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

Candidate surname | Other names

**Pearson Edexcel**
**International GCSE**

Centre Number | Candidate Number

# Wednesday 13 January 2021

Afternoon (Time: 2 hours) | Paper Reference **4MA1/2F**

## Mathematics A

**Paper 2F**
**Foundation Tier**

**You must have:**
Ruler graduated in centimetres and millimetres, protractor, 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* ▶

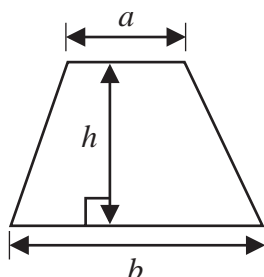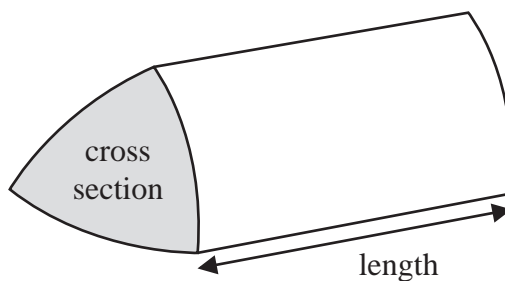P66299A
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**Pearson**

**International GCSE Mathematics**

**Formulae sheet – Foundation Tier**

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



**Volume of prism** = area of cross section × length



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

**Curved surface area of cylinder** $= 2\pi r h$

*P66299A0228*
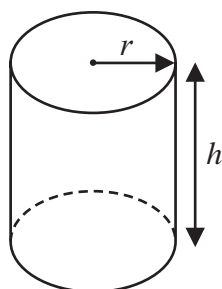
**Answer ALL TWENTY FOUR questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

1 Here is a list of numbers in a box.

| 6 | 8 | 17 | 36 | 44 | 76 | 91 |
|---|---|----|----|----|----|----|

From the numbers in the list, write down

(a) a multiple of 11

........................................ 44 ①

**(1)**

(b) a factor of 30

........................................ 6 ①

**(1)**

(c) a square number

........................................ 36 ①

**(1)**

(d) a prime number

........................................ 17 ①

**(1)**

(e) two numbers whose sum is 84

$76 + 8 = 84$

........................ 76 and ........................ 8 ①

**(1)**

**(Total for Question 1 is 5 marks)**

P 6 6 2 9 9 A 0 3 2 8

**2** The students in class 7T were asked how they got to school one day.

Here is a list of their method of travel to school.

| walk | bus | bicycle | walk | bus |
|---|---|---|---|---|
| bicycle | walk | car | bus | bicycle |
| bus | bicycle | bus | car | walk |
| walk | bus | walk | walk | car |

(a) Complete the frequency table for the methods of travel in the list.

| Method of travel | Tally | Frequency |
|---|---|---|
| walk | ⅢⅠ ‖ | 7 |
| bus | ⅢⅠ Ⅰ | 6 |
| bicycle | ‖‖ | 4 |
| car | ‖Ⅰ | 3 |

②

(2)

(b) Draw a bar chart for the information in your table.



③

(3)

**(Total for Question 2 is 5 marks)**

4

**3** The temperature in New York is –2 °C

At the same time, the temperature in Rabat is 16 °C higher than the temperature in New York.

(a) Work out the temperature in Rabat.

−2 + 16 = 14 °C

.......................................... 14 ① °C

**(1)**

Also, at the same time, the temperature in Helsinki is 17 °C lower than the temperature in New York.
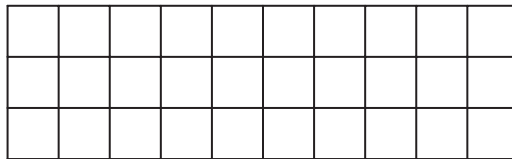
(b) Work out the temperature in Helsinki.

−2 − 17 = −19 °C

.......................................... − 19 ① °C

**(1)**

**(Total for Question 3 is 2 marks)**

**4** A rectangle is made from 30 small coloured square tiles.

There are yellow tiles, blue tiles and red tiles.

30% of the rectangle is made from yellow tiles.

$\frac{1}{3}$ of the rectangle is made from blue tiles.

The rest of the rectangle is made from red tiles.

(a) Work out the number of red tiles.

$\frac{1}{3} \times 30 = 10$ blue tiles ①

$0.3 \times 30 = 9$ yellow tiles ①

$30 - 10 - 9 = 11$ red tiles ①

.................................................. 11

(3)

(b) Put the following numbers in order of size.
Start with the smallest number.

0.76          25%          0.0766          8%          0.026
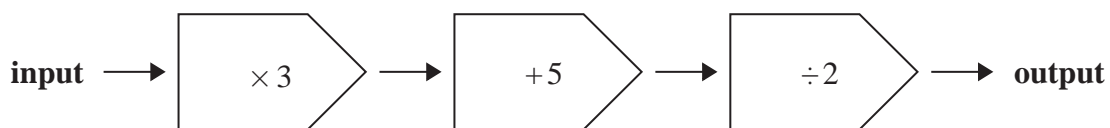
0.25                        0.08                        ①

0.026, 0.0766, 8%, 25%, 0.76 ①

..................................................

(2)

**(Total for Question 4 is 5 marks)**

**5** Here is a number machine.

input → [ × 3 ] → [ + 5 ] → [ ÷ 2 ] → **output**

(a) Work out the output when the input is 7

$7 \times 3 = 21$

$21 + 5 = 26$

$26 \div 2 = 13$

13 ①

........................................

(1)

(b) Work out the input when the output is 160

$160 \times 2 = 320$ ①

$320 - 5 = 315$

$315 \div 3 = 105$

105 ①

........................................

(2)

When the input is *n*, the output is *P*.

(c) Find a formula for *P* in terms of *n*.

$P = \dfrac{(n \times 3 + 5)}{2}$

$P = \dfrac{3n + 5}{2}$ ②

$P = \dfrac{3n + 5}{2}$

........................................

(2)

**(Total for Question 5 is 5 marks)**

*Turn over* ▶

**6** The diagram shows a solid prism.
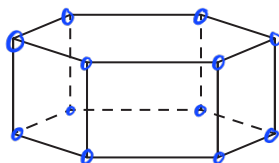


(a) How many vertices has the prism?

........................................ 12 ①

**(1)**

(b) How many faces has the prism?

........................................ 8 ①

**(1)**

(c) Using ruler and compasses only, in the space below construct the equilateral
triangle *ABC* with sides of length 7 cm.
You must show all your construction lines.

Side *AB* has already been drawn for you.



②

*A*                               *B*

**(2)**
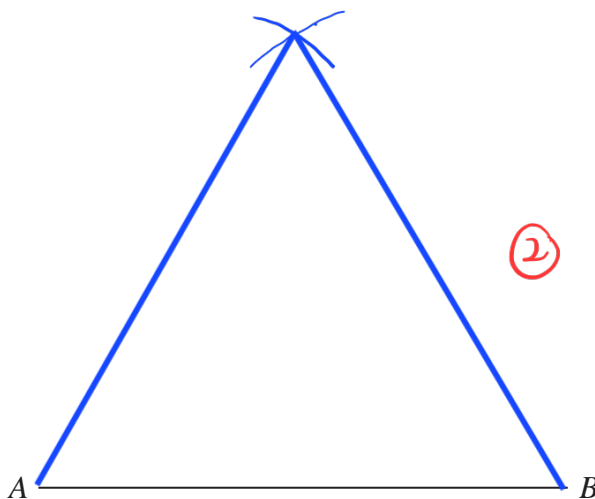
**(Total for Question 6 is 4 marks)**

**7** (a) Simplify $p + p + p + p + p + p$

$$6p \quad ①$$
(1)

(b) Simplify $5y^2 + 6y^2 - 3y^2$

$= (5 + 6 - 3)y^2$

$= 8y^2$

$$8y^2 \quad ①$$
(1)

(c) Simplify $e \times e \times e \times e \times e$

$e^5$

$$e^5 \quad ①$$
(1)

(d) Simplify $5c \times 4d$

$5c \times 4d$

$5 \times 4 \times c \times d = 20cd$

$$20cd \quad ①$$
(1)

(e) Solve $x - 7 = 19$

$x - 7 = 19$

$x = 19 + 7 = 26$

$x =$ $\quad 26 \quad ①$
(1)

$18^2 + 15^2 - 5^3 = 4n$

(f) Work out the value of $n$.

$18^2 + 15^2 - 5^3 = 4n$

$424 = 4n \quad ①$

$n = 424 \div 4$

$n = 106$

$n =$ $\quad 106 \quad ①$
(2)

(g) Factorise $9t - 6$

$9t - 6$

$3(3t - 2)$

$$3(3t - 2) \quad ①$$
(1)

**(Total for Question 7 is 8 marks)**

DO NOT WRITE IN THIS AREA

**8** Paolo has a bag of flour.
The flour in the bag has a weight of 3 kilograms.

Paolo makes 8 pies using the flour in the bag.

3 of the pies each need 150 grams of the flour.
5 of the pies each need 180 grams of the flour.

Work out the weight of flour that remains in the bag when Paolo has made these pies.
Give your answer in grams.

$$150 \times 3 = 450\,g \qquad\qquad 1kg = 1000\,g$$

$$180 \times 5 = 900\,g$$

$$450\,g + 900\,g = 1350\,g \quad \text{①}$$

$$3kg \times 1000 = 3000\,g \quad \text{①}$$

$$3000 - 1350 = 1650\,g \quad \text{①}$$

1650 ....................................................... grams

**(Total for Question 8 is 3 marks)**

P 6 6 2 9 9 A 0 1 0 2 8

**9** Grace has a fair spinner and a fair dice.

The spinner is 3-sided and can land on 6, 7 or 8
The dice can land on 1, 2, 3, 4, 5 or 6
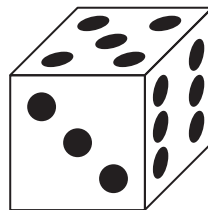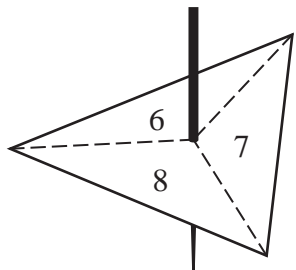
Grace spins the spinner once and throws the dice once.

Grace subtracts the number that the dice lands on from the number that the spinner lands on to get her score.

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

**Number on dice**

|  |  | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Number on spinner** | **6** | 5 | 4 | 3 | 2 | 1 | 0 |
| | **7** | 6 | 5 | 4 | 3 | 2 | 1 |
| | **8** | 7 | 6 | 5 | 4 | 3 | 2 |

②

(2)

Grace spins the spinner once and throws the dice once.

(b) Find the probability that her score is less than 6

$$\frac{15}{18}$$

$$\frac{15}{18}$$ ①
.........................................
(1)

(c) Find the probability that her score is an odd number.

$$\frac{9}{18}$$

$$\frac{9}{18}$$ ①
.........................................
(1)

**(Total for Question 9 is 4 marks)**

**10** The diagram shows a right-angled triangle.

Diagram **NOT** accurately drawn

$4x$ cm

$(6x + 11)$ cm

$(9x - 18)$ cm
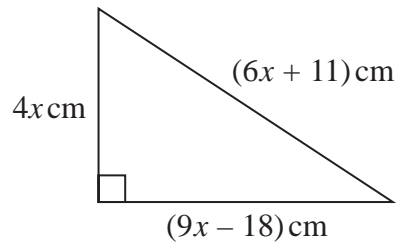
The perimeter of the triangle is 126 cm.

Work out the area of the triangle.

Perimeter $= 4x + 6x + 11 + 9x - 18$

$= 19x - 7$

$126 = 19x - 7$ ①

$126 + 7 = 19x$

$133 = 19x$

$x = 7$ ①

Length of triangle $= 9(7) - 18$

$= 45$ cm

Height of triangle $= 4 \times 7$

$= 28$ cm

Area of triangle $= \frac{1}{2} \times 28 \times 45$ ①

$= 630$ cm$^2$

..................................... 630 ① cm$^2$

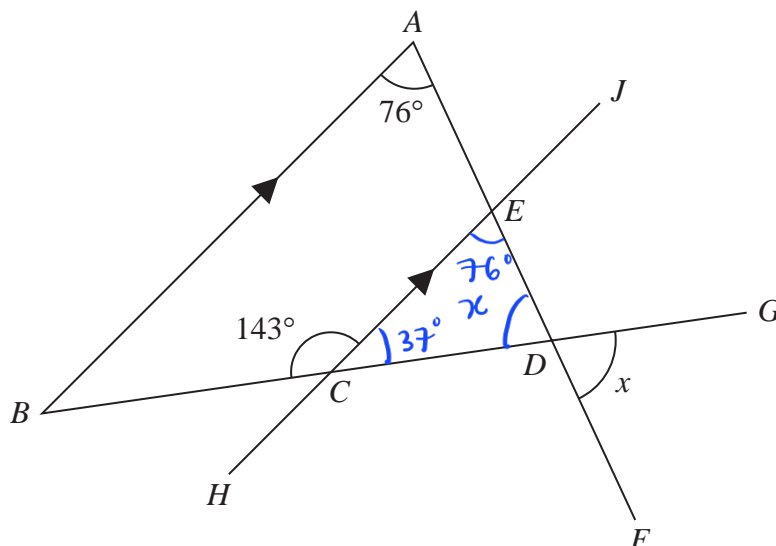**(Total for Question 10 is 4 marks)**

**11**

Diagram **NOT** accurately drawn

*ABD* is a triangle.

*AEDF*, *BCDG* and *HCEJ* are straight lines.
*BA* is parallel to *HCEJ*.

Work out the size of the angle marked *x*.

$$ECD = 180° - 143° = 37°$$

$$x = 180° - 76° - 37° = 67°$$

67 °

**(Total for Question 11 is 3 marks)**

*Turn over* ▶

**12** Elvira and Anja go on holiday to Sweden and to Finland.

In Sweden, Elvira bought some trainers for 438 Swedish krona.
In Finland, Anja bought the same type of trainers for 44.39 euros.

1 Swedish krona = 0.12 dollars

1 dollar        = 0.92 euros

Work out the difference in the cost of the trainers bought by Elvira and the trainers bought by Anja.
Give your answer in dollars.

$438 \times 0.12 = 52.56$ dollars  ①

$44.39 \div 0.92 = 48.25$ dollars  ①

$52.56 - 48.25 = 4.31$ dollars
①            ①

................................ 4.31 ................................ dollars

(**Total for Question 12 is 4 marks**)

*P66299A01428*

**13** The diagram shows the positions of three villages, *R*, *T* and *W*.

North

North

Diagram **NOT** accurately drawn

125°

*R*

84°

*W*

*T*
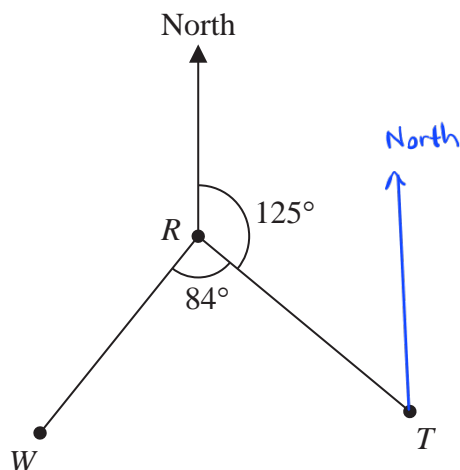
(a) Work out the bearing of village *W* from village *R*.

$125° + 84° = 209°$

209 ① ..................................... °

**(1)**

(b) Work out the bearing of village *R* from village *T*.

$180° - 125° = 55°$

① $360 - 55 = 305$

305 ① ..................................... °

**(2)**

**(Total for Question 13 is 3 marks)**

P 6 6 2 9 9 A 0 1 5 2 8

**14** The diagram shows a trapezium.
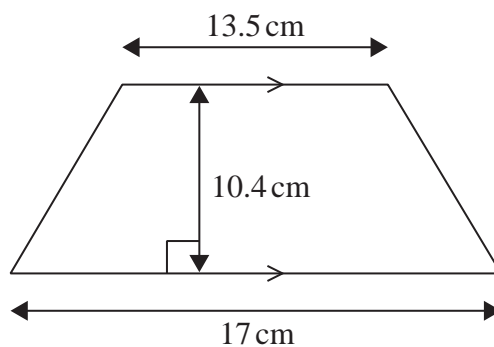
13.5 cm

Diagram **NOT** accurately drawn

10.4 cm

17 cm

(a) Work out the area of the trapezium.

$$= \frac{1}{2} \times (17 + 13.5) \times 10.4 \quad ①$$

$$= \frac{1}{2} \times 30.5 \times 10.4$$

$$= 158.6 \quad ①$$

............158.6............ cm²

**(2)**

The diagram shows a cuboid.

Diagram **NOT** accurately drawn

$x$ cm

8 cm

15.5 cm
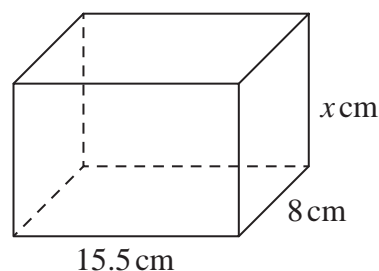
The volume of the cuboid is $806 \text{ cm}^3$

(b) Work out the value of $x$.

$$\text{volume of cuboid} = 15.5 \times 8 \times x$$

$$= 124 x$$

$$806 = 124 x \quad ①$$

$$x = 806 \div 124 \quad ①$$

$$x = 6.5 \quad ①$$

$x = $ ............6.5............

**(3)**

**(Total for Question 14 is 5 marks)**

15 A train takes 6 hours 39 minutes to travel from New Delhi to Kanpur.
The train travels a distance of 429 km.

Work out the average speed of the train.
Give your answer in km/h correct to one decimal place.

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

1 hour = 60 minutes

$$\text{time} = 6 + \frac{39}{60} \text{ hours}$$

$$= 6 + 0.65 \text{ hours}$$

$$= 6.65 \text{ hours} \quad ①$$

$$\text{speed} = \frac{429 \text{ km}}{6.65 \text{ hours}} \quad ①$$

$$= 64.5 \text{ km/h} \quad (1dp)$$

64.5 ① ........................................... km/h

(**Total for Question 15 is 3 marks**)

P 6 6 2 9 9 A 0 1 7 2 8

**16** Ava writes down five whole numbers.

For these five numbers

the median is 7  *– 7 should be in the middle*

the mode is 8  *– 8 should appear twice*

the range is 5  *– smallest number can be obtained by 8–5*

Find a possible value for each of the five numbers that Ava writes down.

*8 – 5 = 3*

*3, 5, 7, 8, 8*  *③*

*3, 5, 7, 8, 8*

**(Total for Question 16 is 3 marks)**

*P 6 6 2 9 9 A 0 1 8 2 8*

**17** Gladys buys a table for $465 to sell in her shop.

She sells the table for $520

(a) Work out the percentage profit that Gladys makes from the sale of the table.
Give your answer correct to 3 significant figures.

$$\text{Profit} = 520 - 465$$
$$= 55 ①$$
$$\% \text{ profit} = \frac{55}{465} \times 100\% ①$$
$$= 11.8\% \ (3sf) ①$$

.................................................... 11.8 %

**(3)**

Gladys has a sale in her shop.

She decreases all the normal prices by 12%
The normal price of an armchair was $550

(b) Work out the sale price of the armchair.

$$100\% - 12\% = 88\%$$

$$\frac{88}{100} \times 550 = 484 \quad ②$$

$ .................................................... 484 ①

**(3)**

**(Total for Question 17 is 6 marks)**

P 6 6 2 9 9 A 0 1 9 2 8

**18**

$x = 1.5$

$x + y = 6$

$y = x$

③

①
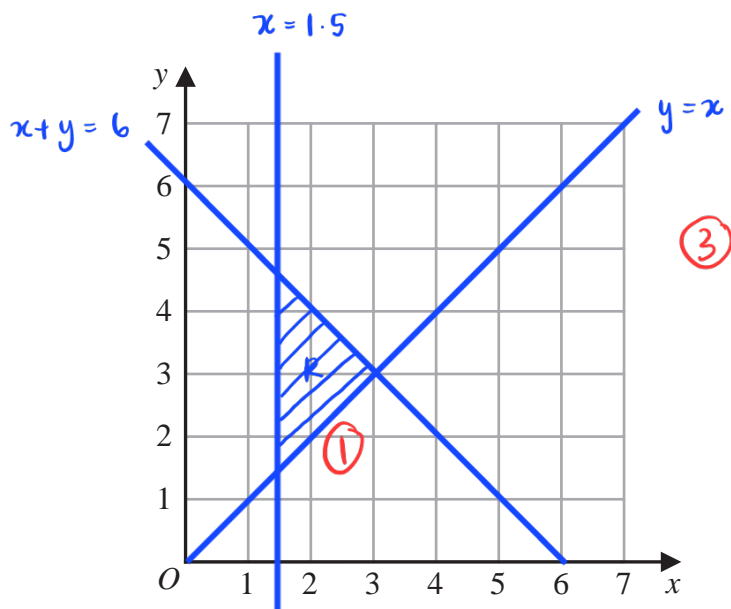
(a) On the grid, draw and **label** the straight line with equation

(i)  $x = 1.5$

(ii)  $y = x$

(iii)  $x + y = 6$

**(3)**

(b) Show, by shading on the grid, the region that satisfies **all three** of the inequalities

$$x \geqslant 1.5 \qquad y \geqslant x \qquad x + y \leqslant 6$$

Label the region **R**.

**(1)**

**(Total for Question 18 is 4 marks)**

**19** (a) Expand and simplify $4x(2x + 5) - 3x(2x - 3)$

$$= 4x(2x+5) - 3x(2x-3)$$
$$= 8x^2 + 20x - 6x^2 + 9x \quad ①$$
$$= 2x^2 + 29x \quad ①$$

$$\underline{2x^2 + 29x}$$
.......................................................
**(2)**

Given that $\dfrac{y^5 \times y^n}{y^6} = y^{13}$

(b) work out the value of $n$.

$$\frac{y^5 \times y^n}{y^6} = y^{13}$$
$$y^{5+n-6} = y^{13}$$
$$n - 1 = 13 \quad ①$$
$$n = 14 \quad ①$$

$n = \underline{\quad 14 \quad}$
**(2)**

(c) (i) Solve the inequality $7t - 8 < 2t + 7$

$$7t - 8 < 2t + 7$$
$$7t - 2t < 8 + 7$$
$$5t < 15 \quad ①$$
$$t < 3 \quad ①$$

$$\underline{t < 3}$$
.......................................................
**(2)**

(ii) On the number line below, represent the solution set of the inequality solved in part (c)(i)



**(1)**
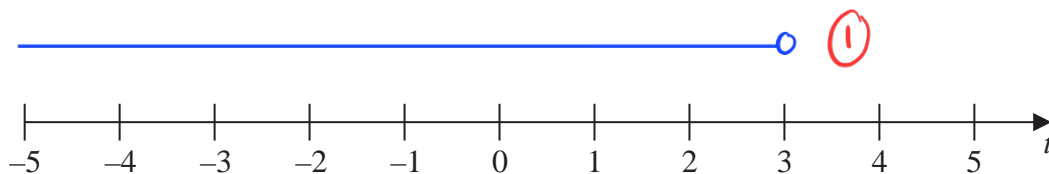
**(Total for Question 19 is 7 marks)**

**20** (a) Write down the value of $y^0$

1 ①

(1)

(b) Work out $\dfrac{9.6 \times 10^{141} + 6.4 \times 10^{140}}{3.2 \times 10^{16}}$

Give your answer in standard form.

$$\approx \dfrac{9.6 \times 10^{141} + 6.4 \times 10^{140}}{3.2 \times 10^{16}}$$

$$= \dfrac{9.6 \times 10^{141} + 0.64 \times 10^{141}}{3.2 \times 10^{16}}$$

$$= \dfrac{10.24 \times 10^{141}}{3.2 \times 10^{16}} \quad ①$$

$$= \dfrac{10.24}{3.2} \times 10^{141-16} \quad ①$$

$$= 3.2 \times 10^{125} \quad ①$$

$3.2 \times 10^{125}$

(3)

**(Total for Question 20 is 4 marks)**

**21** There are 5 cocoa pods in a bag.
The mean weight of the 5 cocoa pods is 398 grams.

A sixth cocoa pod is put into the bag.
The mean weight of the 6 cocoa pods is 401 grams.

Work out the weight of the sixth cocoa pod that is put into the bag.

weight of 5 cocoa pods = 398 × 5 = 1990 ①

weight of 6 cocoa pods = 401 × 6 = 2406

weight of sixth cocoa pod = 2406 − 1990 ①

= 416 ①

........................................ 416 grams

**(Total for Question 21 is 3 marks)**

P 6 6 2 9 9 A 0 2 3 2 8

**22** *A*, *B* and *C* are points on a circle with centre *O*.
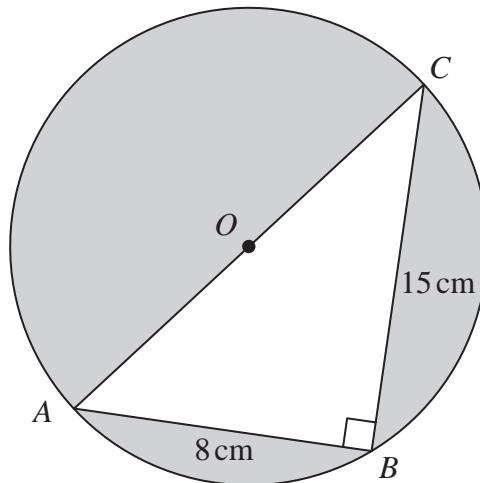


Diagram **NOT** accurately drawn

*AOC* is a diameter of the circle.

*AB* = 8 cm     *BC* = 15 cm

Angle *ABC* = 90°

Work out the total area of the regions shown shaded in the diagram.
Give your answer correct to 3 significant figures.

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

Area of triangle $= \frac{1}{2} \times 8 \times 15 \times \sin 90°$

$= 60$

$AC = \sqrt{8^2 + 15^2}$ ①

$= 17$ ①

radius of circle $= 17 \div 2 = 8.5$ cm

Area of circle $= \pi r^2$

$= \pi (8.5)^2$

$= 226.98$ ①

Area of shaded region $= 226.98 - 60$ ①

$= 166.98$

$= 167 \ (3sf)$ ①

167 ............................................... cm²

**(Total for Question 22 is 5 marks)**

**23**

$$A = 2^3 \times 3^2 \times 5^2 \times 11$$
$$B = 2^4 \times 3 \times 5^4 \times 13$$

Find the lowest common multiple (LCM) of *A* and *B*.
Give your answer as a product of powers of prime numbers.

$2^4 \times 3^2 \times 5^4 \times 11 \times 13$   ②

$2^4 \times 3^2 \times 5^4 \times 11 \times 13$
...............................................

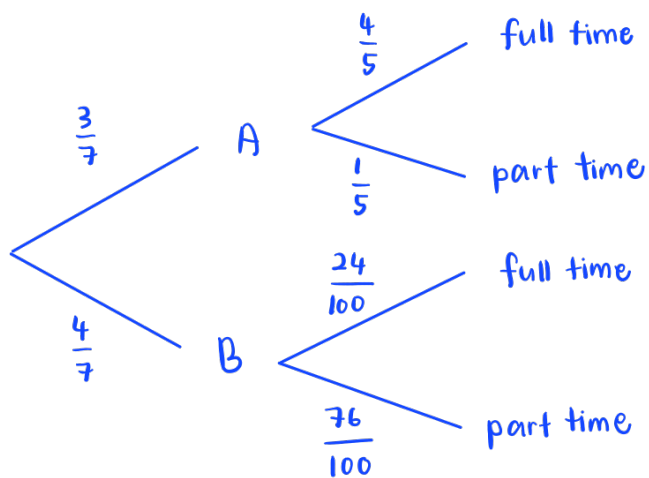**(Total for Question 23 is 2 marks)**

**24** The people working for a company work in Team A or in Team B.

$$\text{number of people in Team A} : \text{number of people in Team B} = 3:4$$

$\dfrac{4}{5}$ of Team A work full time.

24% of Team B work full time.

Work out what fraction of the people working for the company work full time.
Give your fraction in its simplest form.

Team A full time $= \dfrac{3}{7} \times \dfrac{4}{5}$

$= \dfrac{12}{35}$ ①

Team B full time $= \dfrac{4}{7} \times \dfrac{24}{100}$

$= \dfrac{24}{175}$ ①

Total people working full time $= \dfrac{12}{35} + \dfrac{24}{175} = \dfrac{12}{25}$

$\dfrac{12}{25}$ ①

**(Total for Question 24 is 3 marks)**

**TOTAL FOR PAPER IS 100 MARKS**

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