Write your name here

Surname		Other names

Pearson Edexcel International GCSE

Centre Number

Candidate Number

Mathematics A
Level 1/2
Paper 2F

Foundation Tier

Thursday 7 June 2018 – Morning	Paper Reference
Time: 2 hours	**4MA1/2F**

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
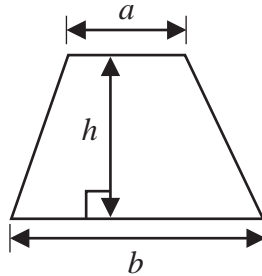 – *use this as a guide as to how much time to spend on each question.*

Advice

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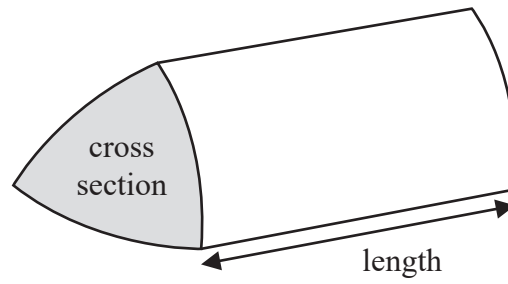- Check your answers if you have time at the end.

Turn over ▶

International GCSE Mathematics

Formulae sheet – Foundation Tier

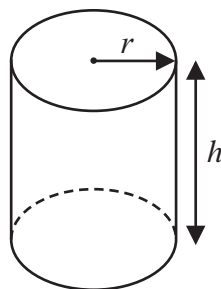**Area of trapezium** = $\frac{1}{2}(a + b)h$

Volume of prism = area of cross section × length

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

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

P54693A0224

Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write 0.63 as a fraction. $\times 100$

$$\frac{0.63}{1} = \frac{63}{100}$$

$$\times 100$$

.......$\frac{63}{100}$.......

(1)

(b) Write 46 821 correct to the nearest 100

$$46821 \longrightarrow 46800$$

$$\hookrightarrow 21 < 50 \Rightarrow \text{round down}$$

.......46800.......

(1)

(c) Write 73.654 correct to 1 decimal place.

$$73.654 \longrightarrow 73.7$$

$$\hookrightarrow 5 \geq 5 \Rightarrow \text{round up}$$

.......73.7.......

(1)

(d) Write 0.09 as a percentage.

$$0.09 \times 100\% = 9\%$$

.......9....... %

(1)

(Total for Question 1 is 4 marks)

2 Daniel has five bags of coloured sweets.
He picks at random a sweet from each bag.
The table shows the probability that the sweet he picks from each bag is red.

Bag	A	B	C	D	E
Probability of red	0.7	0.9	0.5	1	0.2

(a) From which bag is Daniel least likely to pick a red sweet?

E ← has Smallest probability of 0.2

........................E........................
(1)

(b) Which bag contains only red sweets?

D ← P(red) = 1, so it is certain he will
get red ⇒ contains only red

........................D........................
(1)

(c) From which bag is Daniel equally likely to pick a red sweet as a sweet of another colour?

C ← 0.5 red, 1 − 0.5 = 0.5 ⇒ 0.5 another
colour

........................C........................
(1)

(Total for Question 2 is 3 marks)

3 Joseph buys some heating oil.
He puts it in his oil tank.

The scales show the numbers of litres of oil in the tank immediately before and immediately after Joseph puts the oil in the tank.

```
┌─ 1400 litres          ┌─ 1400 litres
│                       │
├─ 1200                 ├─ 1200
│                       │
├─ 1000                 ├─ 1000
│                       │
├─ 800                  ├─ 800
│                       │
├─ 600                  ├─ 600
│                       │
├─ 400                  ├─ 400
│                       │
├─ 200                  ├─ 200
│                       │
└─ 0                    └─ 0

      before                  after
```
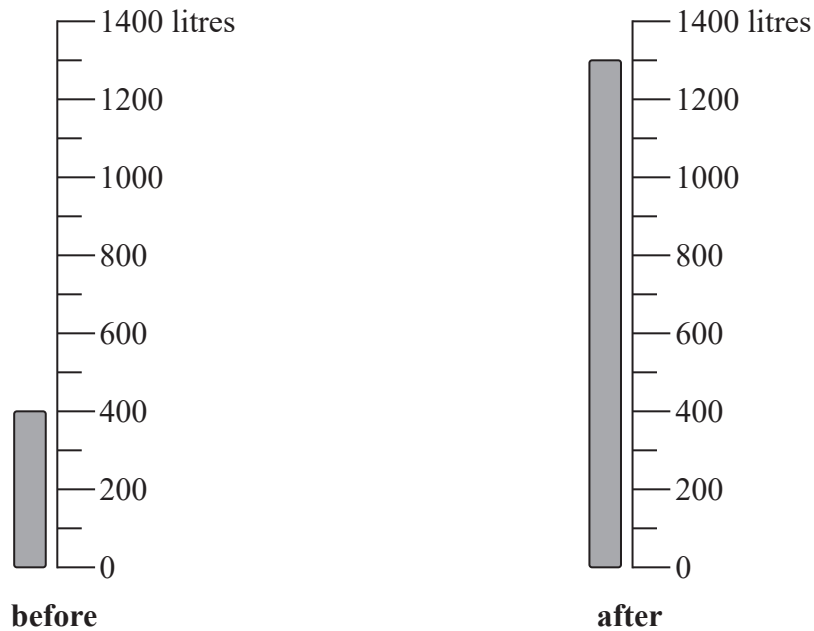
The oil Joseph buys costs 0.40 euros per litre.

Work out the total cost of the oil that Joseph buys.

Before : 400 litres

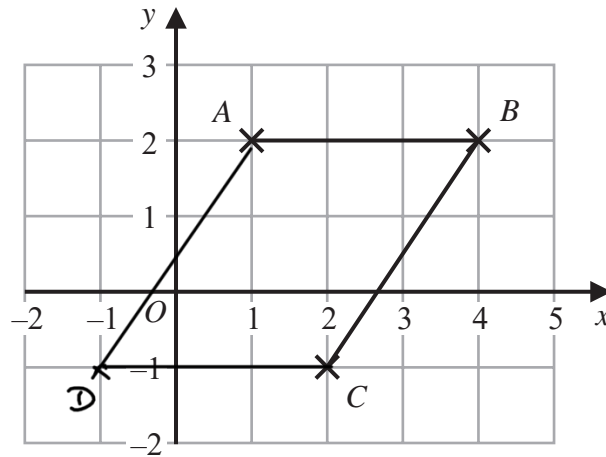After :- 1300 litres

Difference :- 1300 - 400 = 900 litves

Cost : 900 litves × 0.40 euros = 360 euros

.

......................360...................... euros

(Total for Question 3 is 3 marks)

Turn over ▶

4 The diagram shows points *A*, *B* and *C* on a square grid.

(a) Write down the coordinates of *C*.

$(x, y) \longrightarrow (2, -1)$ ← 2 right, 1 down

(.......**2**......., ...**-1**.......)

(1)

(b) Measure the length of *BC*.
Give your answer in centimetres.

3.6 cm ← use a ruler

....................**3.6**.................... cm

(1)

(c) On the grid, mark with a cross (✗) the point *D* so that *ABCD* is a parallelogram.
Label this point *D*.

AB is parallel to CD,

AD is parallel to BC

parallelogram
2 pairs of parallel
Sides

(1)

(Total for Question 4 is 3 marks)

5 (a) Write down a multiple of 8 that is between 20 and 50

Multiples of 8

8   16   24 ← 24 = 3 × 8   20 < 24 < 50
                    ⇒ 24

24

(1)

There is only one prime number that is an even number.

(b) Write down this number.

2 ← prime has only 2 Factors:- 1 and
                                    itself.

2

(1)

Shreya says that 57 is a prime number.

(c) Is Shreya correct?
    Give a reason for your answer.

No ← 57 has 4 factors:-
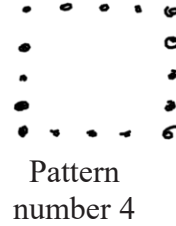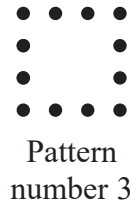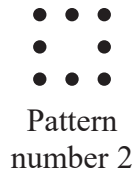   1 × 57, 3 × 19

(1)

(Total for Question 5 is 3 marks)

6 Here is a sequence of patterns made from dots.

Pattern
number 1

Pattern
number 2

Pattern
number 3
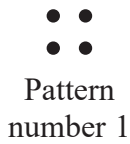
Pattern
number 4

(a) Draw Pattern number 4 in the space above.

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of dots	4	8	12	16	20

+4   +4   +4   +4

(1)

(c) Work out the number of dots in Pattern number 13

Number of Dots = pattern number × 4

13 × 4 = 52 ⟹ 52 dots in pattern 13

52

(2)

(d) Find an expression, in terms of n, for the number of dots in Pattern number n.

4 × pattern number = 4 × n = 4n

4n

(1)

There are fewer than 90 dots in Pattern number k.

(e) What is the largest possible value of k?

90 ÷ 4 = 22.5 ⟹ in 22nd pattern there
are 88, in 23rd, there are
92 ⟹ k = 22

22

(2)

(Total for Question 6 is 7 marks)

7 (a) Write $7 \times 7 \times 7 \times 7 \times 7$ as a power of 7

7^5 ← s lots of 7

7^5

(1)

(b) Show that 64 is both a square number and a cube number.

$\sqrt{64} = 8 \Rightarrow$ square $(8 \times 8 = 64)$

$\sqrt[3]{64} = 4 \; (4 \times 4 \times 4 = 64) \Rightarrow$ cubed

(2)

(c) Find the value of 11^3

$11^3 = 11 \times 11 \times 11$

$\quad = 121 \times 11$

1331

(1)

(d) Find the value of $\sqrt{98.01}$ $= 9.9$ ← use calculator

$\sqrt{98.01}$

9.9

(1)

(Total for Question 7 is 5 marks)

8 (a) Find the value of $25 - 4g$ when $g = -3$

$25 - 4g$

$-4g = -4 \times -3 = 12$ ← $g = -3$

$\therefore 25 + 12 = 37$

37

(2)

(b) Expand and simplify $x(2x + 1) + 3(x - 2) + 7$

$x(2x + 1) + 3(x - 2) + 7$

$(2x^2 + x) + (3x - 6) + 7$

$2x^2 + x + 3x + 7 - 6$ ← collect like terms
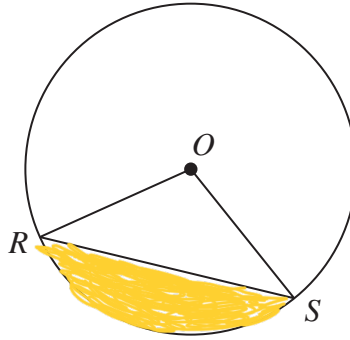
$= 2x^2 + 4x + 1$ ← simplify

$2x^2 + 4x + 1$

(3)

(Total for Question 8 is 5 marks)

9 *R* and *S* are points on a circle with centre *O*.

(a) On the diagram above, shade a segment of the circle.

(1)

(b) Write down the mathematical name of the straight line *RS*.

Chord ← Joins 2 points On
Circumference of Circle with a
straight line

.........Chord.........

(1)

In the diagram below, *P* and *Q* are points on a circle with centre *O*.
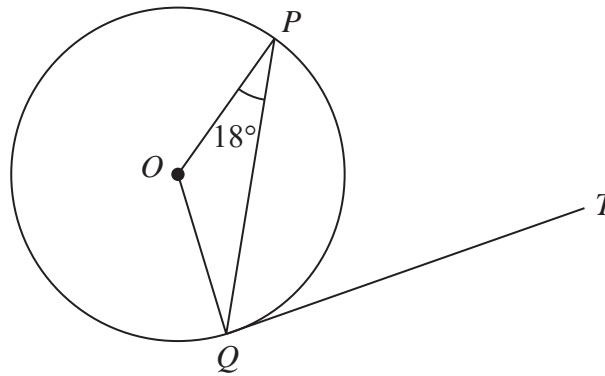

Diagram **NOT**
accurately drawn

QT is a tangent to the circle.
Angle *OPQ* = 18°

(c) Work out the size of angle *PQT*.
    Give a reason for each stage of your working.

$P\hat{Q}O = 18°$ ← triangle is Isosceles as 2 sides
are radii (equal length)
and base angles of an isosceles
triangle are equal

$P\hat{Q}T = 90 - 18 = 72°$ ← Tangent is perpendicular
to radius (90°)

.........72......... °

(3)

(Total for Question 9 is 5 marks)

10 Last Thursday, 135 students each bought one item of fruit.
The table shows information about the 135 items of fruit they bought.

Fruit	apple	pear	orange	banana	peach
Number of students	36	15	27	33	24

One of the 135 students is chosen at random.

(a) Find the probability that this student bought an apple or a banana.

Number of apples: 36
Number of Bananas: 33
P (Apple or Banana) = $\frac{36+33}{135}$

$\frac{69}{135}$

(2)

A pie chart is drawn for the information in the table.

(b) Work out the size of the angle in the pie chart for oranges.

Angle per 1 student = 360 ÷ 135 = $\frac{8}{3}$

Angle for oranges - $\frac{8}{3}$ × 27 = 72°

72° °

(2)

(Total for Question 10 is 4 marks)

11 (a) Work out the value of $\dfrac{10.4}{5.1 - 2.7} + \dfrac{6.8 - 3.2}{9.5}$

Give your answer as a decimal.
Write down all the figures on your calculator display.

$\frac{10.4}{5.1-2.7} = \frac{10.4}{2.4} = \frac{13}{3}$ $\frac{6.8-3.2}{9.5} = \frac{3.6}{9.5} = \frac{36}{95}$

use calculator

$\frac{13}{3} + \frac{36}{95} = 4.712280202$

4.712280702

(2)

(b) Give your answer to part (a) correct to 3 significant figures.

4.712280702
↳ 2 < 5 ⟹ round down
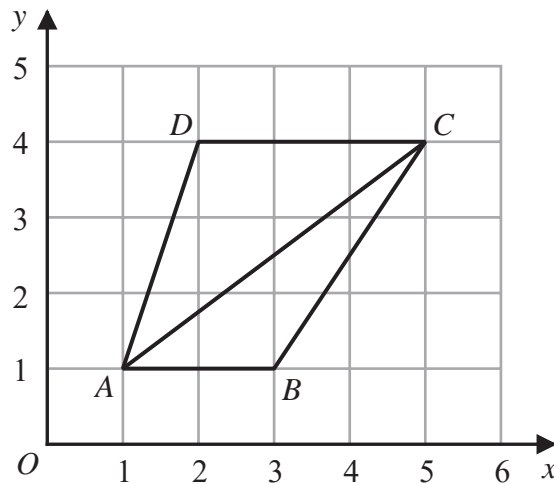
4.71

(1)

(Total for Question 11 is 3 marks)

P 5 4 6 9 3 A 0 1 1 2 4

12 The diagram shows a quadrilateral *ABCD* on a centimetre grid.

(a) Work out the area of triangle *ABC*.
   You must include the units with your answer.

$\frac{1}{2} \times base \times height = \frac{1}{2} \times 2 \times 3 = 3 cm^2$

Area of Triangle
$\frac{1}{2}bh.$

..........3 cm² ....

(3)

(b) Give a reason why angle *ACD* is equal to angle *CAB*.

They are alternate angles and alternate angles are equal

(1)

(c) Write down an equation for the straight line that passes through *D* and *C*.

y = 4 ← At all points on the line
y- coordinate = 4

..........y = 4 ....

(1)

(Total for Question 12 is 5 marks)

P 5 4 6 9 3 A 0 1 2 2 4

13 Tenzin walks in the mountains.
She has a rule to estimate the temperature at different heights on a mountain.

> Temperature decreases by 2°C for every increase of 300 metres in height.

The temperature at a height of 800 metres on a mountain is 6°C.

(a) Use Tenzin's rule to work out an estimate of the temperature at a height of 2000 metres on the mountain.

Increase in height: $2000 - 800 = 1200$ m

Decrease in temperature $= 1200$ m $\div 300$ m $= 4$

$4 \times 2°C = 8°C$ decrease

Temperature at : $6°C - 8°C = -2°C$
2000 m

.... -2 .... °C

(3)

Tenzin also has a rule to estimate the time it will take her to complete a walk in the mountains.

She uses
      an average speed of 5 km/h for the distance she will walk
and then
      adds on 1 minute for every increase of 10 metres in height.

Tenzin plans to walk 12 km in the mountains with an increase of 800 metres in height.

(b) Use Tenzin's rule to work out an estimate for the time it will take her to complete this walk.
Give your answer in hours and minutes.

Hours: $12 \div 5 = 2.4$ hrs 0.4 hrs $\times 60 = 24$ min

Minutes added for height

$800 \div 10 = 80$ min.

2 hrs 24 min $\overset{+36 \text{ min.}}{\curvearrowright}$ 3 hrs $\overset{+44 \text{ min.}}{\curvearrowright}$ 3 hrs 44 min

.... 3 .... hours .... 44 .... minutes

(3)

(Total for Question 13 is 6 marks)

Turn over ▶

14 Javier has two sets of cards.
Each set contains 4 cards, one marked **A**, one marked **B**, one marked **C** and one marked **D**.

Javier is going to take at random one card from each set.
The table shows all possible pairs of cards that Javier could take.

Set 2

	A	**B**	**C**	**D**
A	AA	AB	AC	AD
B	BA	BB	BC	BD
C	CA	CB	CC	CD
D	DA	DB	DC	DD

Set 1

≢ = contain at least 1 C

(a) Find the probability that Javier will take at least one card marked **C**.

Total cards Combinations = 16
Combinations with 1 or more C : 7
probability = 7/16

$\dfrac{7}{16}$

(2)

Javier is going to take at random one card from each set, note the letter on each card and replace the cards.

He is going to do this a total of 80 times.

(b) Work out an estimate for the number of times that Javier will take at least one card marked **C**.

$\dfrac{7}{16}$ × 80 = 35

↑
p for one trial

↘ no.of trials

35

(2)

(Total for Question 14 is 4 marks)
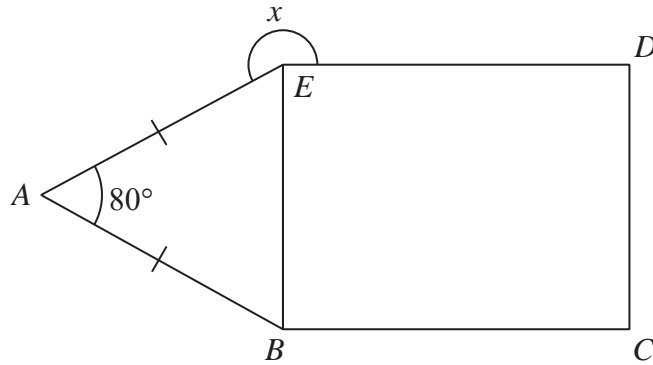
15

x

E

D

A 80°

B

C

Diagram **NOT** accurately drawn

BCDE is a rectangle.
ABE is an isosceles triangle.

AB = *AE*
Angle *BAE* = 80°

Work out the size of angle *x*.

$A\hat{E}B = A\hat{B}E$ ← Base angle of an isosceles triangle are equal.

$A\hat{E}B = (180-80) \div 2 = 100 \div 2 = 50°$ ← angles in triangle sum to 180°

$B\hat{E}D = 90°$ ← All angles in a rectangle are right angles

Obtuse angle $A\hat{E}D = 50+90 = 140°$

Reflex angle $A\hat{E}D = x = 360 - 140 = 220°$ ← 360° about a point

.... **220** °

(Total for Question 15 is 3 marks)

16 Work out the difference between the largest share and the smallest share when 3450 yen is divided in the ratios $2:6:7$

Total 'parts' of ratio: $2+6+7 =15$

Yen per "part": $3450 \div 15 = 230$

Smallest 'part': $2 \times 230 = 460$

Largest part: $7 \times 230 = 1610$

Difference: $1610 - 460 = 1150$ yen

.................1150................. yen

(Total for Question 16 is 3 marks)

17 Gopal is paid 20 000 rupees each month.
   Jamuna is paid 19 200 rupees each month.

   Gopal and Jamuna are both given an increase in their monthly pay.
   After the increase, they are both paid the same amount each month.

   Gopal was given an increase of 8%

   Work out the percentage increase that Jamuna was given.

Gopal $100\% + 8\% = 108\%$

        ↑   ↑
     original   increase

Multiplier $= 108 \div 100 = 1.08$

Gopal's new salary $= 20000 \times 1.08 = 21600$ rupees

Jamuna:

percentage increase $= \dfrac{\text{new salary} - \text{original salary}}{\text{original salary}} \times 100\%$

Jamuna's new salary $= 21600$ rupees

percentage increase $= \dfrac{21600 - 19200}{19200} \times 100\%$

.................12.5................. %

(Total for Question 17 is 4 marks)

18 (a) Make a the subject of the formula $\quad M = ac - bd$

$$+bd \left(\begin{array}{l} M = ac - bd \\ M + bd = ac \end{array} \right) +bd$$

$$\div c \left(\begin{array}{l} \\ \dfrac{M+bd}{c} = a \end{array} \right) \div c$$

$$a = \dfrac{M+bd}{c}$$

(2)

(b) Solve the inequality $\quad 5x - 4 < 39$

$$+4 \left(\begin{array}{l} 5x - 4 < 39 \\ 5x < 43 \end{array} \right) +4$$

$$\div 5 \left(\begin{array}{l} \\ x < 8.6 \end{array} \right) \div 5$$

$$x < 8.6$$

(2)

(c) Factorise fully $\quad 18e^2f^3 - 12e^3f$

$$18e^2f^3 - 12e^3f = 6e^2f(3f^2 - 2e)$$

$$\downarrow \qquad\qquad \downarrow$$

$$3 \times 6 \times e^2 \times f^3 \qquad 2 \times 6 \times e^3 \times f$$

$$6e^2f(3f^2 - 2e)$$

(2)

(Total for Question 18 is 6 marks)

Turn over ▶

19 The diagram shows two cylinders, **A** and **B**.

0.56 m

Diagram **NOT**
accurately drawn

A

1.6 m
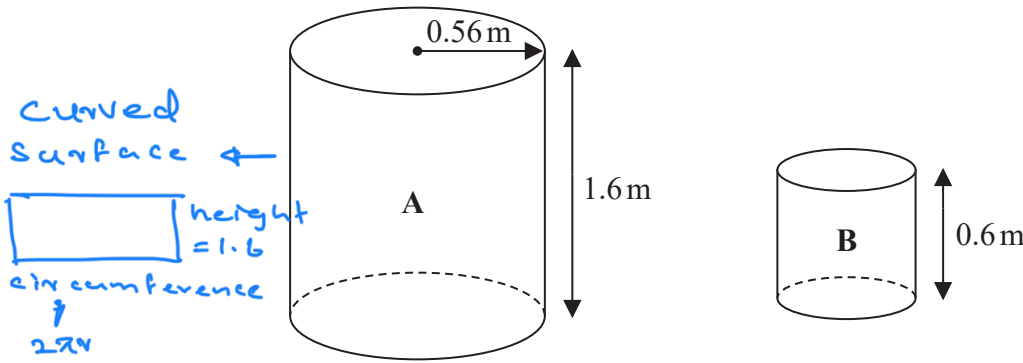
B

0.6 m

curved
surface ←
height
=1.6
circumference
↑
2πr

Cylinder **A** has height 1.6 m and radius 0.56 m.

(a) Work out the curved surface area of cylinder **A**.
   Give your answer in m² correct to 3 significant figures.

Circumference : 2 × π × 0.56 = 3.519

Curved surface area :- 1.6 × 3.519 = 5.6304
→ 5.63 m³ (3.sf)

5.63 .... m²

(2)

Cylinder **B** is mathematically similar to cylinder **A**.
The height of cylinder **B** is 0.6 m.

(b) Work out the radius of cylinder **B**.

scale factor :- B/A = height 0.6/1.6 = 3/8
So lengths of B are 3/8 of the corresponding
lengths of A
Radius of B :- 3/8 × 0.56 = 0.21 m

0.21 .... m

(2)

(Total for Question 19 is 4 marks)

P 5 4 6 9 3 A 0 1 8 2 4

20 Show that $3\dfrac{4}{7} - 1\dfrac{5}{8} = 1\dfrac{53}{56}$

Convert to improper fractions:

$$3\tfrac{4}{7} = \tfrac{21}{7} + \tfrac{4}{7} = \tfrac{25}{7} \xrightarrow{\times 8} \tfrac{200}{56}$$

$$1\tfrac{5}{8} = \tfrac{8}{8} + \tfrac{5}{8} = \tfrac{13}{8} \xrightarrow{\times 7} \tfrac{91}{56}$$

LCM is 56

$\Rightarrow$ write over 56

Hence $3^4/7 - 1\,^5/8 = \,^{200}/56 - \,^{91}/56 = \,^{109}/56$
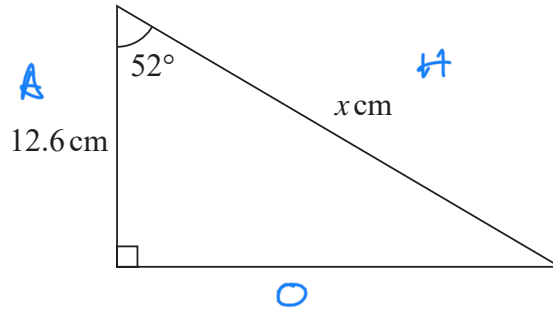
Answer as a mixed number

$$\frac{109}{56} = \frac{56}{56} + \frac{(109-56)}{56} = 1\frac{53}{56}$$

(Total for Question 20 is 3 marks)

P 5 4 6 9 3 A 0 1 9 2 4

21

A

12.6 cm

52°

x cm

H

Diagram **NOT**
accurately drawn

S$\overset{o}{_H}$ C$\overset{A}{_H}$ T$\overset{o}{_A}$

use C$\overset{A}{_H}$

Work out the value of x.
Give your answer correct to 3 significant figures.

$$\cos 52 = \frac{12.6}{x}$$

$$x = \frac{12.6}{\cos 52}$$

$$x = 20.5$$

$x =$ 20.5

(Total for Question 21 is 3 marks)

22 The students in Class A and in Class B take the same examination.

There are 28 students in Class A and 32 students in Class B.
The mean score for all the students in both classes is 72.6
The mean score for the students in Class A is 75

(a) Work out the mean score for the students in Class B.

$$\text{mean Score} = \frac{\text{Sums of all scores}}{\text{Total no. of Students}}$$

$$\frac{\text{Sum of all Scores}}{60} = 72.6$$

Sum of all scores = $72.6 \times 60 = \underline{4356}$

Class A: Sum of class A Scores = 28×75 mean
$= 2100$

Class B: Sum of class B scores $= 4356 - 2100$
$= 2256$

$$\frac{2256}{32} = 70.5$$

32 Students in class B

70.5

....

(4)

The lowest score in Class A is 39
The range of scores for Class A is 57
The lowest score in Class B is 33
The range of scores for Class B is 60

(b) Find the range of scores for all the students in both classes.

Highest Score in A = lowest + Range
Score
$= 39 + 57 = \underline{96}$

lowest Overall Score :- 33
Highest Overall Score :- 96
Overall Range :- $96 - 33 = 63$

63

....

(3)

(Total for Question 22 is 7 marks)

Turn over ▶

23 Solve the simultaneous equations

$$x + y = 15$$
$$7x - 5y = 3$$

Show clear algebraic working.

$$x + y = 15 \quad ① \quad \rbrace \text{ label simultaneous equations.}$$
$$7x - 5y = 3 \quad ②$$

$$① \times 5 \quad 5x + 5y = 75 \quad ③ \leftarrow \text{now } y\text{- coefficients are equal}$$

$$③ + ② \quad 5x + 5y = 75$$
$$+ \quad 7x - 5y = 3$$
$$\overline{\qquad 12x + 0y = 78} \leftarrow \text{Get rid of } y \text{ terms}$$

$$\begin{array}{l} 12x = 78 \\ \div 12 \; \lfloor\!\!\rightarrow x = 6.5 \end{array} \rbrace \div 12$$

Sub $x = 6.5$ into ①

$$6.5 + y = 15$$
$$y = 8.5$$

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

$y =$ ....**8.5**....

(Total for Question 23 is 3 marks)

24 $\dfrac{8}{2^7} = 2^n$

(a) Find the value of n.

$8 = 2 \times 2 \times 2 = 2^3$

$\dfrac{2^3}{2^7} = 2^{3-7} = 2^{-4} \Rightarrow n = -4$

$n = $ ....-4...........................

(2)

$(13^{-6})^4 \times 13^5 = 13^k$

(b) Find the value of k.

$(13^{-6})^4 = 13^{-24}$

$13^{-24} \times 13^5 = 13^{-19} \Rightarrow k = -19$

$\dfrac{x^a}{x^b} = x^{a-b}$

$(x^c)^d = x^{cd}$

$x^e \times x^f = x^{e+f}$

$k = $ ....-19...........................

(2)

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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