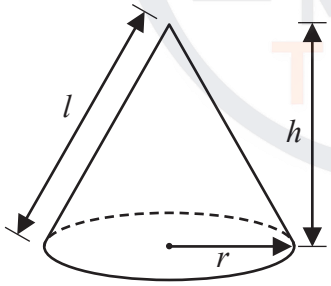
Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$

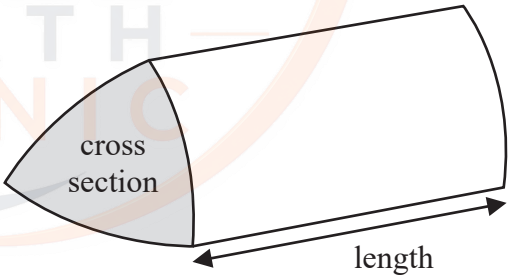
Area of triangle $= \frac{1}{2}ab\sin C$

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

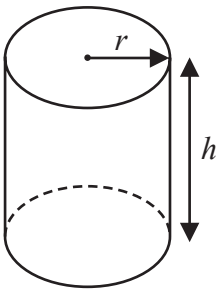
Curved surface area of cone $= \pi rl$



Volume of prism
= area of cross section × length

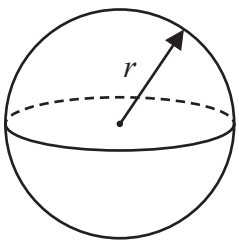


Volume of cylinder $= \pi r^2 h$
Curved surface area of cylinder $= 2\pi rh$



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

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



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Answer ALL TWENTY EIGHT questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table gives information about the number of kilometres that Ted cycled on each of the 30 days in April.

Number of kilometres (K)	Frequency
$0 \leqslant K < 5$	8
$5 \leqslant K < 10$	7
$10 \leqslant K < 15$	3
$15 \leqslant K < 20$	10
$20 \leqslant K < 25$	2

Midpoint | f × midpoint

2.5 | 2.5 × 8 = 20

7.5 | 7.5 × 7 = 52.5

12.5 | 12.5 × 3 = 37.5

17.5 | 17.5 × 10 = 175

22.5 | 22.5 × 2 = 45

Total = 330

Calculate an estimate for the mean number of kilometres that Ted cycled on each day in April.

Use the midpoint of each class (see the table)

Total of f × midpoint = 20 + 52.5 + 37.5 + 175 + 45 = 330

Total frequency = 30 days

$$\text{Mean} = \frac{\text{total of f} \times \text{midpoint}}{\text{total frequency}} = \frac{330}{30} = 11 \text{ km}$$

11 ..... kilometres

(Total for Question 1 is 4 marks)

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2 By rounding each number to one significant figure, work out an estimate for the value of

$$\frac{2.11^2 \times 58.9}{\sqrt{8.859}}$$

Show your working clearly.

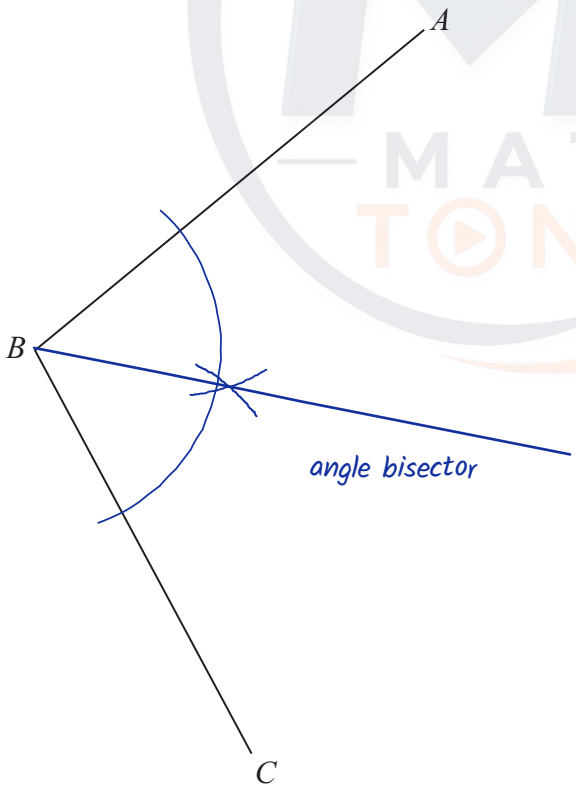
Round to 1 s.f.: $2.11 \approx 2$, $58.9 \approx 60$, $8.859 \approx 9$

$\frac{2^2 \times 60}{\sqrt{9}} = \frac{4 \times 60}{3} = \frac{240}{3} = 80$

80

(Total for Question 2 is 2 marks)

3 Using ruler and compasses only, construct the bisector of angle ABC
Show all your construction lines.



(Total for Question 3 is 2 marks)

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Solved by Mr. Pabitra

4 e, f and g represent integers such that

e f 7 g 12 17

is a list of integers written in order of size.

The integers have

a range of 15
a median of 8.5
a mean of 9

Work out the value of e, the value of f and the value of g

Range = 15: $17 - e = 15$, so $e = 2$

Median of 6 numbers = middle of 7 and g: $(7 + g) \div 2 = 8.5$, so $g = 10$

Mean = 9: total $= 6 \times 9 = 54$

$2 + f + 7 + 10 + 12 + 17 = 54$, $48 + f = 54$, so $f = 6$

$e =$ 2

$f =$ 6

$g =$ 10

(Total for Question 4 is 3 marks)

5 Show that $3\frac{5}{7} + 1\frac{2}{3} = 5\frac{8}{21}$

$3\frac{5}{7} + 1\frac{2}{3} = \frac{26}{7} + \frac{5}{3}$

$= \frac{26 \times 3}{7 \times 3} + \frac{5 \times 7}{3 \times 7} = \frac{78}{21} + \frac{35}{21}$

$= \frac{113}{21} = \frac{105}{21} + \frac{8}{21}$

$= 5\frac{8}{21}$ as required

(Total for Question 5 is 3 marks)

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Solved by Mr. Pabitra

6 Eli and Peta share \$275 in the ratio 2 : 3

Eli gives $\frac{3}{11}$ of his share to charity.

Peta gives 0.32 of her share to charity.

Work out the total amount that Eli and Peta give to charity.

275 ÷ (2 + 3) = 55

Eli gets 2 × 55 = \$110, Peta gets 3 × 55 = \$165

Eli gives $\frac{3}{11}$ × 110 = \$30

Peta gives 0.32 × 165 = \$52.80

Total = 30 + 52.80 = \$82.80

\$ 82.80

(Total for Question 6 is 4 marks)

7 The weight of a bag of apples is 475 g correct to the nearest g

(a) Write down the lower bound of the weight.

Correct to the nearest g: half of 1 g = 0.5 g, 475 − 0.5 = 474.5

474.5 g

(1)

The height of a box is 120 cm correct to the nearest 10 cm

(b) Write down the upper bound for the height.

Correct to the nearest 10 cm: half of 10 = 5, 120 + 5 = 125

125 cm

(1)

(Total for Question 7 is 2 marks)

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Solved by Mr. Pabitra

8 $\dfrac{8^{-2} \times 8^{9}}{8^{10}} = 8^{n}$

Work out the value of n

$\frac{8^{-2} \times 8^{9}}{8^{10}} = \frac{8^{-2+9}}{8^{10}} = \frac{8^{7}}{8^{10}} = 8^{7-10} = 8^{-3}$

so $n = -3$

$n =$ −3

(Total for Question 8 is 2 marks)

9 Hari scored 140 points playing a game on Tuesday.
This was 12% more points than he scored playing the game on Monday.

Work out the number of points that Hari scored playing the game on Monday.

Tuesday is 12% more than Monday: 100% + 12% = 112% = 1.12

1.12 × Monday = 140

Monday = $\frac{140}{1.12}$ = 125 points

125

(Total for Question 9 is 3 marks)

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Solved by Mr. Pabitra

10 (a) Simplify $(6m)^0$

Anything (not zero) to the power 0 is 1

1

(1)

(b) Solve $5y + 20 < 7y + 1$

$5y + 20 < 7y + 1$

$20 - 1 < 7y - 5y$

$19 < 2y$

$y > 9.5$

$y > 9.5$

(2)

(c) Factorise fully $15w^2x^5 + 25w^3x^2$

HCF: 5, w^2, x^2 so $15w^2x^5 + 25w^3x^2 = 5w^2x^2(3x^3 + 5w)$

$5w^2x^2(3x^3 + 5w)$

(2)

(d) Simplify fully $\dfrac{36a^5c^7}{12a^2c^3}$

$\frac{36}{12} = 3$, $\frac{a^5}{a^2} = a^3$, $\frac{c^7}{c^3} = c^4$

$3a^3c^4$

(2)

(Total for Question 10 is 7 marks)

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Solved by Mr. Pabitra

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11 ABC is a right-angled triangle.

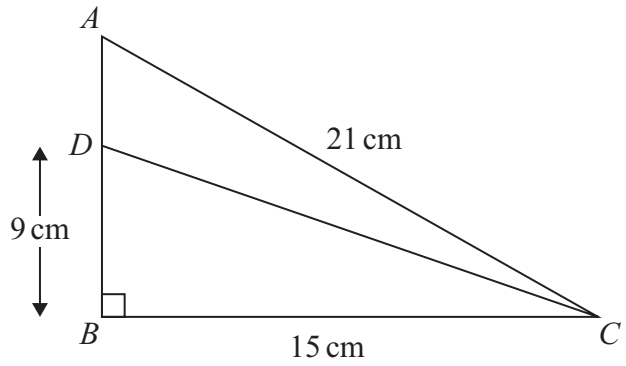


Diagram **NOT** accurately drawn

$AC = 21$ cm $BC = 15$ cm angle $ABC = 90°$

The point D lies on AB such that $DB = 9$ cm

Work out the size of angle ACD
Give your answer correct to one decimal place.

Triangle ABC: $AB = \sqrt{21^2 - 15^2} = \sqrt{216} = 14.696...$ cm

$\tan(\text{angle } ACB) = \frac{AB}{BC} = \frac{14.696...}{15}$, angle $ACB = 44.415...°$

$\tan(\text{angle } DCB) = \frac{DB}{BC} = \frac{9}{15}$, angle $DCB = 30.963...°$

Angle ACD = angle ACB − angle DCB

$= 44.415... - 30.963... = 13.451...°$

$= 13.5°$ (1 d.p.)

13.5 °

(Total for Question 11 is 4 marks)

Solved by Mr. Pabitra

12

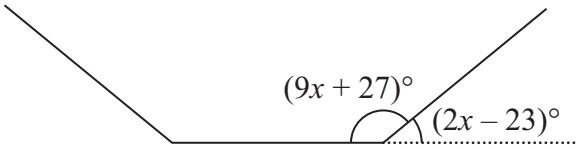


Diagram **NOT** accurately drawn

The diagram shows part of a regular n-sided polygon with

an interior angle of $(9x + 27)°$
an exterior angle of $(2x – 23)°$

Work out the value of n

Interior angle + exterior angle = 180° (angles on a straight line)

$(9x + 27) + (2x - 23) = 180$

$11x + 4 = 180$

$11x = 176, \quad x = 16$

Exterior angle = $2 \times 16 - 23 = 9°$

$n = 360 \div$ exterior angle $= 360 \div 9 = 40$

$n =$ 40

(Total for Question 12 is 4 marks)

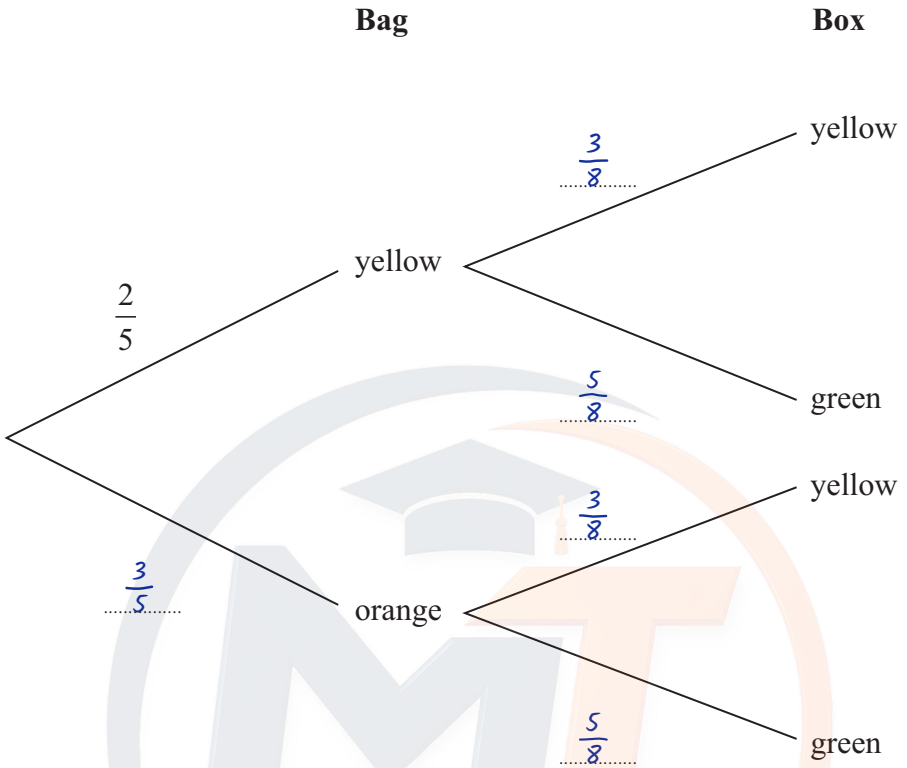
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Solved by Mr. Pabitra

13 In a bag, there are only 2 yellow beads and 3 orange beads.
In a box, there are only 3 yellow beads and 5 green beads.

Chi takes at random a bead from the bag and a bead from the box.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Chi takes two beads of different colours.

Different colours = everything except (yellow, yellow)

$P(\text{yellow, yellow}) = \frac{2}{5} \times \frac{3}{8} = \frac{6}{40}$

$P(\text{different}) = 1 - \frac{6}{40} = \frac{34}{40} = \frac{17}{20}$

Check: $\frac{2}{5} \times \frac{5}{8} + \frac{3}{5} \times \frac{3}{8} + \frac{3}{5} \times \frac{5}{8} = \frac{10 + 9 + 15}{40} = \frac{34}{40}$

$\frac{17}{20}$

(3)

(Total for Question 13 is 5 marks)

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Solved by Mr. Pabitra

14 (a) Expand and simplify $7x(3x + 2)(2x - 5)$

$(3x + 2)(2x - 5) = 6x^2 - 15x + 4x - 10 = 6x^2 - 11x - 10$

$7x(6x^2 - 11x - 10) = 7x \times 6x^2 - 7x \times 11x - 7x \times 10$

$= 42x^3 - 77x^2 - 70x$

$42x^3 - 77x^2 - 70x$

(3)

(b) Solve $\frac{9}{2y} + \frac{5}{7} = 5$

Show clear algebraic working.

Multiply every term by $14y$:

$9 \times 7 + 5 \times 2y = 5 \times 14y$

$63 + 10y = 70y$

$63 = 60y$

$y = \frac{63}{60} = 1.05$

$y =$ 1.05

(3)

(Total for Question 14 is 6 marks)

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15 AOB is a sector of a circle with centre O and radius 12 cm

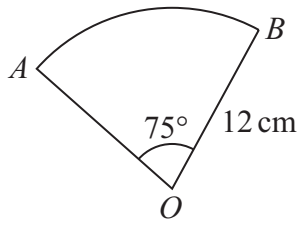


Diagram **NOT** accurately drawn

Work out the area of the sector.
Give your answer correct to 3 significant figures.

Area of sector $= \frac{75}{360} \times \pi \times r^2 = \frac{75}{360} \times \pi \times 12^2$

$= 30\pi = 94.247... = 94.2 \text{ cm}^2$ (3 s.f.)

94.2 ..... cm^2

(Total for Question 15 is 2 marks)

16 Ivan asked 15 people how many books they read last year.

Here are his results.

1 1 3 4 6 7 8 9 10 12 15 25 30 37 50

Work out the interquartile range of the number of books read.

$n = 15$: LQ $= (15 + 1) \div 4 =$ 4th value $= 4$

UQ $= 3 \times (15 + 1) \div 4 =$ 12th value $= 25$

IQR $= 25 - 4 = 21$

21 .....

(Total for Question 16 is 2 marks)

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Solved by Mr. Pabitra

17 Show that $\dfrac{2\sqrt{7}+2}{\sqrt{7}-3}$ can be written in the form $a - \sqrt{b}$ where a and b are integers.

Show your working clearly.

Multiply top and bottom by $(\sqrt{7}+3)$:

$$\frac{2\sqrt{7}+2}{\sqrt{7}-3} \times \frac{\sqrt{7}+3}{\sqrt{7}+3} = \frac{2\times 7 + 6\sqrt{7} + 2\sqrt{7} + 6}{7-9}$$

$$= \frac{20 + 8\sqrt{7}}{-2} = -10 - 4\sqrt{7}$$

$$4\sqrt{7} = \sqrt{16 \times 7} = \sqrt{112}$$

$$= -10 - \sqrt{112} \qquad a = -10, \quad b = 112$$

(Total for Question 17 is 3 marks)

18 Make y the subject of $p = \sqrt{\dfrac{y+w}{3y-t}}$

Square both sides: $p^2 = \dfrac{y+w}{3y-t}$

$$p^2(3y - t) = y + w$$

$$3p^2y - p^2t = y + w$$

$$3p^2y - y = w + p^2t$$

$$y(3p^2 - 1) = w + p^2t$$

$$y = \frac{w + p^2t}{3p^2 - 1}$$

$y = \dfrac{w + p^2t}{3p^2 - 1}$

(Total for Question 18 is 4 marks)

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MATH TONIC

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19 The diagram shows triangle ABC

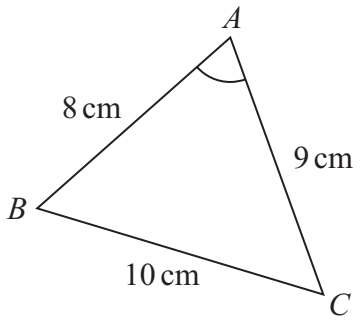


Diagram **NOT** accurately drawn

$AB = 8\,\text{cm}$ $BC = 10\,\text{cm}$ $CA = 9\,\text{cm}$

Work out the size of angle BAC
Give your answer correct to one decimal place.

Cosine rule: $BC^2 = AB^2 + AC^2 - 2 \times AB \times AC \times \cos A$

$10^2 = 8^2 + 9^2 - 2 \times 8 \times 9 \times \cos A$

$\cos A = \frac{8^2 + 9^2 - 10^2}{2 \times 8 \times 9} = \frac{64 + 81 - 100}{144} = \frac{45}{144} = 0.3125$

$A = \cos^{-1}(0.3125) = 71.790...°$

Angle $BAC = 71.8°$ (1 d.p.)

71.8 °

(Total for Question 19 is 3 marks)

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Solved by Mr. Pabitra

20 The straight line **L** has equation $y = 4x + 7$

The straight line **M** is perpendicular to **L** and passes through the point with coordinates (8, 1)

Find an equation for **M**
Give your answer in the form $y = mx + c$

Gradient of L = 4, so gradient of M = $-\frac{1}{4}$ (perpendicular: $m_1 \times m_2 = -1$)

$y = -\frac{1}{4}x + c$ through (8, 1):

$1 = -\frac{1}{4} \times 8 + c = -2 + c$, $c = 3$

$y = -\frac{1}{4}x + 3$

$y = -\frac{1}{4}x + 3$

(Total for Question 20 is 3 marks)

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Solved by Mr. Pabitra

21 Express $5x^2 - 20x + 23$ in the form $a(x - b)^2 + c$ where a, b and c are integers.

$5x^2 - 20x + 23 = 5(x^2 - 4x) + 23$

$= 5[(x - 2)^2 - 4] + 23$

$= 5(x - 2)^2 - 20 + 23$

$= 5(x - 2)^2 + 3$

$a = 5, \quad b = 2, \quad c = 3$

$5(x - 2)^2 + 3$

(Total for Question 21 is 3 marks)

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MATH TONIC

Solved by Mr. Pabitra

22 There are 15 buttons in a box.

3 of the buttons are red
2 of the buttons are pink
10 of the buttons are blue

Pete takes at random three buttons from the box.

Work out the probability that there is still at least one pink button in the box.

There are 2 pink and 13 not pink (3 red + 10 blue).

No pink left in the box only if Pete takes BOTH pink buttons.

$P(P, P, \text{not } P) = \frac{2}{15} \times \frac{1}{14} \times \frac{13}{13} = \frac{2}{210} = \frac{1}{105}$

The not-pink button can be 1st, 2nd or 3rd: $3 \times \frac{1}{105} = \frac{3}{105} = \frac{1}{35}$

$P(\text{at least one pink still in the box}) = 1 - \frac{1}{35} = \frac{34}{35}$

$\frac{34}{35}$

(Total for Question 22 is 3 marks)

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Solved by Mr. Pabitra

23 $a = \dfrac{2x + 5}{1 - x}$ $x = \dfrac{5 - 2y}{3y}$

Write a in the form $\dfrac{m + ny}{p(y - 1)}$ where m, n and p are integers.

Show your working clearly.

Numerator: $2x + 5 = 2 \times \frac{5 - 2y}{3y} + 5 = \frac{10 - 4y + 15y}{3y} = \frac{10 + 11y}{3y}$

Denominator: $1 - x = 1 - \frac{5 - 2y}{3y} = \frac{3y - 5 + 2y}{3y} = \frac{5y - 5}{3y}$

$a = \frac{10 + 11y}{3y} \div \frac{5y - 5}{3y} = \frac{10 + 11y}{3y} \times \frac{3y}{5y - 5}$

$= \frac{10 + 11y}{5y - 5} = \frac{10 + 11y}{5(y - 1)}$

$m = 10, \quad n = 11, \quad p = 5$

$a = \dfrac{10 + 11y}{5(y - 1)}$

(Total for Question 23 is 3 marks)

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Solved by Mr. Pabitra

24 A curve has equation $y = f(x)$

There is only one turning point on the curve.
The coordinates of this turning point are (4, 3)

Write down the coordinates of the turning point on the curve with equation

(i) $y = f(x + 5)$

$f(x + 5)$: move 5 to the left, so x-coordinate $4 - 5 = -1$

(−1 , 3)

(1)

(ii) $y = f(x) + 7$

$f(x) + 7$: move up 7, so y-coordinate $3 + 7 = 10$

(4 , 10)

(1)

(iii) $y = f(2x)$

$f(2x)$: x-coordinates are halved, so $4 \div 2 = 2$

(2 , 3)

(1)

(Total for Question 24 is 3 marks)

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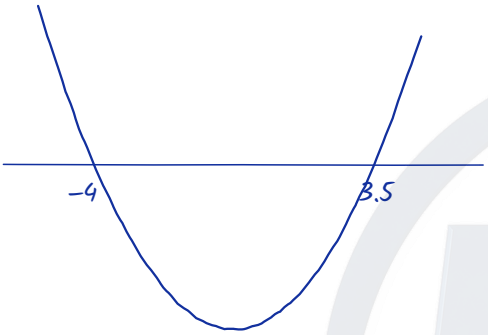
25 Solve the inequality $2x^2 + x - 28 > 0$
Show clear algebraic working.

Solve $2x^2 + x - 28 = 0$

$(2x - 7)(x + 4) = 0$

$x = 3.5$ or $x = -4$

The curve $y = 2x^2 + x - 28$ is a U shape, so it is above 0 outside the roots



$x < -4$ or $x > 3.5$

$x < -4$ or $x > 3.5$

(Total for Question 25 is 3 marks)

Turn over for Question 26

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Solved by Mr. Pabitra

26 Here is a prism $ABCDEFGH$ with a horizontal, rectangular base $ABGF$

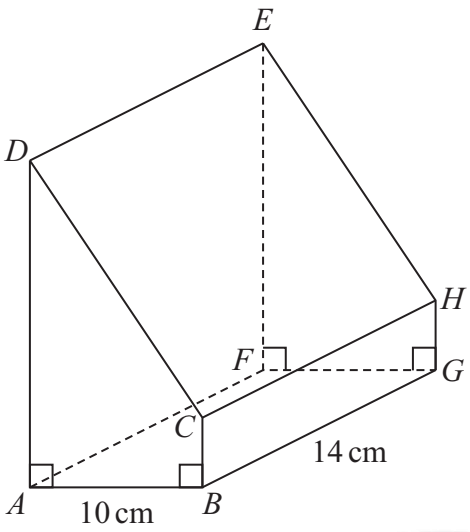


Diagram **NOT** accurately drawn

$AB = 10\,\text{cm}$ $BG = 14\,\text{cm}$

angle DAB = angle ABC = angle EFG = angle $FGH = 90°$

$BC = \frac{1}{5}AD$

The angle of elevation of E from B is 50°

Calculate the volume of the prism.
Give your answer correct to 3 significant figures.
Show your working clearly.

E is vertically above F, so EF = AD. BF is the diagonal of the base.

$BF = \sqrt{10^2 + 14^2} = \sqrt{296} = 17.204...$ cm

Angle of elevation of E from B = 50°: $\tan 50° = \frac{EF}{BF}$

$EF = 17.204... \times \tan 50° = 20.503...$ cm, so $AD = 20.503...$ cm

$BC = \frac{1}{5} \times AD = \frac{1}{5} \times 20.503... = 4.100...$ cm

Cross-section ABCD is a trapezium (AD parallel to BC, height AB = 10):

$\text{Area} = \frac{1}{2} \times (AD + BC) \times AB = \frac{1}{2} \times (20.503... + 4.100...) \times 10$

$= 123.022...\ \text{cm}^2$

Volume = area × length = $123.022... \times 14 = 1722.31...\ \text{cm}^3$

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Volume = 1720 cm^3 (3 s.f.)

1720 ..... cm^3

(Total for Question 26 is 5 marks)

Turn over for Question 27

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27

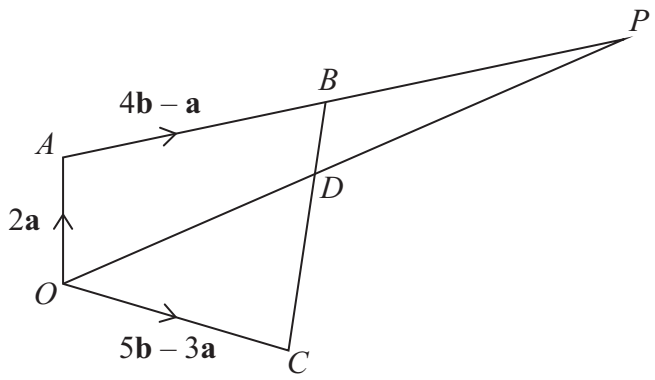


Diagram **NOT** accurately drawn

$OABC$ is a quadrilateral.
ABP and ODP are straight lines.

$\overrightarrow{OA} = 2\mathbf{a}$ $\overrightarrow{AB} = 4\mathbf{b} - \mathbf{a}$ $\overrightarrow{OC} = 5\mathbf{b} - 3\mathbf{a}$

(a) Find an expression in terms of **a** and **b** for the vector $\overrightarrow{BC}$
Simplify your answer.

$\overrightarrow{BC} = \overrightarrow{BA} + \overrightarrow{AO} + \overrightarrow{OC}$

$= -(4b - a) - 2a + (5b - 3a)$

$= -4b + a - 2a + 5b - 3a = b - 4a$

$b - 4a$

(2)

The point D lies on BC such that $BD : DC = 1 : 3$

Given that $\overrightarrow{OP} = n\overrightarrow{OD}$

(b) use a vector method to find the value of n

$\overrightarrow{OD} = \overrightarrow{OB} + \frac{1}{4}\overrightarrow{BC}$ $(BD : DC = 1 : 3)$

$= (2a + 4b - a) + \frac{1}{4}(b - 4a) = a + 4b + \frac{1}{4}b - a = \frac{17}{4}b$

$\overrightarrow{OP} = n\overrightarrow{OD} = \frac{17n}{4}b$

P is on the line AB: $\overrightarrow{OP} = \overrightarrow{OA} + k\overrightarrow{AB} = 2a + k(4b - a) = (2 - k)a + 4kb$

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Compare a: $2 - k = 0$, so $k = 2$

Compare b: $4k = 8$

$\frac{17n}{4} = 8$, $n = \frac{32}{17}$

$n =$ $\frac{32}{17}$

(4)

(Total for Question 27 is 6 marks)

Turn over for Question 28

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28 The curve **C** has equation $x^2 + y^2 = d - 11x$ where d is an integer.
The line **L** has equation $y = 3x + e$ where e is an integer.

C and **L** intersect at the point A and at the point B

The coordinates of A are (0.2, 2.6)

Work out the coordinates of B
Show your working clearly.

$A(0.2, 2.6)$ is on L: $2.6 = 3 \times 0.2 + e$, $e = 2$

A is on C: $0.2^2 + 2.6^2 = d - 11 \times 0.2$

$0.04 + 6.76 = d - 2.2$, $d = 9$

Substitute $y = 3x + 2$ into $x^2 + y^2 = 9 - 11x$:

$x^2 + (3x + 2)^2 = 9 - 11x$

$x^2 + 9x^2 + 12x + 4 = 9 - 11x$

$10x^2 + 23x - 5 = 0$

$(5x - 1)(2x + 5) = 0$

$x = 0.2$ (this is A) or $x = -2.5$

When $x = -2.5$: $y = 3 \times (-2.5) + 2 = -5.5$

$B = (-2.5, -5.5)$

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(−2.5 , −5.5)

(Total for Question 28 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

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