Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number	Candidate Number

Thursday 4 June 2020

Morning (Time: 2 hours) | Paper Reference **4MA1/2FR**

Mathematics A

Paper 2FR

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

Turn over ▶

P62656A

1/1/1/1/

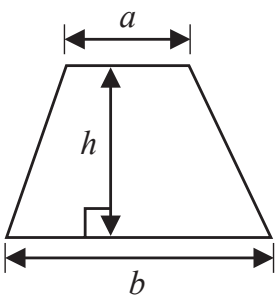
P 6 2 6 5 6 A 0 1 2 4

Pearson

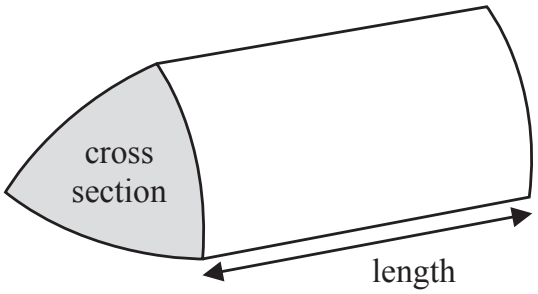
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

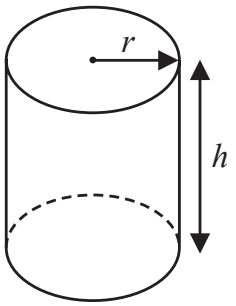


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table shows the depth of six ocean trenches.

Trench	Depth (metres)
Diamantina	8047
Eurasian Basin	4437
Philippine	10 540
Puerto Rico	8594
South Sandwich	8458
Tonga	10 882

(a) Which of these trenches has the greatest depth?

Tonga (1)

.....

(1)

(b) Write down the value of the 5 in the number 8594

hundredth

500 (1)

.....

(1)

(c) Write the number 4437 in words.

Four thousand, four hundred and thirty seven (1)

.....

(1)

When written correct to the nearest hundred, one of the numbers in the table is 8500

(d) What is this number?

8458 5 ≥ 5, so we round up

8458 (1)

.....

(1)

The Mariana Trench is 2864 metres deeper than the Diamantina Trench.

(e) Work out the depth of the Mariana Trench.

8047 + 2864 = 10911 (1)

(1)

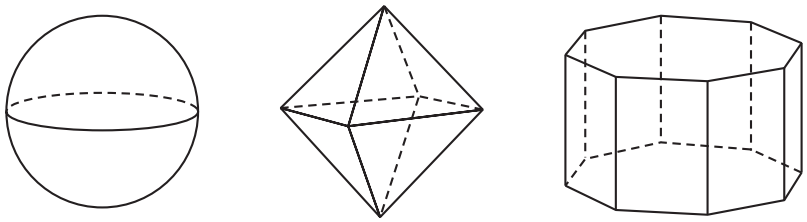
10911 ..... metres

(2)

(Total for Question 1 is 6 marks)

2 The diagram shows some 3-D shapes.

Shape A **Shape B** **Shape C**



(a) What is the mathematical name of shape **A**?

Sphere (1)

(1)

(b) How many edges has shape **B**?

12 (1)

(1)

(c) How many faces has shape **C**?

faces = flat surfaces

10 (1)

(1)

(Total for Question 2 is 3 marks)

---

3 Here are the first five terms of a number sequence.

1 (×3) 3 (×3) 9 (×3) 27 (×3) 81

(a) Find the next term of this sequence.

$81 \times 3 = 243$ (1)

243

(1)

(b) Explain how you found this term.

Multiply the previous term with the common ratio (3) (1)

(1)

The 9th term of this number sequence is 6561

$T_n = a \times r^{n-1}$

(c) Find the 10th term of this sequence.

10^{th} term $= ar^9 = 1 \times 3^9$

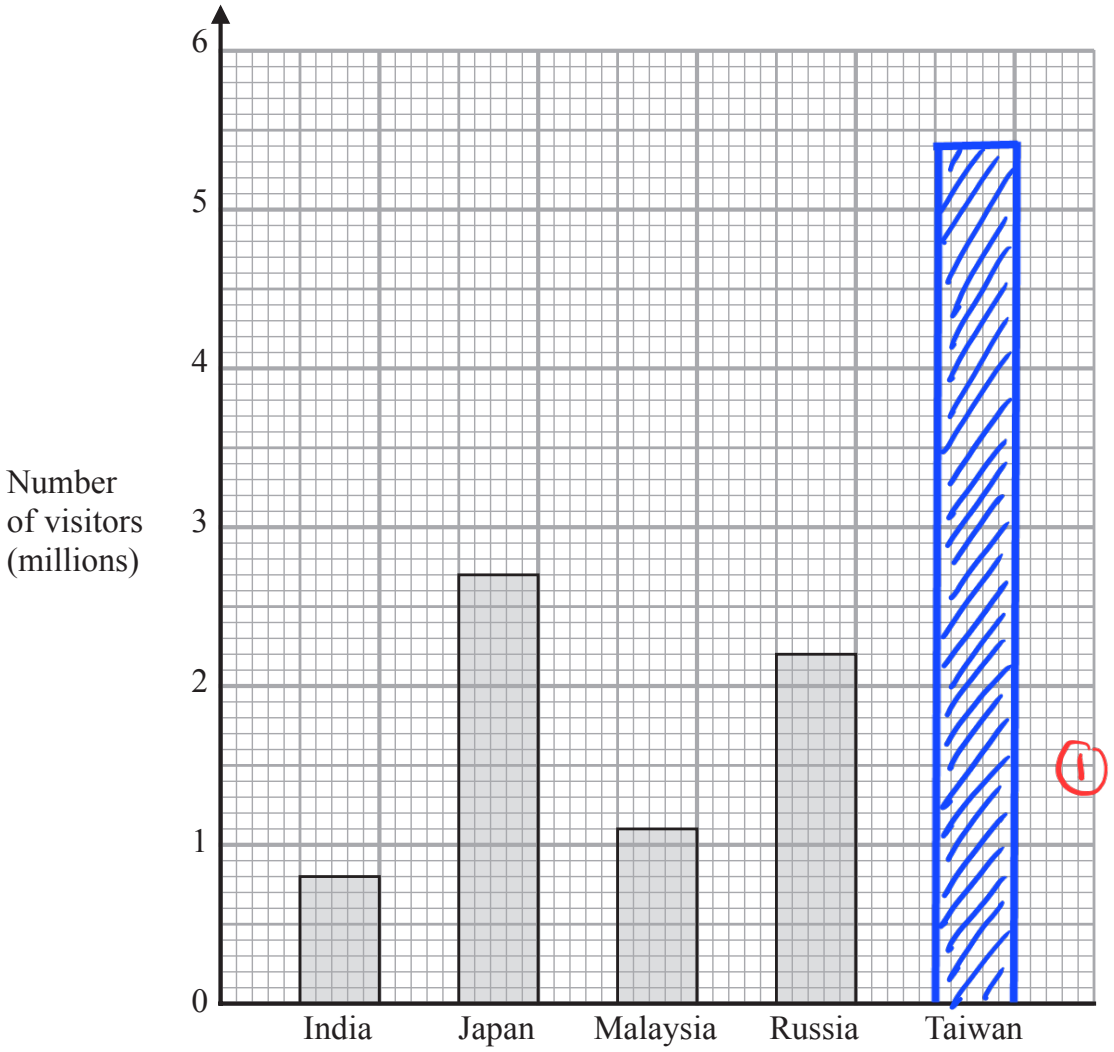
$= 19683$ (1)

19683

(1)

(Total for Question 3 is 3 marks)

4 The bar chart shows information about the number of visitors to China from each of four countries in 2015



(a) Write down the number of visitors from Japan.

2.7 (1) million

(1)

(b) From which country were there 1.1 million visitors?

Malaysia (1)

(1)

The number of visitors from Taiwan was 5.4 million.

(c) Draw a bar on the bar chart to show this information.

(1)

The number of visitors from one country was twice the number of visitors from Malaysia.

(d) Write down the name of this country.

1·1 x 2 = 2.2 million

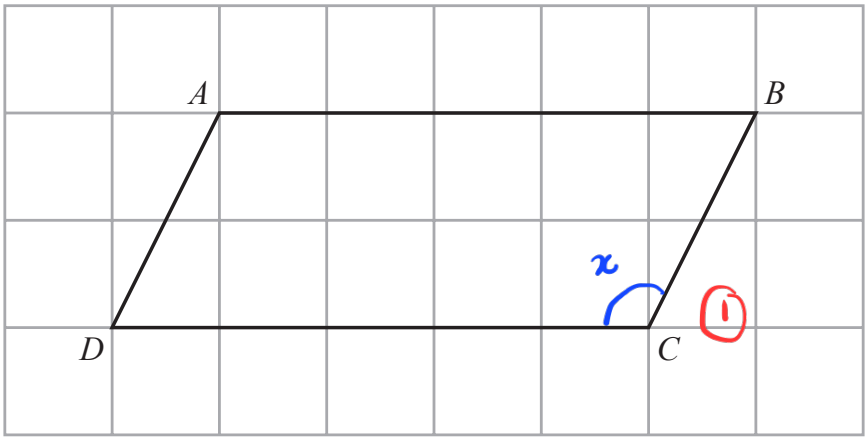
Russia has 2.2 million visitors.

Russia (1)

(1)

(Total for Question 4 is 4 marks)

5 The diagram shows a quadrilateral *ABCD* drawn on a square grid.



(a) Measure the length of *BC*.

3.1 (1) cm

(1)

(b) Write down the mathematical name of quadrilateral *ABCD*.

Parallelogram (1)

(1)

(c) Write down the order of rotational symmetry of quadrilateral *ABCD*.

number of times a shape can fit into itself when rotated 360° about its centre.

2 (1)

(1)

(d) On the diagram, mark an obtuse angle with the letter *x*.

(1)

Obtuse angle = $90° < x < 180°$

Here is a diagram of a trapezium.

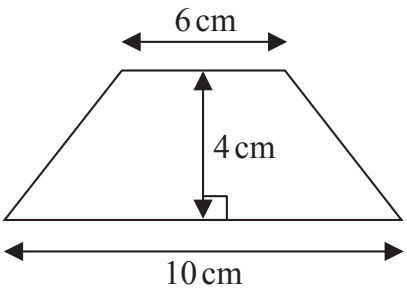


Diagram **NOT** accurately drawn

(e) Work out the area of the trapezium.

Area = $\frac{1}{2} \times (10 + 6) \times 4 = 32\ cm^2$ (1) (1)

32 ..... cm^2

(2)

(Total for Question 5 is 6 marks)

6 There are 32 children in a nursery.

Sandeep buys 5 boxes of balloons.
There are 25 balloons in each box.

Sandeep shares the balloons equally between the 32 children so that each child gets as many balloons as possible.

Work out the number of balloons that are not shared between the 32 children.

Total balloons = $25 \times 5 = 125$ balloons (1)

$$\begin{array}{r} 3 \\ 32\overline{)125} \\ -\ 96 \\ \hline 29 \end{array}$$ (1) (1) balance

(1) 29 balloons

(Total for Question 6 is 4 marks)

7 The diagram shows a trapezium $ABCD$ in which AB and DC are parallel.

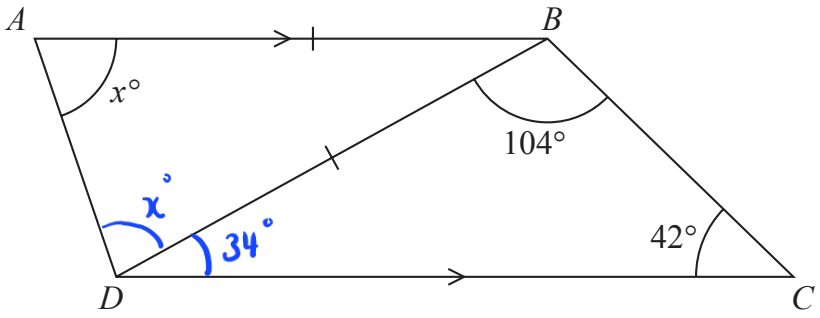


Diagram **NOT** accurately drawn

$AB = DB$

Work out the value of x.
Give a reason for each stage of your working.

angle BDC = 180° - 104° - 42°

= 34° (angle in a triangle sums up to 180°) (1)

angle BAD = angle ADB = x° (because ABD is an isosceles triangle) (1)

angle BAD = 180° - x° - 34° (because co-interior angle adds up to 180°)

x° = 180° - x° - 34° (1)

2x° = 146°

x° = 73° (1)

$x =$ 73

(Total for Question 7 is 4 marks)

8 The following rule is used to work out the total cost, in euros, of hiring a room.

Total cost = 9 euros for each hour plus 20 euros

Paolo hires the room for 5 hours.

(a) Work out the total cost.

$(5 \times 9) + 20$

$= 45 + 20$ (1)

$= 65$ (1)

65 euros

(2)

Agathe also hires the room.
The total cost is 164 euros.

(b) For how many hours does Agathe hire the room?

$\frac{164 - 20}{x \text{ hours}} = 9 \text{ euros per hour}$ (1)

$144 = 9x$

$x = \frac{144}{9}$ (1)

$= 16$ hours (1)

16 hours

(3)

The total cost of hiring the room for n hours is T euros.

(c) Write down a formula for T in terms of n.

$T = 9n + 20$ (2)

$T = 9n + 20$

(2)

(Total for Question 8 is 7 marks)

9 (a) Work out $16 \div 4 + 3 \times 8$

BIDMAS

$(16 \div 4) + (3 \times 8)$

$= 4 + 24 = 28$

28 (1)

(1)

(b) Find the cube root of 5832

use calculator

18 (1)

(1)

(c) Write 85% as a decimal.

$\frac{85}{100} = 0.85$

0.85 (1)

(1)

(d) Write these fractions in order of size.
Start with the smallest fraction.

$\frac{3}{4}$ $\frac{2}{5}$ $\frac{7}{15}$ $\frac{2}{3}$

Compare in decimals :

$\frac{3}{4} = 0.75$ $\frac{7}{15} = 0.46\dot{}$ (1)

$\frac{2}{5} = 0.4$ $\frac{2}{3} = 0.6\dot{}$

$\frac{2}{5}, \frac{7}{15}, \frac{2}{3}, \frac{3}{4}$ (1)

(2)

(e) Write 36 as a fraction of 96
Give your fraction in its simplest form.

divide by common factor

$\frac{36 \div 12}{96 \div 12} \Rightarrow \frac{3}{8}$ (1)

$\frac{3}{8}$ (1)

(2)

(Total for Question 9 is 7 marks)

10 Freda is playing a car racing game on her computer.

She sets up her computer so that her car completes each lap in the same number of seconds.
Her car completes 3 laps in 72 seconds.

To win the game, Freda has to complete 68 laps in less than half an hour.

Does Freda win the game?
Give a reason for your answer.

Find the time she completes in 1 lap :

$\frac{72\ s}{3\ lap} = 24\ s\ per\ lap$ (1)

Find the time taken to complete 68 laps :

68×24 (1) $= 1632\ s \div 60$ ← convert to minutes

$= 27.2\ minute$ (1)

∴ Yes. Freda wins the game. (1)

(Total for Question 10 is 4 marks)

11 Show that $\frac{5}{12} + \frac{3}{8} = \frac{19}{24}$

LHS : $\frac{5 \times 2}{12 \times 2} + \frac{3 \times 3}{8 \times 3}$ — common denominator of 24

$= \frac{10}{24} + \frac{9}{24}$ (1)

$= \frac{19}{24}$ (shown) (1)

(Total for Question 11 is 2 marks)

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12 (a) Expand $4(m + 2)$

$4(m+2) = 4m + 8$ (1)

$4m + 8$

(1)

(b) Solve $2x + 5 = -19$

$2x + 5 = -19$

$2x = -19 - 5$ $\quad -5$

$2x = -24$

$x = \frac{-24}{2}$ $\quad \div 2$ (1)

$x = -12$ (1)

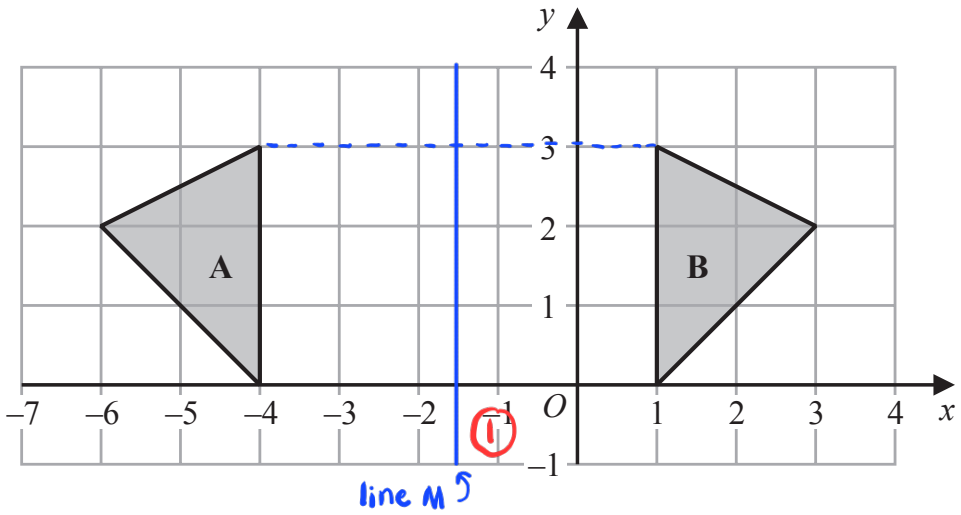
$x =$ -12

(2)

(Total for Question 12 is 3 marks)

13

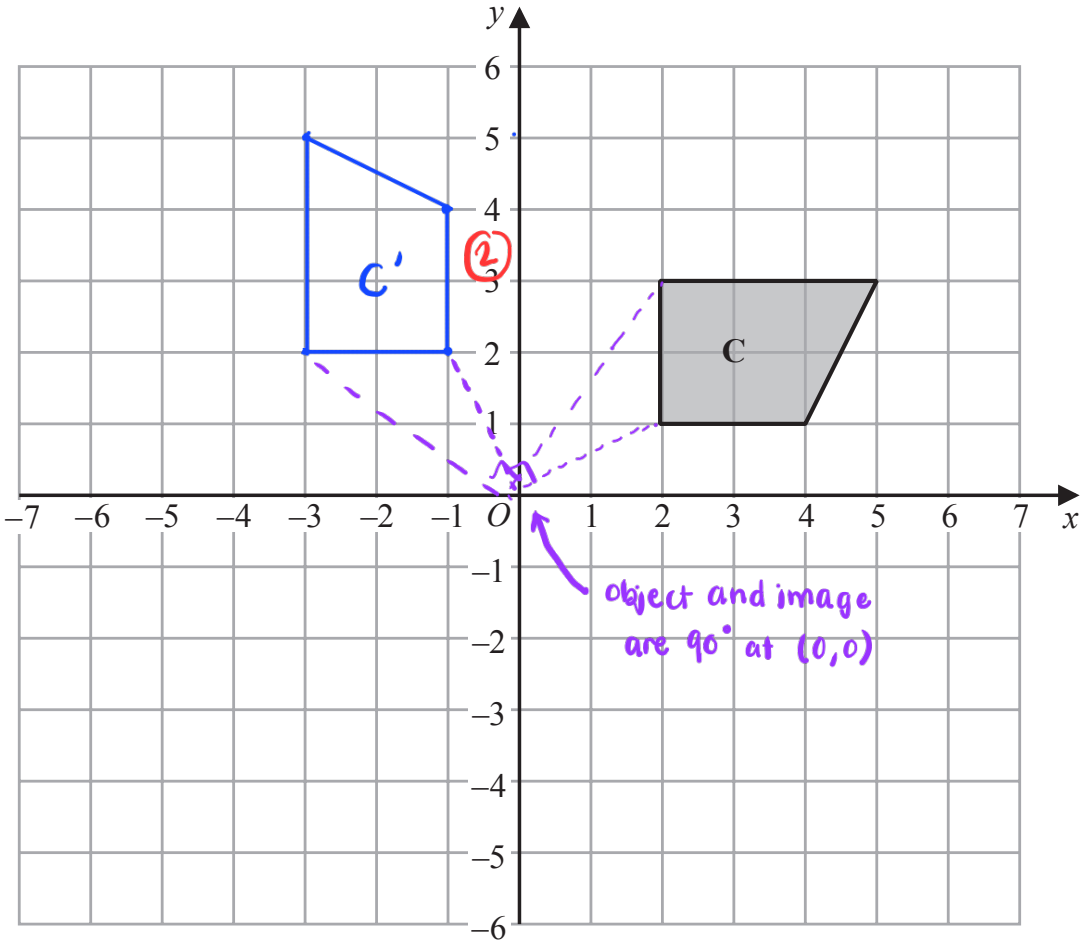
(5 square ÷ 2) = 2.5 square



On the grid above, triangle **A** is the reflection of triangle **B** in the mirror line M.

(a) On the grid, draw the mirror line M.
Label the line M.

(1)

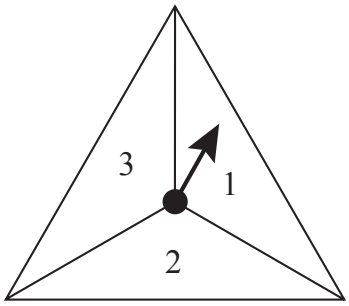


(b) On the grid above, rotate the shaded shape **C** 90° anticlockwise about the point with coordinates (0, 0)

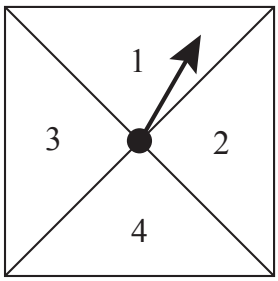
(2)

(Total for Question 13 is 3 marks)

14 Here are two fair spinners.



Spinner **A**



Spinner **B**

Chanthira spins each spinner once.

She adds together the number that spinner **A** lands on and the number that spinner **B** lands on to find the score.

(a) Complete the table to show all possible scores.
Three scores have been done for you.

sum of spinner A and B

Spinner **A** \ Spinner **B**	**1**	**2**	**3**	**4**
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7

(2)

(b) Find the probability that the score will be 4 or less.

Total possible scores = 12 (1)

Total scores of 4 or less : 6

Probability of the score will be 4 or less :

$\frac{6}{12}$ (1)

$\frac{6}{12}$

(2)

Chanthira now spins both spinners together 84 times.

(c) Find an estimate for the number of times that spinner **A** and spinner **B** land on the same number.

Probability of both spinners land on same number :

$\frac{3}{12}$ (1) ($\frac{1}{12}$ for each 1, 2 and 3 numbers)

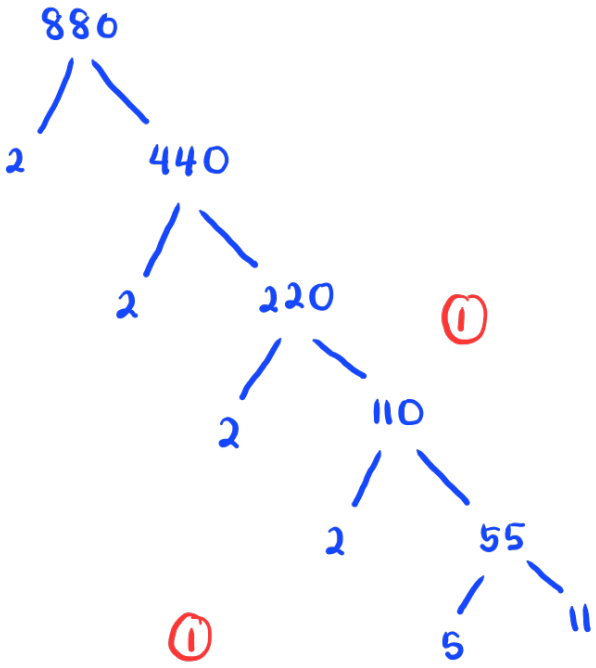
$\frac{3}{12} \times 84 = 21$ times (1)

21

(2)

(Total for Question 14 is 6 marks)

15 Write 880 as a product of powers of its prime factors.
Show your working clearly.



(1)

$2 \times 2 \times 2 \times 2 \times 5 \times 11 = 880$

$2^4 \times 5 \times 11 = 880$ (1)

$2^4 \times 5 \times 11$

(Total for Question 15 is 3 marks)

16 (a) Write 2.46×10^6 as an ordinary number.

2.460000 ← ×10 six times

$= 2460\,000$ (1)

2460 000

(1)

(b) Write 0.000 74 in standard form.

0.00074 ← 4 times

$= 7.4 \times 10^{-4}$ (1)

7.4×10^{-4}

(1)

(c) Work out $(5.6 \times 10^6) + (2.3 \times 10^5)$

$(5.6 \times 10^6) + (2.3 \times 10^5)$

$= (56 \times 10^5) + (2.3 \times 10^5)$ ← convert to 10^5

$= (56 + 2.3) \times 10^5$

$= 58.3 \times 10^5$ (1)

$= 5.83 \times 10^6$ (1) ← convert back to 10^6 for standard form

5.83×10^6

(2)

(Total for Question 16 is 4 marks)

17 Alexa has five cards.
Each card has a number on it.

The table gives information about the numbers on the five cards.

Total	Median	Mode	Range
45	8	5	10

Using the information in the table, complete each card by writing its number on it.

Median : 8 (means two number smaller and two number larger than 8)

Mode : 5 (means appear the most . since 8 is median, there are two 5s)

Range : 10 . (since 5 is the smallest number, largest number is 15)

Total : 45 . the remaining card is 45 - 5 - 5 - 8 - 15 = 12

5	5	8	12	15

(3)

(Total for Question 17 is 3 marks)

---

18 The length of a book is 33.8 cm, correct to one decimal place.

(a) Write down the lower bound of the length of the book.

33.75 (1) cm

(1)

(b) Write down the upper bound of the length of the book.

33.85 (1) cm

(1)

(Total for Question 18 is 2 marks)

---

19 Nav has worked out $\dfrac{68.3 \times 42.8}{0.021}$ on his calculator.

His answer is 139 201.9048

Without using a calculator and using suitable approximations, check that his answer is sensible.
Show your working clearly.

For approximation :

let 68.3 = 70 ← round up

42.8 = 40 ← round down

0.021 = 0.02

$$\frac{70 \times 40}{0.02} \text{ (1)} = \frac{2800}{0.02} = \frac{2800}{\frac{2}{100}}$$

$$= \frac{280000}{2}$$

= 140 000 . Yes his answer is sensible .
(1)

(Total for Question 19 is 2 marks)

20 Markus makes a steel framework.
The framework is in the shape of the right-angled triangle ABC shown in the diagram.

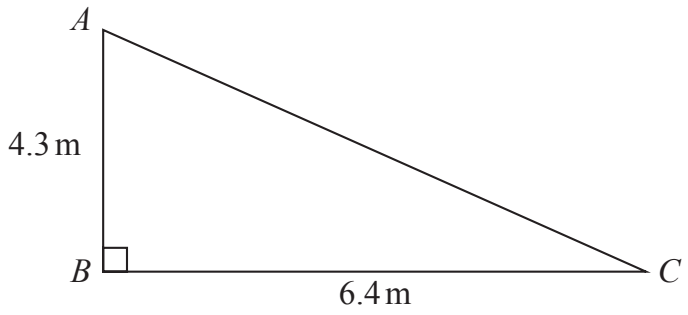


Diagram **NOT** accurately drawn

The steel that Markus uses costs \$22 per metre.
The steel can **only** be bought in a length that is a whole number of metres.

Work out the total cost of the steel that Markus buys in order to make the framework.

Finding length AC using Pythagoras' Theorem :

$AC = \sqrt{4.3^2 + 6.4^2}$ (1)

$= 7.71$ m (1)

Finding total length of framework :

$7.71 \text{ m} + 4.3 \text{ m} + 6.4 \text{ m} = 18.4 \text{ m}$

∴ Since steel can only be bought in whole number of metres, round up 18.4 m to 19 m.

↖ cannot round down to 18 m. Not enough for total framework.

Total cost of steel : $19 \times \$22$ (1)

$= \$418$ (1)

\$ 418

(Total for Question 20 is 4 marks)

21 Alison buys 2 boxes of strawberries, box **A** and box **B**.

Box **A** contains 15 strawberries.
The strawberries in box **A** have a mean weight of 24 grams.

Box **B** contains 25 strawberries.
The strawberries in box **B** have a mean weight of 18 grams.

Alison puts all 40 strawberries into a bowl.
Work out the mean weight of the 40 strawberries.

mean = total weight / no. of strawberry

Calculating total weight of box A :

$24 \times 15 = 360$ g

Calculating total weight of box B :

$18 \times 25 = 450$ g (1)

Calculating total weight of all strawberries :

$360 + 450 = 810$ g (1)

Mean weight of 40 strawberries :

$\frac{810 \text{ g}}{40} = 20.25$ g (1)

20.25 grams

(Total for Question 21 is 3 marks)

22 (a) Factorise $x^2 - x - 42$

$(x+6)(x-7)$ (2)

$(x+6)(x-7)$

(2)

(b) Solve the inequality $3x + 15 < 8x + 3$

Show clear algebraic working.

$3x + 15 < 8x + 3$

$15 - 3 < 8x - 3x$ (1)

$12 < 5x$ (1)

$\frac{12}{5} < x$ (1)

$x > \frac{12}{5}$

(3)

(Total for Question 22 is 5 marks)

---

23 Given that $150^x = 1$

(a) write down the value of x.

$x^0 = 1$ (1)

$x =$ 0

(1)

Given that $3^{-8} \div 3^{-6} = 3^n$

(b) find the value of n.

$\frac{3^{-8}}{3^{-6}} = 3^n$

$3^{(-8-(-6))} = 3^n$

$3^{-2} = 3^n$

$n = -2$ (1)

$a^m \times a^n = a^{m+n}$

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

$n =$ -2

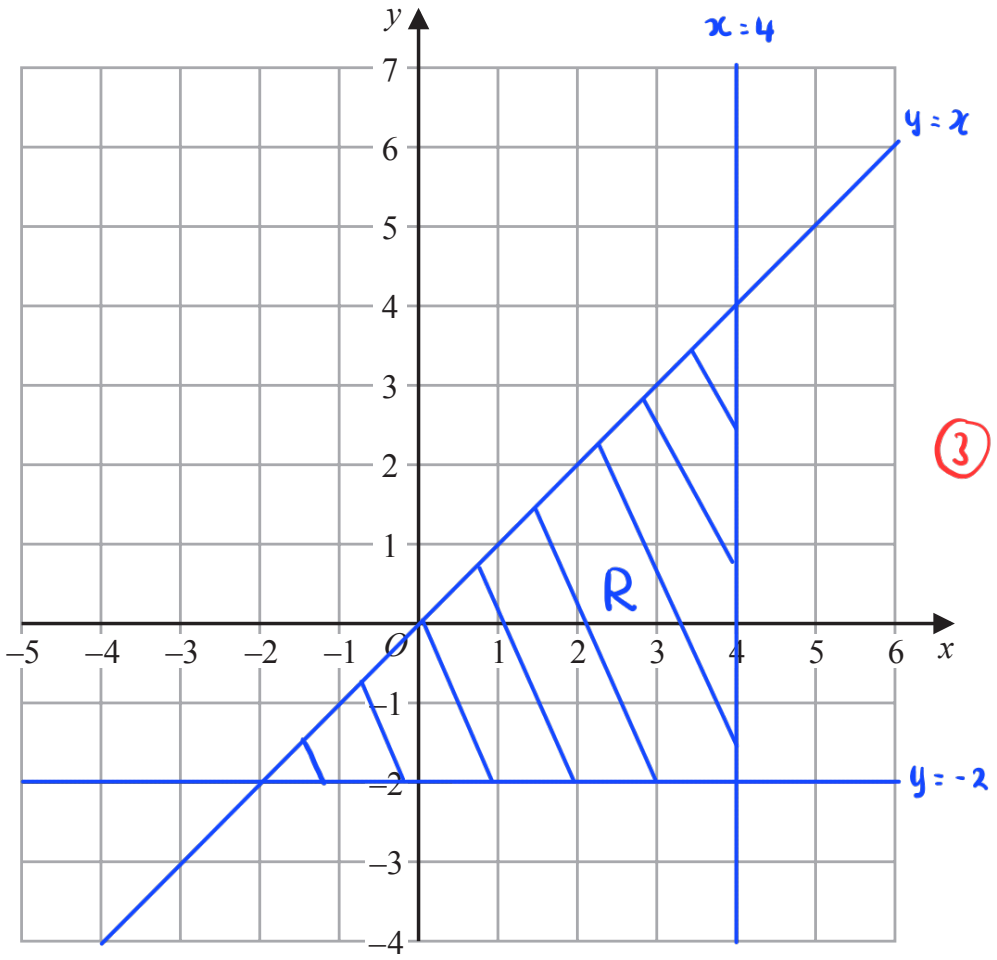
(1)

(Total for Question 23 is 2 marks)

24 Show, by shading on the grid, the region that satisfies all three of the inequalities

$x \leqslant 4$ and $y \geqslant -2$ and $y \leqslant x$

Label the region **R**.



3

(Total for Question 24 is 3 marks)

25 Find the gradient of the straight line with equation $5x + 2y = 7$

Equation of straight line : $y = mx + c$

Rearrange equation to $y = mx + c$

where m = gradient

c = y-intercept

$5x + 2y = 7$

$2y = -5x + 7$

$y = \boxed{-\frac{5}{2}}x + \frac{7}{2}$ (1)

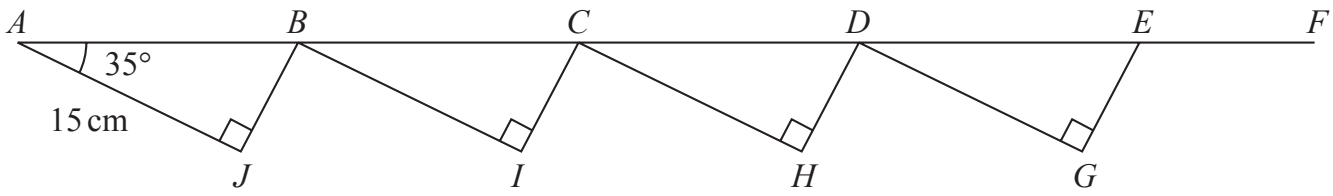
↖ gradient, m

$-\frac{5}{2}$ (1)

(Total for Question 25 is 2 marks)

26 The diagram shows four congruent right-angled triangles *ABJ*, *BCI*, *CDH* and *DEG*.
The diagram also shows the straight line *ABCDEF*.

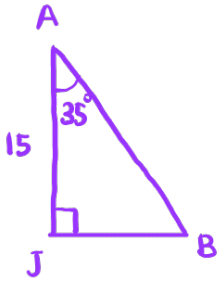
Diagram **NOT** accurately drawn



AJ = 15 cm
Angle *BAJ* = 35°

AF = 80 cm

Work out the length of *EF*.
Give your answer correct to 3 significant figures.



$\cos 35^\circ = \frac{AJ}{AB}$

$AB = \frac{AJ}{\cos 35^\circ}$

length AB = $\frac{15 \text{ cm}}{\cos 35^\circ}$ (1)

= 18.3 cm (1)

since all triangles are congruent :

length AE = 4 × 18.3 cm

= 73.2 cm (1)

length EF = AF − AE

= 80 − 73.2 (1)

= 6.75 cm (1)

6.75 ..... cm

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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