Please check the examination details below before entering your candidate information

Candidate surname	Other names
WRITTEN MS	

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Tuesday 3 November 2020

Morning (Time: 1 hour 30 minutes) | Paper Reference **4MB1/01**

Mathematics B

Paper 1

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**.

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.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ▶

P61906A

1/1/1/1/

P 6 1 9 0 6 A 0 1 2 4

Pearson

Answer ALL TWENTY NINE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Solve the inequality $7x + 3 \leqslant 4x - 15$

$7x + 3 \leqslant 4x - 15$

$-4x$ $-4x$

$3x + 3 \leqslant -15$

-3 -3

$3x \leqslant -18$

$\div 3$ $\div 3$

$x \leqslant -6$

→ Here you must bring all x terms to one-side and all constant terms to the other

$x \leqslant -6$

(Total for Question 1 is 2 marks)

2 Show that

$$4\frac{2}{7} \div \frac{5}{21} = 18$$

First make all fractions improper:

$4\frac{2}{7} = \frac{4 \times 7}{7} + \frac{2}{7}$

$= \frac{28 + 2}{7}$

$= \frac{30}{7}$

Now flip second fraction and multiply:

$\frac{30}{7} \div \frac{5}{21} = \frac{6}{1} \times \frac{21}{5} \; {}^{3}_{1}$

$= 18$

(Total for Question 2 is 2 marks)

3 The nth term of a sequence is given by $3n^2 + 11$

Calculate the difference between the 6th term and the 9th term of the sequence.

Find the 6th term by substituting $n=6$

$3(6)^2 + 11 = 3(36) + 11$

$= 119$

Find the 9th term by substituting $n=9$

$3(9)^2 + 11 = 3(81) + 11$

$= 254$

Subtract to find difference:

$254 - 119 = 135$

135

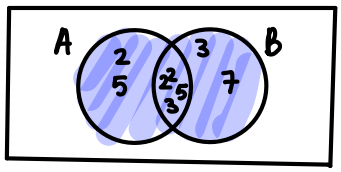
(Total for Question 3 is 2 marks)

4 $A = 2^3 \times 3 \times 5^2$

$B = 2^2 \times 3^2 \times 5 \times 7$

(i) Find the Lowest Common Multiple (LCM) of A and B.

Draw a Venn Diagram:



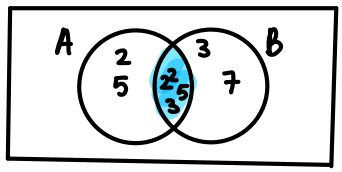
$LCM = 2^3 \times 3^2 \times 5^2 \times 7$

$= 12\,600$

12600

(1)

(ii) Find the Highest Common Factor (HCF) of A and B.



$HCF = 2^2 \times 5 \times 3$

$= 60$

60

(1)

(Total for Question 4 is 2 marks)

5 The price of each sandwich in a cafe was increased by 4%
Chris bought a sandwich after the price increase for $3.64

Calculate the increase in the price of the sandwich Chris bought.

Here you can use the multiplier

If a price increases by 4%, the extra 4% has been added on the 100%.

100% + 4% = 104%

$\text{Original Price} \times \frac{104}{100} = 3.64$

$\text{Original Price} = 3.64 \div \frac{104}{100}$

$= 3.5$

Calculate increase:

$3.64 - 3.50 = 0.14$

$ 0.14

(Total for Question 5 is 2 marks)

6 Given that $a : b = 3 : 5$ and that $a : c = 7 : 4$

find $a : b : c$
Give your answer in its simplest form.

a : b
3 : 5

Make a term the same by making it the lowest common multiple of 3 and 7.

×7

a : : c
7 : : 4

×3

a : b : c
21 : 35
21 : 12

21 : 35 : 12

$a : b : c =$ 21 : 35 : 12

(Total for Question 6 is 2 marks)

7

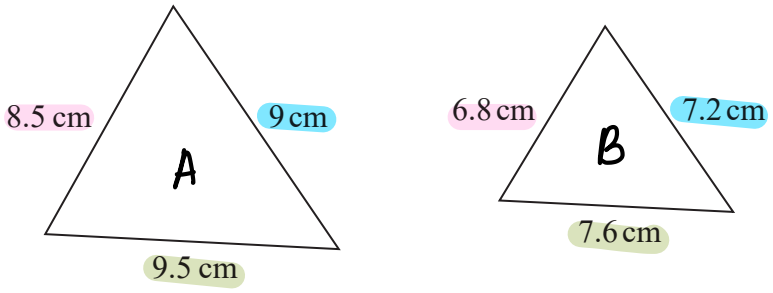


Diagram **NOT** accurately drawn

The diagram shows two triangles.

Show that the triangles are similar.

Two similar triangles must share a common scale factor.

$\frac{9.5}{7.6} = 1.25$

$\frac{8.5}{6.8} = 1.25$

$\frac{9}{7.2} = 1.25$

Since all sides on triangle B can be multiplied by 1.25 to get triangle A, they must be similar.

∴ Shown

(Total for Question 7 is 2 marks)

8 Given that $y = x^4 - \frac{8}{x^2}$

find $\frac{dy}{dx}$

The general rule for differentiation is to "bring down the factor and subtract 1"

$y = x^4 - 8x^{-2}$

$\frac{dy}{dx} = 4x^{4-1} - (-2)8x^{-2-1}$

$\frac{dy}{dx} = 4x^3 + 16x^{-3}$

$\frac{dy}{dx} =$ $4x^3 + 16x^{-3}$

(Total for Question 8 is 2 marks)

9 The table gives information about the number of brothers that each student in a class has.

Number of brothers	Frequency
0	5
1	2
2	8
3	4
4	1

Calculate the mean number of brothers.

$\text{Mean} = \frac{\text{Sum of (no. brothers} \times \text{frequency)}}{\text{total frequency}}$

$\text{Mean} = \frac{(0\times 5)+(1\times 2)+(2\times 8)+(3\times 4)+(4\times 1)}{5+2+8+4+1}$

$= 1.7$

≈ 2

↳ Since you cannot have a fraction of a brother

2

(Total for Question 9 is 3 marks)

10 Without using a calculator and showing your working clearly, find the value of the integer a so that

$$\sqrt{180} - \sqrt{27} - \sqrt{20} + \sqrt{147} = a(\sqrt{5} + \sqrt{3})$$

Rewrite all surds as multiples of 5 and 3.

$\sqrt{180} = \sqrt{30}\sqrt{6}$
$= \sqrt{6}\sqrt{5}\sqrt{6}$
$= 6\sqrt{5}$

$\sqrt{27} = \sqrt{9}\sqrt{3}$
$= 3\sqrt{3}$

$\sqrt{20} = \sqrt{4}\sqrt{5}$
$= 2\sqrt{5}$

$\sqrt{147} = \sqrt{49}\sqrt{3}$
$= 7\sqrt{3}$

Complete subtractions/addition:

$6\sqrt{5} - 3\sqrt{3} - 2\sqrt{5} + 7\sqrt{3} = 4\sqrt{5} + 4\sqrt{3}$
$= 4(\sqrt{5} + \sqrt{3})$

$a =$ 4

(Total for Question 10 is 3 marks)

11 Solve $\frac{x+5}{4} + \frac{x-3}{5} = 2$

Show clear algebraic working.

You must have the same denominators to add fractions.

$$\frac{5(x+5) + 4(x-3)}{4 \times 5} = 2$$

$$\frac{5x + 25 + 4x - 12}{20} = 2$$

Simplify

$$\frac{9x + 13}{20} = 2$$

$\times 20$ / $\times 20$

$$9x + 13 = 40$$

-13 / -13

$$9x = 27$$

$\div 9$ / $\div 9$

$$x = 3$$

$x =$ 3

(Total for Question 11 is 3 marks)

12 The diagram shows a half cylinder.

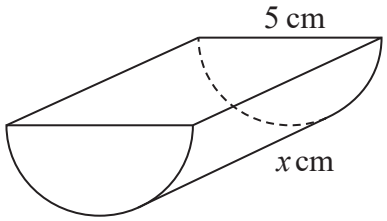


Diagram **NOT** accurately drawn

The half cylinder has a length of x cm and a semicircular cross section of diameter 5 cm.

The volume of the half cylinder is 35π cm^3

Calculate the value of x.

You must work backwards to find x.

Volume of a cylinder = $\pi r^2 \times$ length

diameter = 5 cm
radius = 2.5cm

$\pi(2.5)^2 \times (x) \times \frac{1}{2} = 35\pi$

$\times 2$ $\quad$ $\times 2$

$(2.5)^2 \times x = 70$

$\div 2.5^2$ $\quad$ $\div 2.5^2$

$x = 11.2$

$x =$ 11.2

(Total for Question 12 is 3 marks)

13 (a) Simplify $m^{12} \div m^3$

$m^{12} \div m^3 = m^{12-3}$

$= m^9$

m^9

(1)

(b) Simplify fully $(125p^9w^3)^{\frac{2}{3}}$

$(125p^9w^3)^{\frac{2}{3}} = (\sqrt[3]{125p^9w^3})^2$

$= (5p^3w)^2$

$= 25p^6w^2$

$25p^6w^2$

(2)

(Total for Question 13 is 3 marks)

14 Given that

$$p = \frac{2}{6n + 5} \quad \text{and} \quad n = \frac{5}{4m + 2}$$

find an expression for p in terms of m.
Give your answer in its simplest form.

Start by subbing n into the denominator:

$$6n + 5 = 6\left(\frac{5}{4m+2}\right) + 5$$

$$= \frac{30}{4m+2} + 5$$

$$= \frac{30}{4m+2} + \frac{5(4m+2)}{4m+2}$$

$$= \frac{30 + 20m + 10}{4m+2}$$

$$= \frac{40 + 20m}{4m+2}$$

$$= \frac{2(20 + 10m)}{2(2m + 1)}$$

Find expression for p:

$$p = \frac{2}{\frac{20+10m}{2m+1}}$$

$$= 2 \times \frac{2m+1}{20+10m}$$

$$= \frac{4m+2}{10m+20}$$

$$= \frac{2(2m+1)}{2(5m+10)}$$

$p =$ $\frac{2m+1}{5m+10}$

(Total for Question 14 is 3 marks)

15 Akash drove from his home to his friend's house.

The distance Akash drove was 190 km, to the nearest 5 km.
His average speed for the journey was 62 km/h, to the nearest km/h.

Calculate the upper bound for the time taken by Akash to drive from his home to his friend's house.
Give your answer in hours and minutes, to the nearest minute.

time = $\frac{\text{distance}}{\text{speed}}$

Upper bound for time = $\frac{\text{Upper bound distance}}{\text{lower bound speed}}$

Essentially, you want to find the largest value for time.

$187.5 \leq 190 < 192.5$

$61.5 \leq 62 < 62.5$

Upper bound for time = $\frac{192.5}{61.5}$

$= 3.13008...$ hours

$3.13008... - 3 = 0.1300...$

$0.1300... \times 60 = 7.804...$ min

≈ 8 min

3 hours 8 minutes

(Total for Question 15 is 4 marks)

16

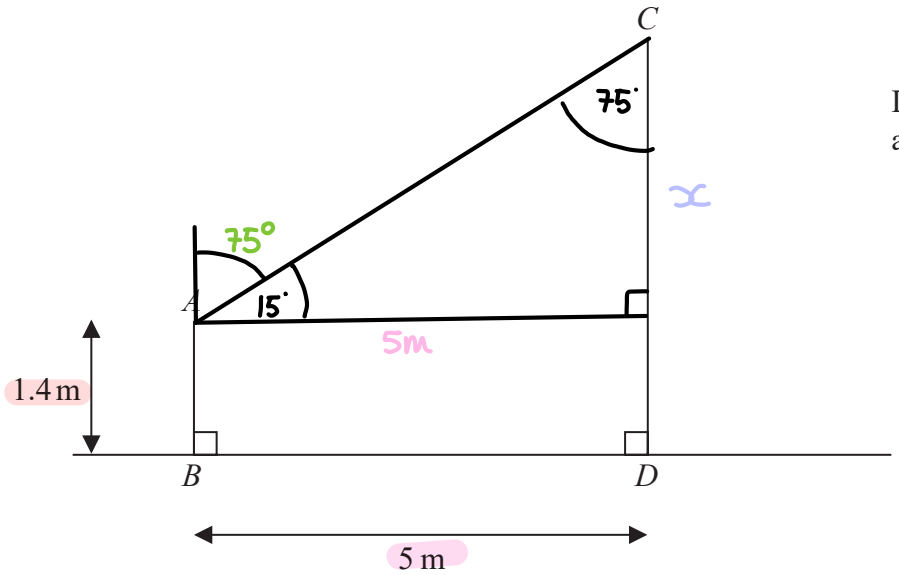


Diagram **NOT** accurately drawn

In the diagram, AB represents a vertical wall and CD represents a vertical building.
The height of the wall is 1.4 m.

The bottom of the wall, B, and the bottom of the building, D, are on horizontal ground, such that $BD = 5$ m.

The angle of elevation of C from A is 75°

Calculate the height, in m to one decimal place, of the building. /CD

First draw a trapezium above to connect the two walls and divide it into a square and a triangle so you can apply the sin rule.
Remember angles in a triangle add up to 90°.

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{x}{\sin 15} = \frac{5}{\sin 75}$$

$$x = \frac{5}{\sin 75} \times \sin 15$$

$$x = 1.3397\ldots$$

$$CD = 1.4 + 1.3397\ldots$$

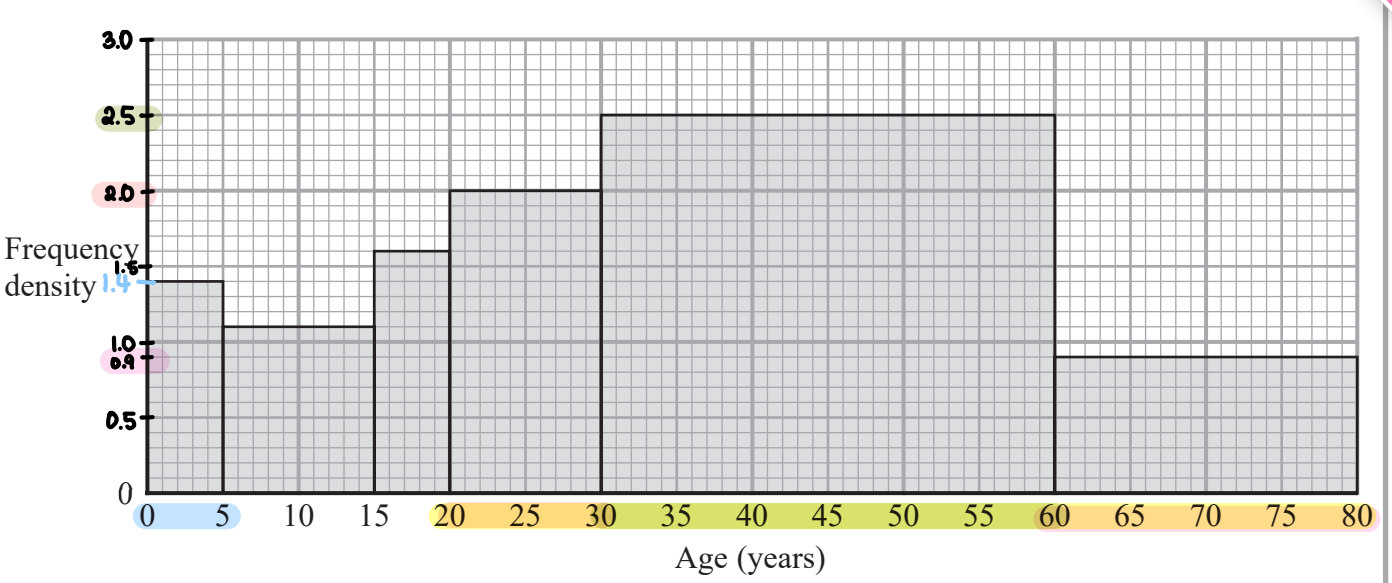
$$= 2.73974\ldots$$

$$\approx 2.7 \text{ (1 d.p.)}$$

2.7 m

(Total for Question 16 is 4 marks)

17 The histogram below shows information about the age of each person on a plane.



There were 7 people on the plane with an age of 5 years or under.

Calculate the number of people on the plane with an age of over 20 years.

Frequency Density = Frequency ÷ Class Width

Frequency Density for 5 or under = 7 ÷ 5
= 1.4

Since 14 small squares have a height of 1.4, 1 small small square should have a height of 0.1.

$\frac{1.4}{14} = 0.1$

For each category find frequency:
Frequency = frequency density × Class width

20 to 30 → 2.0 × 10 = 20

30 to 60 → 2.5 × 30 = 75

60 to 80 → 0.9 × 20 = 18

20 + 75 + 18 = 113

113

(Total for Question 17 is 3 marks)

DIRECTLY PROPORTIONAL

18 A varies directly as the square of c

$A = 950$ when $c = 5$

Calculate the value of A when $c = 7$

Since A is "directly proportional" to c^2, $A \propto c^2$

$A = kc^2$ where k is a constant.

① Find k.

$k = \frac{A}{c^2}$

$k = \frac{950}{5^2}$

$= 38$

② Find A when $c=7$

$A = 38 \times 7^2$

$= 1862$

$A =$ 1862

(Total for Question 18 is 3 marks)

19 Solve the simultaneous equations $5x - 3y = 21$
$3x - 4y = 22.5$

Show clear algebraic working.

Substitution

① Rearrange one of the equations in terms of y or x.

$5x - 3y = 21$
$5x = 21 + 3y$
$x = \frac{21+3y}{5}$

② Substitute into other equation

$3\left(\frac{21+3y}{5}\right) - 4y = 22.5$

$\frac{63+9y}{5} - 4y = 22.5$

$63 + 9y - 20y = 112.5$

$63 - 11y = 112.5$

$-11y = 49.5$

$y = -\frac{9}{2}$

③ Sub $y = -\frac{9}{2}$ into first equation for x.

$5x - 3\left(-\frac{9}{2}\right) = 21$

$5x + \frac{27}{2} = 21$

$5x = \frac{15}{2}$

$x = 3/2$

Eliminating variables

① Make modulus of either y or x the same

$5x - 3y = 21$
$20x - 12y = 84$
$3x - 4y = 22.5$
$9x - 12y = 67.5$

② same signs Subtract / Different Signs add

$20x - 12y = 84$
$-\ 9x - 12y = 67.5$
$11x = 16.5$
$x = \frac{3}{2}$

③ Substitute to find y

$5\left(\frac{3}{2}\right) - 3y = 21$

$\frac{15}{2} - 3y = 21$

$-3y = \frac{27}{2}$

$y = -\frac{9}{2}$

$x =$ $\frac{3}{2}$

$y =$ $-\frac{9}{2}$

(Total for Question 19 is 4 marks)

20

$$\mathbf{A} = \begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} -7 & -2 \\ 1 & 3 \end{pmatrix}$$

Find

(a) **A – B**

Subtraction of 2×2 Matrices:

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} - \begin{pmatrix} e & f \\ g & h \end{pmatrix} = \begin{bmatrix} a-e & b-f \\ c-g & d-h \end{bmatrix}$$

$$\begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix} - \begin{bmatrix} -7 & -2 \\ 1 & 3 \end{bmatrix} = \begin{bmatrix} 4--7 & 3--2 \\ -2-1 & 1-3 \end{bmatrix}$$

$$= \begin{bmatrix} 11 & 5 \\ -3 & -2 \end{bmatrix}$$

$$\begin{pmatrix} 11 & 5 \\ -3 & -2 \end{pmatrix}$$

(2)

(b) **AB**

Multiplying 2×2 Matrices:

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} ae+bg & af+bh \\ ce+dg & cf+dh \end{bmatrix}$$

$$\begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix} \times \begin{bmatrix} -7 & -2 \\ 1 & 3 \end{bmatrix} = \begin{bmatrix} (4)(-7)+(3)(1) & (4)(-2)+(3)(3) \\ (-2)(-7)+(1)(1) & (-2)(-2)+(1)(3) \end{bmatrix}$$

$$= \begin{bmatrix} -25 & 1 \\ 15 & 7 \end{bmatrix}$$

$$\begin{pmatrix} -25 & 1 \\ 15 & 7 \end{pmatrix}$$

(2)

(Total for Question 20 is 4 marks)

21

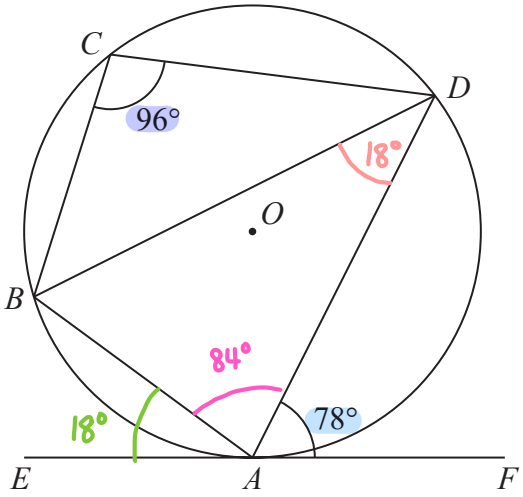


Diagram **NOT** accurately drawn

$ABCD$ is a quadrilateral such that the points A, B, C and D lie on a circle, centre O.
EAF is the tangent to the circle at A.

$\angle DAF = 78°$ $\angle BCD = 96°$

Calculate the size, in degrees, of $\angle BDA$.
Give reasons for each stage of your working.

Opposite angles in a cyclic quadrilateral add to 180°.

180 - 96 = 84°

Angles on a straight line add to 180°.

180 - 84 - 78 = 18°

Angle between a tangent and a chord at the point of contact is equal to the angle subtended by the chord in the alternate segment.

∠EAB = ∠BDA

∠BDA = 18°

$\angle BDA =$ 18 °

(Total for Question 21 is 4 marks)

22 Given that $\dfrac{20 \times 25^{5n+3}}{4 \times (\sqrt{125})^{4n+2}}$ can be written in the form 5^y

find an expression for y in terms of n.

Rewrite everything in terms of 5 and simplify

$$\frac{4 \times 5 \times 5^{2(5n+3)}}{4 \times (\sqrt{5^3})^{4n+2}} = \frac{5 \times 5^{10n+6}}{(5^3)^{\frac{1}{2}(4n+2)}}$$

$25 = 5^2$
$20 = 4 \times 5$
$125 = 5^3$
$\sqrt{a} = a^{\frac{1}{2}}$

$$= \frac{5^1 \times 5^{10n+6}}{5^{\frac{3}{2}(4n+2)}} \qquad (a^m)^n = a^{mn}$$

$$= \frac{5^{1+10n+6}}{5^{6n+3}} \qquad a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$= 5^{1+10n+6-(6n+3)}$$

$$= 5^{4n+4}$$

$y =$ $4n+4$

(Total for Question 22 is 4 marks)

23 The function g is such that

$$g(x) = 9 - 10x - 5x^2 \quad \text{for all values of } x$$

Find the range of g.
Show clear algebraic working.

Range = all possible outputs

① Differentiate g(x). The general rule for differentiation is to bring down power and subtract 1.

$g(x) = 9 - 10x - 5x^2$

$g'(x) = -10 - 2(5x^{2-1})$

$= -10 - 10x$

② Find maximum by equating to 0.

$-10 - 10x = 0$

$+10 \quad +10$

$-10x = 10$

$\div -1 \quad \div -1$

$x = -1$

③ Substitute into g(x) for g(x).

$g(-1) = 9 - 10(-1) - 5(-1)^2$

$= 9 + 10 - 5$

$= 14$

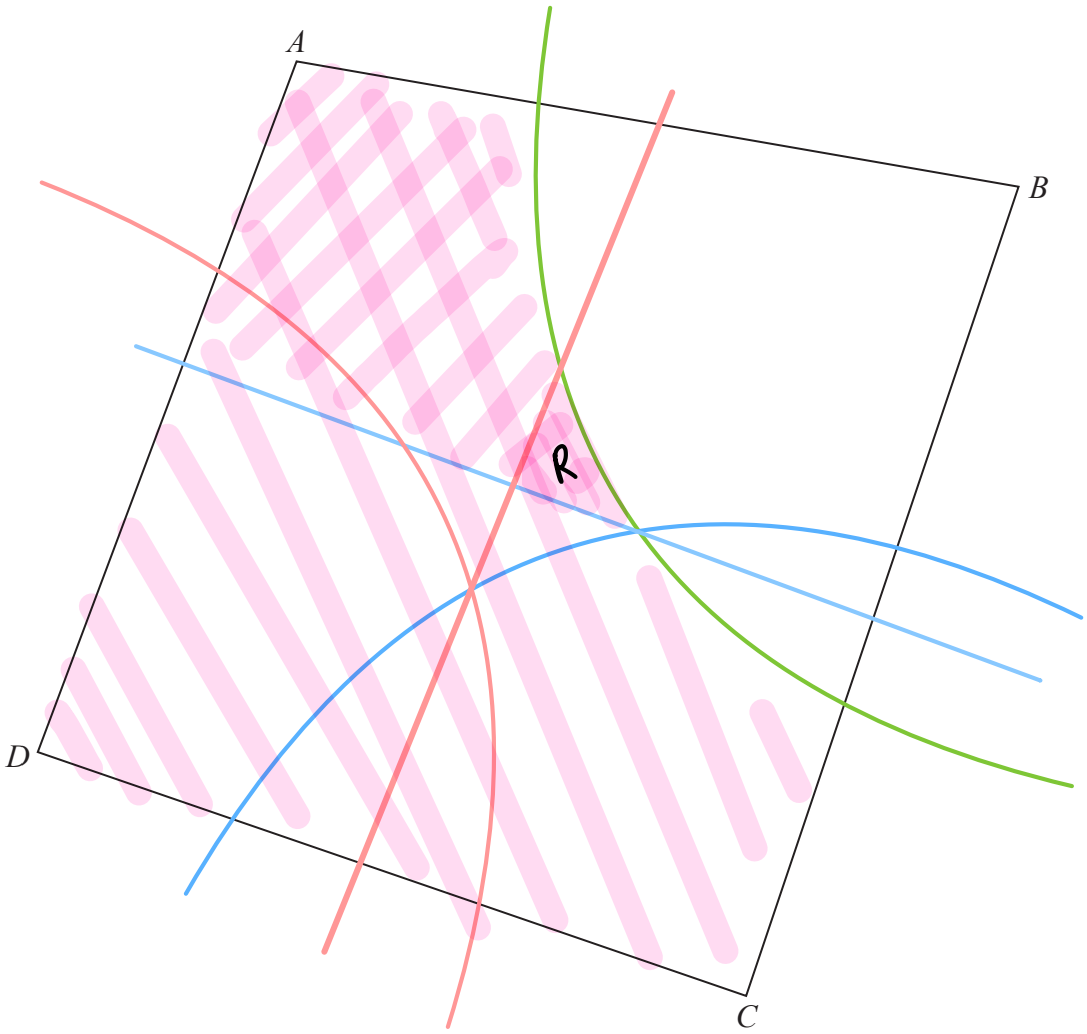
④ Range

$g(x) \leq 14$

$g(x) \leq 14$

(Total for Question 23 is 4 marks)

24



ABCD is a quadrilateral.
Leaving in all of your construction lines, construct the locus of all points inside the quadrilateral that are

(a) 4 cm from *B*,

Draw an arc of radius 4cm with centre B using compass. **(1)**

(b) equidistant from *B* and *C*,

Draw arc of radius 4cm with centre at C.
Draw perpendicular bisector where arcs meet. **(2)**

(c) equidistant from the lines *DA* and *DC*.

Draw arc of radius 4cm centered at D.
Draw angle bisector. **(2)**

The region **R** consists of all the points inside the quadrilateral that are more than 4 cm from *B*, closer to *B* than to *C* and closer to *DC* than to *AD*,

(d) show, by shading, the region **R**.
Label the region **R**. **(1)**

(Total for Question 24 is 6 marks)

25 (a) Make a the subject of the formula $B = ac + de$

$B = ac + de$

$-de$ → $B - de = ac$ ← $-de$

$\div c$ → $\frac{B - de}{c} = a$ ← $\div c$

$a = \frac{B - de}{c}$

(2)

(b) Factorise fully $14x^2y^3 - 21x^5y^2$

Take out all common factors from both parts:

$14x^2y^3 - 21x^5y^2 = 7x^2y^2(2y - 3x^2)$

$7x^2y^2(2y - 3x^2)$

(2)

(Total for Question 25 is 4 marks)

26

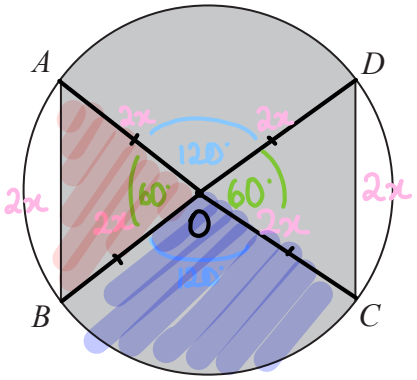


Diagram **NOT** accurately drawn

The diagram shows a circle of radius $2x$ cm.

The lines AB and DC are parallel and $AB = DC = 2x$ cm.
The area of the region shown shaded in the diagram is kx^2 cm^2

Find the exact value of k.

All sides of triangle AOB are equal so it is equilateral.
∴ Angles are equal
Angles in a triangle add to 180°.

$\frac{180}{3} = 60°$

Angles around a point add to 360.

$360 - 2(60) = 360 - 120$
$= 240$

$\frac{240}{2} = 120$

Find area of segment and triangle:

① Segment
Area of a circle $= \pi r^2$

$\frac{120}{360} \times \pi \times (2x)^2 = \frac{4}{3}\pi x^2$

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

$\frac{1}{2} \times 2x \times 2x \times \sin 60 = \sqrt{3}x^2$

Add and make equal to kx^2.

$2\left(\frac{4}{3}x^2\right) + 2\left(\sqrt{3}x^2\right) = kx^2$

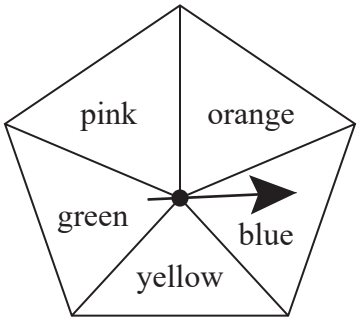
$\frac{8}{3}x^2 + 2\sqrt{3}x^2 = kx^2$

$\frac{8}{3} + 2\sqrt{3} = k$

$k = \frac{8}{3} + 2\sqrt{3}$

(Total for Question 26 is 5 marks)

27 Aarya has a biased 5-sided spinner.



When the spinner is spun once, it can land on blue or yellow or green or pink or orange.
Aarya spins the spinner many times and records the colour that the spinner lands on each time.
She uses these results to calculate the probability of the spinner landing on each colour.

The table below gives the probabilities that Aarya calculated for blue, yellow and green.

Colour	blue	yellow	green	pink	orange
Probability	0.22	0.34	0.12	0.08	0.24

Aarya's calculations showed that the probability of the spinner landing on orange is 3 times the probability of the spinner landing on pink.

(a) Complete the table for pink and for orange.

$P(\text{pink}) = x$

$P(\text{orange}) = 3x$

$3(0.08) = 0.24$

All probabilities add to 1.

$0.22 + 0.34 + 0.12 + x + 3x = 1$

$0.68 + 4x = 1$

$4x = 0.32$

$x = 0.08$

(3)

When Aarya spun the spinner, it landed on green 90 times.

(b) Work out an estimate for the total number of times Aarya spun the spinner.

$\frac{90}{0.12} = 750$

750

(2)

(Total for Question 27 is 5 marks)

28

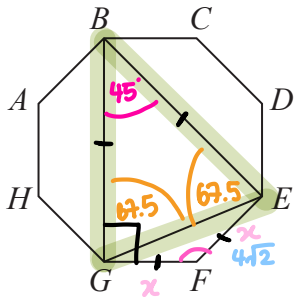


Diagram **NOT** accurately drawn

In the diagram, *ABCDEFGH* is a regular octagon.
The area of triangle *GEF* is $\left(4\sqrt{2}\right)$ cm^2

Calculate the perimeter, in cm to one decimal place, of triangle *BEG*.

To find interior angle of a regular polygon: $\frac{(n-2)\times 180}{n}$

$\angle GFE = \frac{(8-2)\times 180}{8}$

$= 135°$

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

$\frac{1}{2} \times x \times x \times \sin 135 = 4\sqrt{2}$

$\frac{\sqrt{2}}{4}x^2 = 4\sqrt{2}$

$x^2 = 16$

$x = 4$

Use cosine rule to find GE.

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

$a = GE$
$b = 4$
$c = 4$
$A = 135$

$GE = \sqrt{(4)^2 + (4)^2 - 2(4)(4)\cos 135}$

$= 7.39103...$

$\angle FGE = \frac{180 - 135}{2} = 22.5$

$\angle BGE = 90 - 22.5$

$= 67.5$

$\angle EBG = 180 - 2(67.5)$

$= 45$

Use sine rule to find GB:

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{GB}{\sin 67.5} = \frac{7.391...}{\sin 45}$$

$$GB = \frac{7.391...}{\sin 45} \times \sin 67.5$$

$$= 9.6568...$$

Perimeter → $7.39... + 2(9.65...)$

$= 26.7047...$

≈ 26.7

26.7 cm

(Total for Question 28 is 7 marks)

Turn over for Question 29

29 (a) Use the factor theorem to show that $(x - 5)$ is a factor of $x^3 - 6x^2 - 7x + 60$

If $(x-5)$ is a factor, subbing $x=5$, will give 0

$x - 5 = 0$

$x = 5$

$(5)^3 - 6(5)^2 - 7(5) + 60$

$= 125 - 150 - 35 + 60$

$= 0$

(2)

(b) Hence factorise completely $x^3 - 6x^2 - 7x + 60$

① Complete long division to obtain quadratic:

$$
\begin{array}{r|l}
x-5 & x^2 - x - 12 \\
\hline
 & x^3 - 6x^2 - 7x + 60 \\
 & -(x^3 - 5x^2) \\
 & \hline
 & -x^2 - 7x \\
 & -(-x^2 + 5x) \\
 & \hline
 & -12x + 60 \\
 & -(-12x + 60) \\
 & \hline
 & 0
\end{array}
$$

② Factorise $x^2 - x - 12$

What two numbers add to give -1 and multiply to give -12?

↳ -4 and 3

$\therefore x^2 - x - 12 = (x-4)(x+3)$

$(x-5)(x-4)(x+3)$

(3)

(Total for Question 29 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS