Model Solutions

Write your name here

Surname		Other names

Pearson Edexcel
International GCSE

Centre Number

Candidate Number

Mathematics A
Level 1/2
Paper 1F

Foundation Tier

Thursday 24 May 2018 – Morning
Time: 2 hours

Paper Reference
4MA1/1F

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.
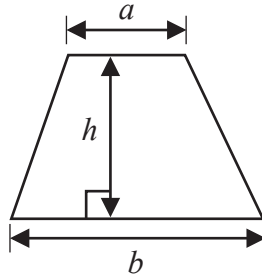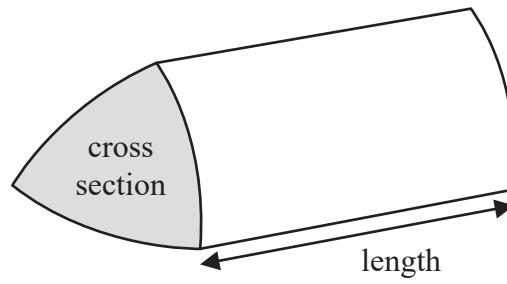- Check your answers if you have time at the end.

Turn over ▶

Pearson

International GCSE Mathematics

Formulae sheet – Foundation Tier
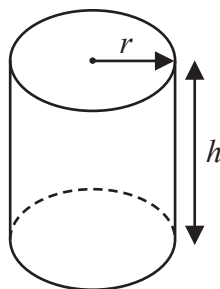
Area of trapezium $= \dfrac{1}{2}(a + b)h$

Volume of prism = area of cross section × length

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

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

P 5 4 6 9 2 A 0 2 2 4

Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   (a) Write $\dfrac{7}{100}$ as a decimal.

$$\frac{7}{100} = 7 \div 100 = 0.07$$

0.07

(1)

(b) Write $\dfrac{48}{60}$ as a fraction in its simplest form.

$$\frac{48}{60} = \frac{12}{15} = \frac{4}{5}$$

in simplest form ↳ top and bottom of fraction have no common factors

$\dfrac{4}{5}$

(1)

(c) Write $\dfrac{17}{3}$ as a mixed number.

$$\frac{17}{3} = \frac{15}{3} + \frac{2}{3} = 5\frac{2}{3}$$

↳ 15 ÷ 3 = 5

$5\dfrac{2}{3}$

(1)

There are 840 tickets available for a concert.

$\dfrac{1}{7}$ of these tickets have **not** been sold.

(d) How many of the tickets have been sold?

not sold = $\dfrac{1}{7}$ × 840 = 120 tickets
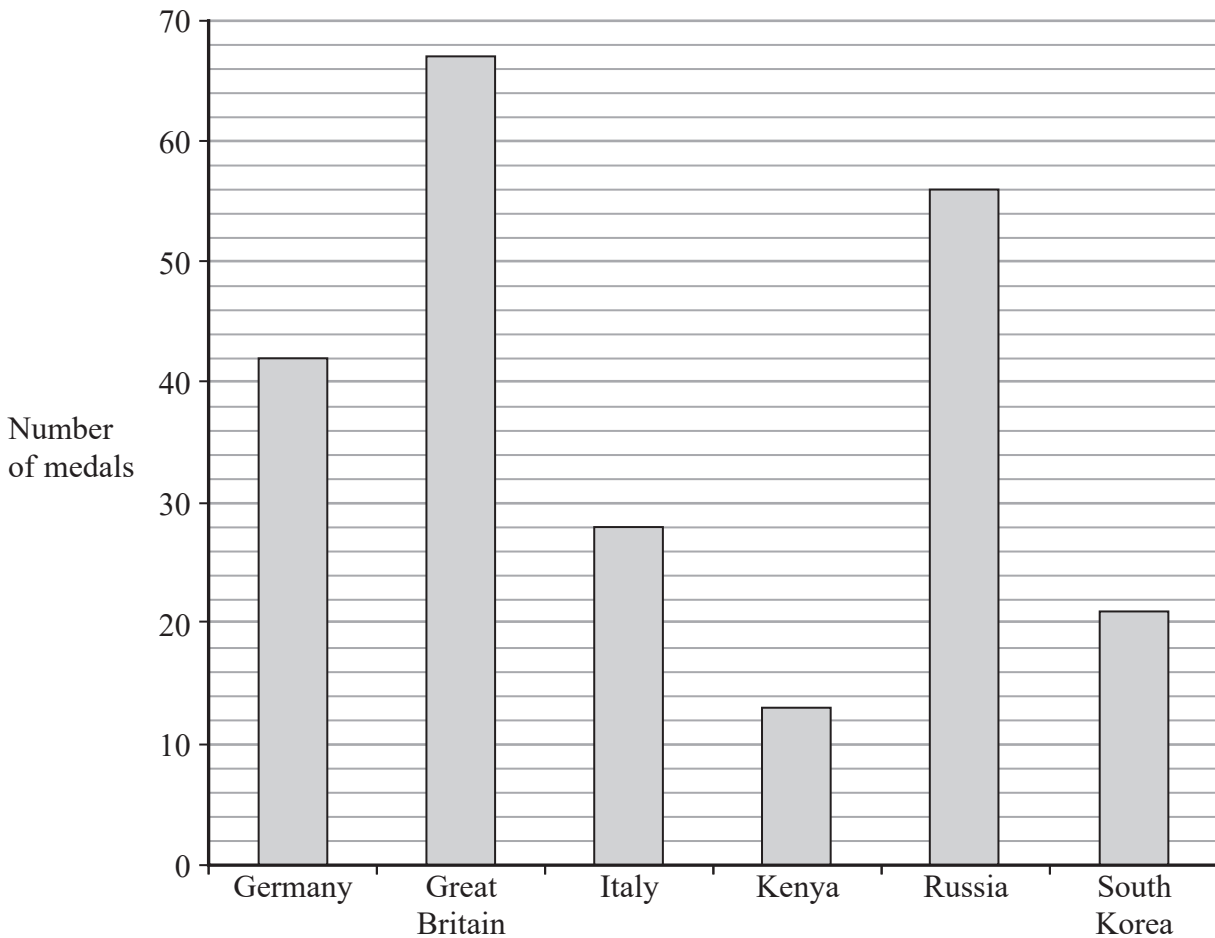
sold = 840 − 120 = 720 tickets

720

(2)

(Total for Question 1 is 5 marks)

2 The bar chart gives information about the total number of medals won by each of six countries at the 2016 Olympic Games.

Number of medals

	Germany	Great Britain	Italy	Kenya	Russia	South Korea

(a) Which of these countries won the fewest total number of medals?

kenya

.... kenya

(1)

Great Britain won 27 gold medals.

(b) How many of the medals won by Great Britain were **not** gold medals?

total number of medals = 67

not gold medals = 67 - 27 = 40

.... 40

(2)

P 5 4 6 9 2 A 0 4 2 4

(c) Write down the ratio of the total number of medals won by Russia to the total number of medals won by Germany.
Give your ratio in its simplest form.

Russia   : Germany

÷2 (56 → 8   42 → 6) ÷7
÷2 (8 → 4   6 → 3) ÷2   in simplest form

4 : 3

(2)

The USA won
    46 gold medals
    37 silver medals
    38 bronze medals

(d) What fraction of the total number of medals won by the USA were gold medals?

total number of medals
        = 46 + 37 + 38 = 121
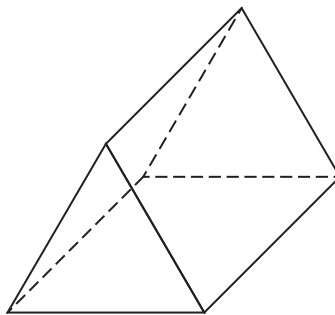
gold medals = 46/121 → number of gold medals
                    → total number of medals

46/121

(2)

(Total for Question 2 is 7 marks)

3   (i) Write down the mathematical name of this 3-D shape.

triangular prism

(ii) How many faces does the shape have?

5 faces

(iii) How many vertices does the shape have?

6 vertices

(Total for Question 3 is 3 marks)

Turn over ▶

4 (a) Change 650 centimetres into metres.

$\div 100$

100cm = 1m

$\div 100$

650 cm = 6.5 metres

.... 6·5 .... metres

(1)

(b) Change 8 litres into millilitres.

×1000

1 litre = 1000 ml

×1000

8 Litres = 8000 millilitres

.... 8000 .... millilitres

(1)

Memona has a 6 kg sack of rice and some empty bags.
She fills each bag with 475 grams of rice from the sack.

(c) How many bags can Memona completely fill with rice?

×1000

1kg = 1000g

×1000

6kg = 6000g of rice

number of bags = 6000 ÷ 475 = 12.63

475g of rice per bag

completely fill so round down to 12 bags

.... 12 ....

(3)

(Total for Question 4 is 5 marks)

5 (a) Simplify $6x + 8x - 3x$

$$= 14x - 3x$$
$$= 11x$$

.......................$11x$......................
(1)

(b) Simplify $4e \times 5f$

$4e \times 5f = 4 \times 5 \times e \times f$

$$= 20ef$$

.......................$20ef$......................
(1)

(c) Solve $8p = 24$

$$8p = 24$$
$$\div 8 \quad \searrow p = 3 \quad \div 8$$

$p = $ ....3......................
(1)

(d) Solve $k - 4 = 13$

$+4 \quad \quad +4$

$$k = 17$$

$k = $ ....17......................
(1)

(e) Simplify $10t + 4d - 3t + 2d$

$$= (10t - 3t) + (4d + 2d)$$
$$= 7t + 6d$$

.......................$7t + 6d$......................
(2)

(Total for Question 5 is 6 marks)

6 The two-way table shows some information about where 50 people went for their last holiday.

	UK	Africa	USA	Total
Male	23-7-2 = 14	16 − 9 = 7	2	23
Female	16	(9)	4 − 2 = 2	16 + 9 + 2 = 27
Total	14 + 16 = 30	16	50 − 30 − 16 = 4	50

(a) Complete the table.

(3)

(b) What percentage of these 50 people were female **and** went on holiday in Africa?

female and went to Africa = 9

$\frac{9}{50} \times 100\% = 18\%$

18 %

(2)

(Total for Question 6 is 5 marks)

7 3 kg of potatoes and 2 kg of apples cost a total of £7.33
4 kg of potatoes cost £3.80

Work out the cost of 1 kg of apples.

4kg potatoes = £3.80
1kg potatoes = £0.95
3kg potatoes = £2.85

2 kg apples = £7.33 − £2.85 = £4.48
Total cost   3kg potatoes
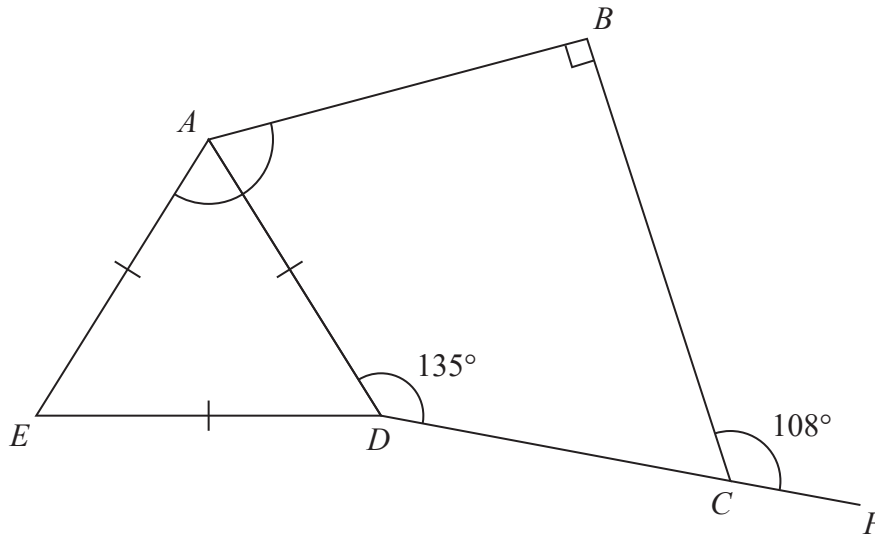
2kg apples = £4.48
1kg apples = £2.24

£ 2.24

(Total for Question 7 is 4 marks)

8

Diagram **NOT** accurately drawn

ABCD is a quadrilateral.
ADE is an equilateral triangle.
DCF is a straight line.

Work out the size of angle *EAB*.
Give a reason for each stage of your working.

angle DCB = 180 − 108 = 72°

       ∫ angles on a straight line add up
                                to 180°

angle DAB = 360 − 90 − 72 − 135 = 63°

        ∫ angles in a quadrilateral add up to
                                     360°

angle EAD = 60°

       ∫ equilateral triangle
                  = three equal 60° angles

angle EAB = 60 + 63 = 123°

          ∫   ∫
    angle EAD   angle DAB

123 °

(Total for Question 8 is 5 marks)

9 You can use this graph to change between temperatures in degrees Celsius (°C) and temperatures in degrees Fahrenheit (°F).
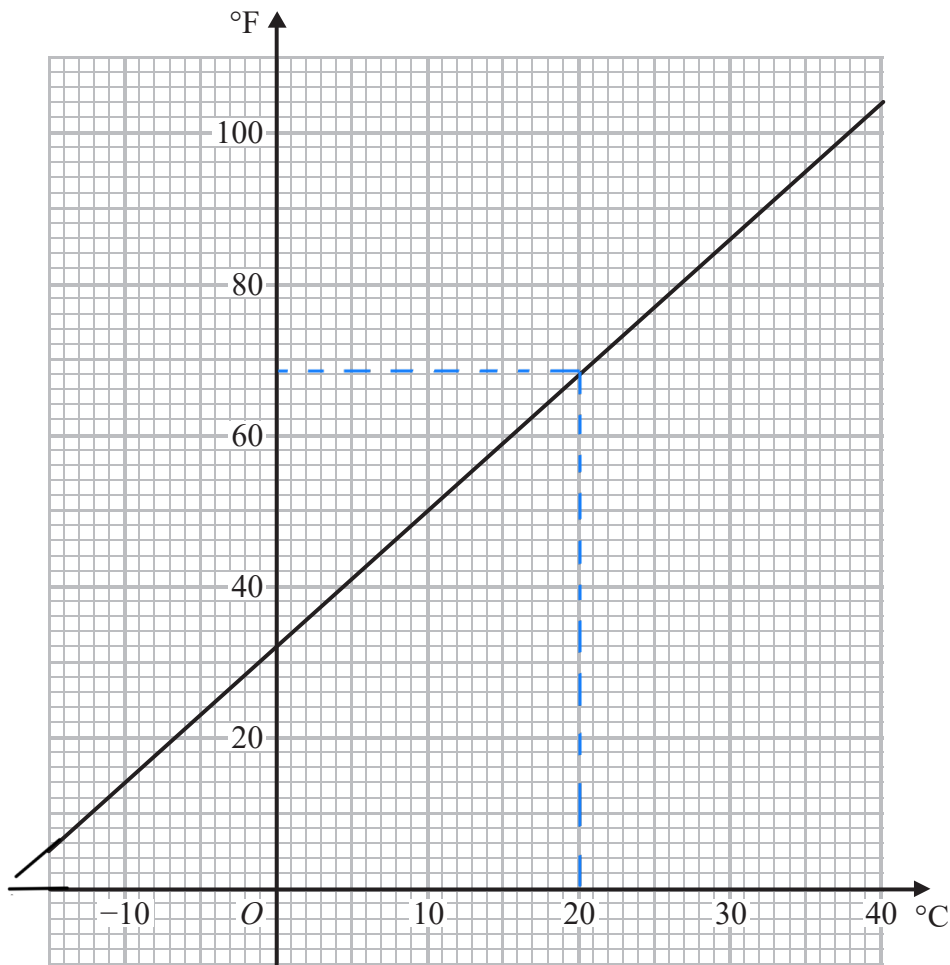
The temperature in Dubai on Monday increased by 20 °C from midnight to midday.

(a) What is this temperature increase in degrees Fahrenheit?

$0°C = 32°F$

$20°C = 68°F$

Choose any two temperatures with a difference of 20°c
↳ 0°c and 20°c
↳ 10°c and 30°c

temperature increase = 68 - 32 = 36°F

..................**36**.................. °F

(2)

Maninder says,

"30 °C is the same as 86 °F, therefore 60 °C will be the same as 172 °F."

(b) Is Maninder correct?
   Give a reason for your answer.

No Maninder is not correct as temperatures in °F are not proportional to temperatures in C°, → the graph does not pass through (0,0)

(Total for Question 9 is 3 marks)

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

10 (a) Find the Lowest Common Multiple (LCM) of 12 and 20

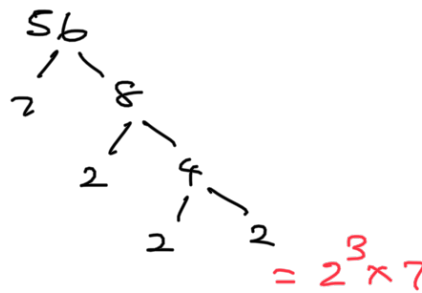write out multiples of 12
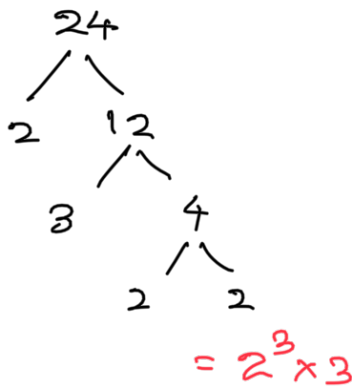
multiples of 12 = 12 24 36 48 <u>60</u>

multiples of 20 = 20 40 <u>60</u>

<div align="right">

60

(2)
</div>

(b) Find the Highest Common Factor (HCF) of 24 and 56

$= 2^3 \times 3$

$= 2^3 \times 7$

HCF = product of highest power of each prime factor that appears in both 24 and 56

$HCF = 2^3 = 8$

<div align="right">

8

(2)
</div>

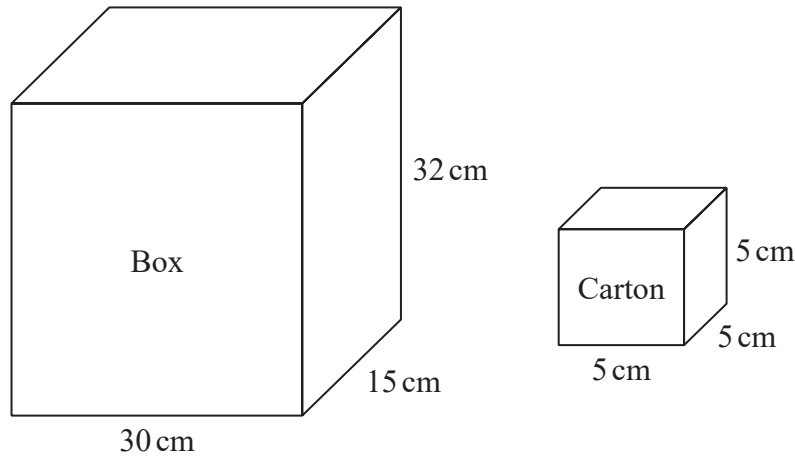**(Total for Question 10 is 4 marks)**

11

Diagram **NOT**
accurately drawn

A wooden box measures 30 cm by 15 cm by 32 cm.
The box has a lid.

A carton measures 5 cm by 5 cm by 5 cm.

James has 110 cartons.
He wants to put all these cartons in the box and be able to shut the lid.

Can James put all 110 cartons in the box and shut the lid?
Show your working clearly.

base of box
15cm = 3×5 cm

a carton

30cm = 6×5 cm

base of box = 30 cm × 15 cm
$= (6×5) × (3×5)$
$= 6×3$ cartons
$= 18$ cartons
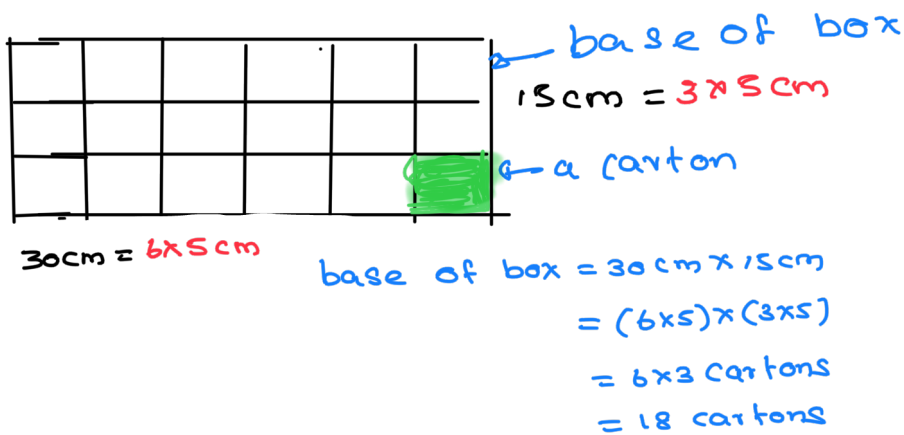
$110 ÷ 18 = 6·11$ → there will be 6 complete
≈ 7 layers of cartons and
a 7th layer with only
2 cartons

for 7 layers, total height = 5×7 = 35cm
35 > 32 ∴ no James cannot put 110 cartons
in the box.

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

12

triangles A and B are at equal distances from mirror line $x = ^-1$
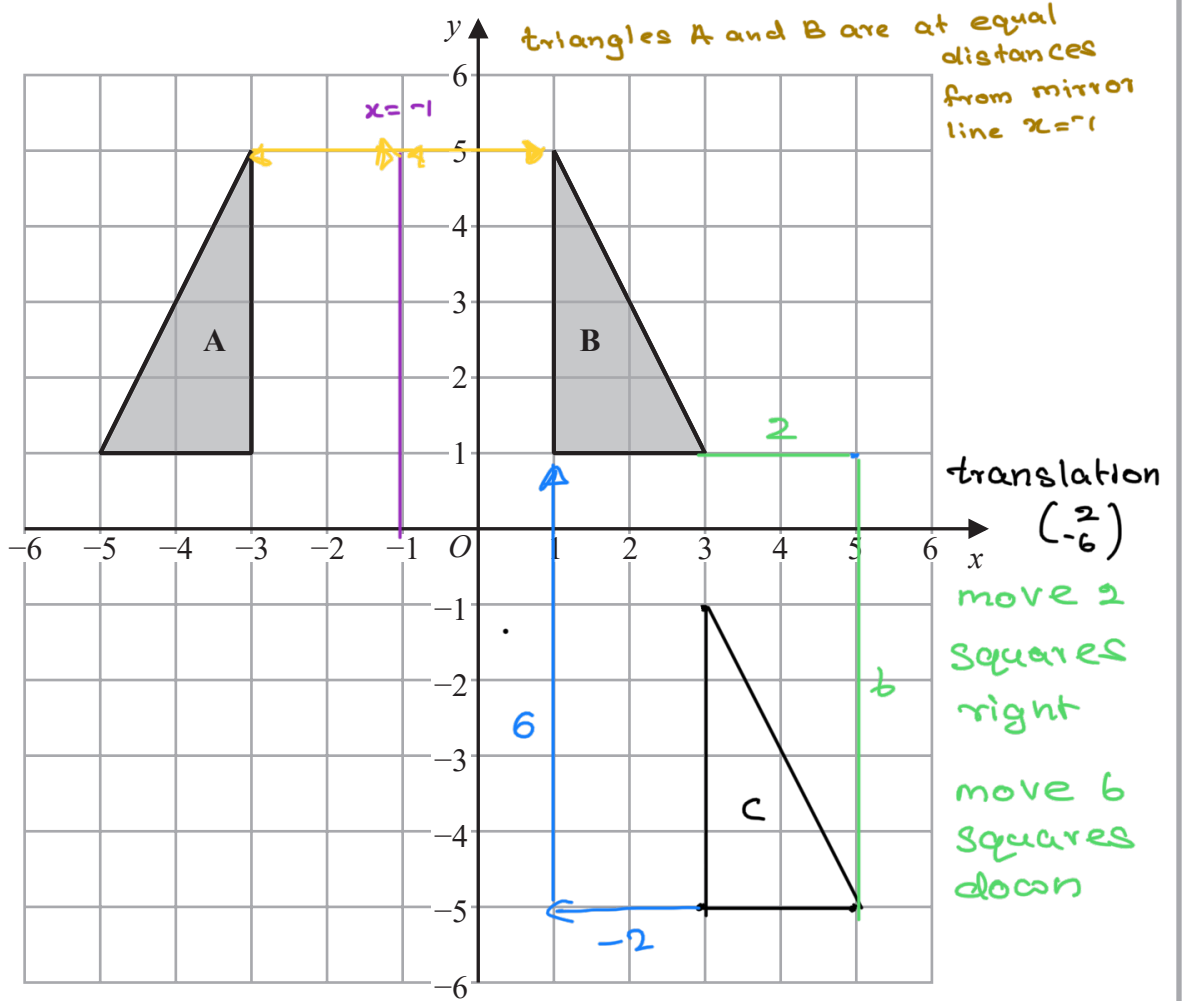
$x = ^-1$

2

translation $\binom{2}{-6}$

move 2 squares right

move 6 squares down

6

-2

(a) Describe fully the single transformation that maps triangle **A** onto triangle **B**.

reflection in the line $x = ^-1$

....

....

(2)

(b) On the grid, translate triangle **B** by the vector $\begin{pmatrix} 2 \\ -6 \end{pmatrix}$

Label your triangle **C**.

(1)

(c) Describe fully the single transformation that maps triangle **C** onto triangle **B**.

translation by $\binom{-2}{6}$ ⤳ 2 units left

6 units up

(1)

(Total for Question 12 is 4 marks)

Turn over ▶

13 There are some people in a cinema.

$\frac{3}{5}$ of the people in the cinema are children.

For the children in the cinema,

    number of girls : number of boys = 2 : 7

There are 170 girls in the cinema.

Work out the number of adults in the cinema.

girls : boys

×85 ⌈   2 : 7⌉ × 85

   ⌊170 : 595⌋ → total number of

children = 170 + 595

= 765

765 = $\frac{3}{5}$ of people

÷3 ⌈ ⌉ ÷ 3

255 = $\frac{1}{5}$ of people

×2 ⌈ ⌉ ×2

510 = $\frac{2}{5}$ of people → number of

adults = 510

510

(Total for Question 13 is 5 marks)

14 The accurate scale drawing shows the positions of two ships, *L* and *M*.

North

measure using protractor

110°

L

bearings are measured clockwise from North

North

240°

M

60°

draw an arc of radius 8cm with centre at L

P is where the line and arc intersect

draw a line on bearing of 240° from M
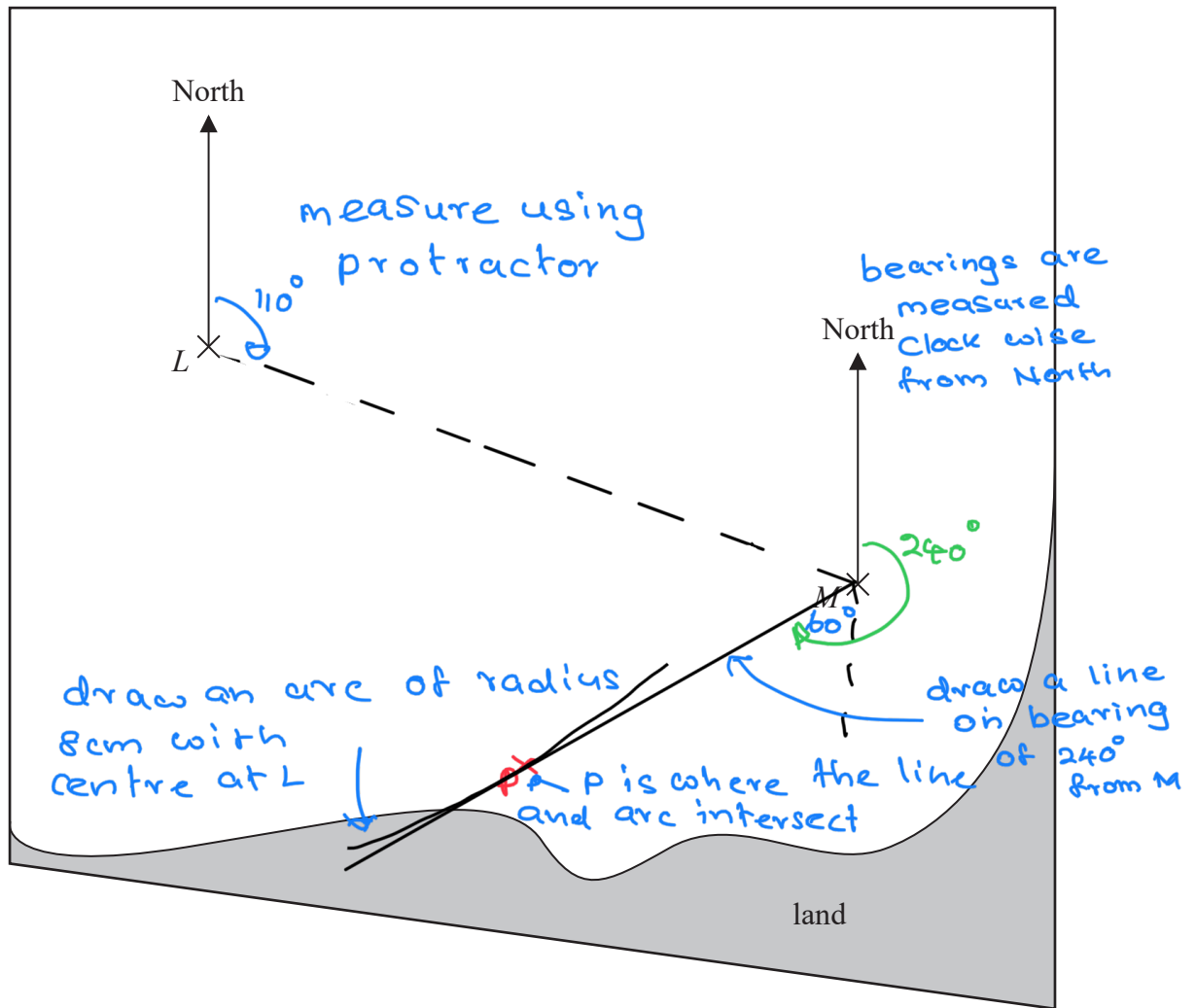
land

(a) Find the bearing of ship *M* from ship *L*.

110°   .... °

(1)

The scale of the drawing is 1 cm to 5 km.

Ship *P* is 40 km from *L* and on a bearing of 240° from *M*.

(b) On the diagram, mark with a cross (✕) the position of ship *P*.

×8   (1 cm = 5 km
       8 cm = 40 km)

(3)

bearing of 240° = 180° + 60°

(Total for Question 14 is 4 marks)

Turn over ▶

15 The table shows information about the weights, in kg, of 40 parcels.

Weight of parcel (p kg)	Frequency
$0 < p \leqslant 1$	19
$1 < p \leqslant 2$	12
$2 < p \leqslant 3$	5
$3 < p \leqslant 4$	2
$4 < p \leqslant 5$	2

(a) Write down the modal class.

modal class = $0 < p \leq 1$
$\quad$ & class with highest frequency

$0 < p \leq 1$

(1)

(b) Work out an estimate for the mean weight of the parcels.

weight (pkg)	midpoint	frequency	midpoint × freq.
$0 < p \leq 1$	0.5	19	9.5
$1 < p \leq 2$	1.5	12	18
$2 < p \leq 3$	2.5	5	12.5
$3 < p \leq 4$	3.5	2	7
$4 < p \leq 5$	4.5	2	9

mean = $\dfrac{\text{sum of (midpoint} \times \text{frequency)}}{\text{total frequency}}$

1.4 .... kg

(4)

(Total for Question 15 is 5 marks)

$= \dfrac{9.5 + 18 + 12.5 + 7 + 9}{40} = \dfrac{56}{40} = 1.4 \, kg.$

16 (a) Simplify $y^5 \times y^9$

$$y^5 \times y^9 = y^{5+9} \rightarrow a^m \times a^n = a^{m+n}$$
$$= y^{14}$$

y^{14}

(1)

(b) Simplify $(2m^3)^4$

$$(2m^3)^4 = 2^4 \times (m^3)^4$$
$$= 16 \times m^{3 \times 4} \rightarrow (a^m)^n = a^{m \times n}$$
$$= 16 \times m^{12}$$

$16m^{12}$

(2)

(c) Solve $5(x + 3) = 3x - 4$
   Show clear algebraic working.

$$5(x+3) = 3x - 4$$
$$5x + 15 = 3x - 4$$
$$\quad -3x \qquad -3x$$
$$2x + 15 = {}^-4$$
$$\quad -15 \quad -15$$
$$2x = {}^-19 \div 2$$
$$\div 2$$
$$x = -\frac{19}{2} = -9.5$$

$x = \quad {}^-9.5$

(3)

(d) (i) Factorise $x^2 + 2x - 24$

$$x^2 + 2x - 24 = (x+6)(x-4)$$
$$6 \times {}^-4 = {}^-24$$
$$6 + {}^-4 = 2$$

$(x+6)(x-4)$

(2)

(ii) Hence, solve $x^2 + 2x - 24 = 0 \longrightarrow (x+6)(x-4) = 0$

$$x + 6 = 0 \qquad x - 4 = 0$$
$$\quad -6 \quad -6 \qquad\qquad +4 \quad +4$$
$$x = {}^-6 \qquad\qquad x = 4$$

$x = {}^-6, 4$

(1)

(Total for Question 16 is 9 marks)

Turn over ▶

17 Here is a Venn diagram.
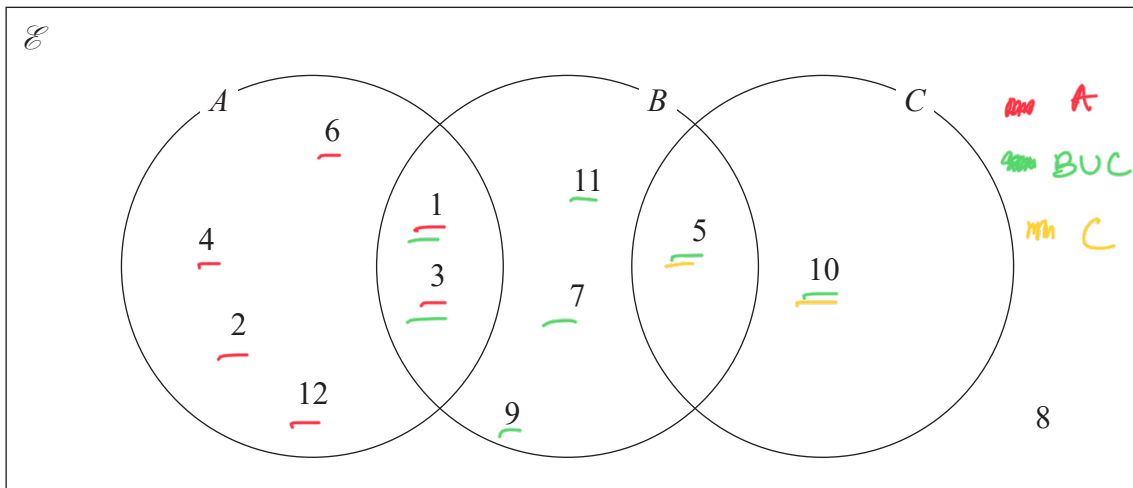
(a) Write down the numbers that are in the set

(i) A

1,2,3,4,6,12

(ii) $B \cup C$

↓ → B or C or both
union

1,3,5,7,9,10,11

(2)

Brian writes down the statement $A \cap C = \emptyset$

(b) Is Brian's statement correct?
You must give a reason for your answer.

A∩C → A and C intersection Yes. Brian is correct as
there are no numbers in both A and C

(1)

One of the numbers in the Venn diagram is picked at random.

(c) Find the probability that this number is in set C'

$P(c) = \frac{2}{12}$ → numbers in set C
→ total of numbers in venn diagram.

$P(c') = 1 - P(c) = 1 - \frac{2}{12} = \frac{10}{12}$

$\frac{10}{12}$

(2)

Not C

(Total for Question 17 is 5 marks)

18 (a) Write 8×10^4 as an ordinary number.

10^4 so move decimal point 4 places to the right

$8 \times 10^4 = 80\,000$

$\underset{1\ \ 2\ \ 3\ \ 4}{\underbrace{}}$

80000

(1)

(b) Work out $(3.5 \times 10^5) \div (7 \times 10^8)$

Give your answer in standard form.

$(3.5 \times 10^5) \div (7 \times 10^8)$

$= (3.5 \div 7) \times (10^5 \div 10^8)$

$10^5 \div 10^8 = 10^{5-8} = 10^{-3}$

$= 0.5 \times 10^{-3}$

$\times 10 \quad \div 10$ multiply front number by 10 so divide power by 10 (subtract 1 from power)

$= 5 \times 10^{-4}$

↳ standard form
$A \times 10^n$ where $1 \leq A < 9.\dot{9}$

5×10^{-4}

(2)

(Total for Question 18 is 3 marks)

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

19 (a) On the grid, draw the graph of $y = 2x + 3$ for values of x from -2 to 3

plot
points
and join
with a
straight
line

R

$y = 1$

$x = 2$

arrows
show direction
of
inequalities
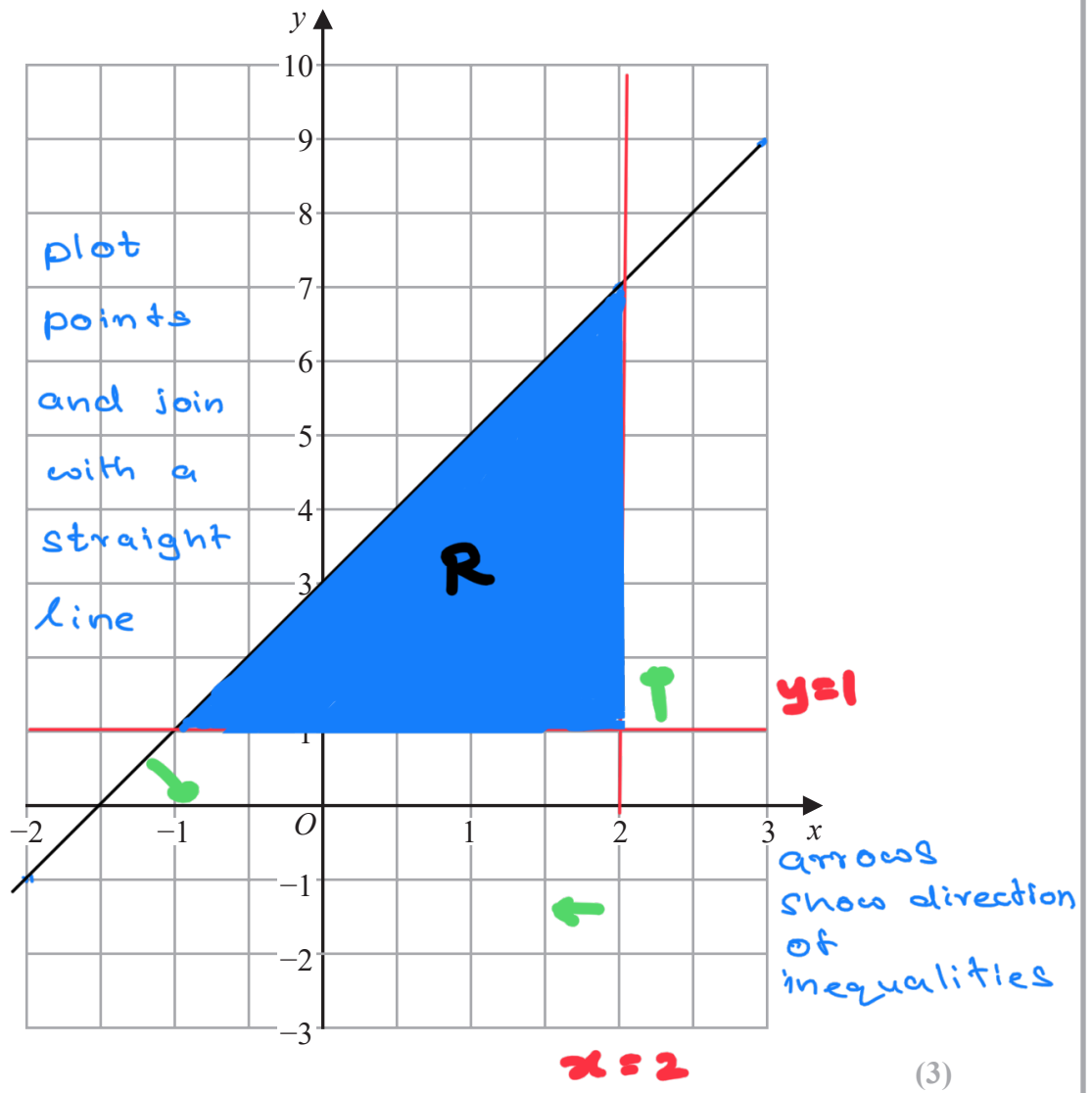
(3)

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

$x \leqslant 2$ $y \geqslant 1$ $y \leqslant 2x + 3$

to left of   above line   below line

Label the region **R**. line x = 2 $y = 1$ $y = 2x + 3$

(2)

(Total for Question 19 is 5 marks)

x	-2	-1	0	1	2	3
y	-1	1	3	5	7	9

$2(1) + 3$

$y = 2x + 3$
Substitute in x-values

20

Diagram **NOT** accurately drawn
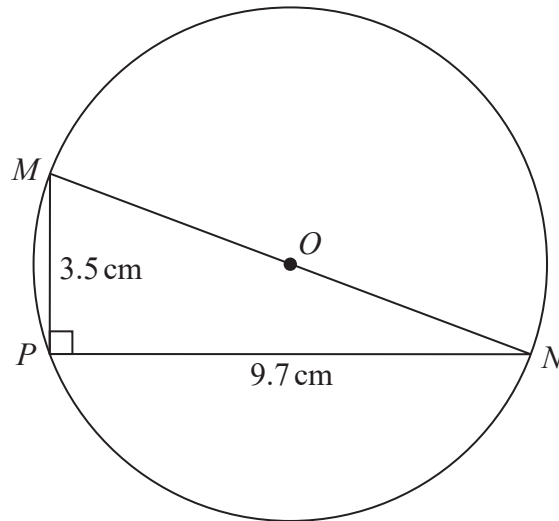
M, *N* and *P* are points on a circle, centre *O*.
MON is a diameter of the circle.

MP = 3.5 cm
PN = 9.7 cm

Angle *MPN* = 90°

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

Pythagoras: $a^2 + b^2 = c^2$

$MON^2 = 3.5^2 + 9.7^2 = 106.34$

$MON = \sqrt{106.34} = 10.31... \text{ cm}$

↳ diameter

Circumference $= \pi d$

$\quad = \pi \times 10.31$

$\quad = 32.396$

$\quad = 32.4 \text{ cm} \quad$ to 3SF

.... 32.4 .... cm

(Total for Question 20 is 4 marks)

21 Chao bought a boat for HK$160 000
The value of the boat depreciates by 4% each year.

(a) Work out the value of the boat at the end of 3 years.
Give your answer correct to the nearest HK$.

depreciates by 4% → 100% - 4% = 96% = 0.96 ÷100

↳ mutiplier

final value = initial value × multiplier^n

$= 160 000 × (0.96)^3$ → end of 3 years so substitute $n=3$

$= HK\$ 141 558$ to nearest HK$

HK$ **141 558**

(3)

Jalina gets a salary increase of 5%
Her salary after the increase is HK$252 000

(b) Work out Jalina's salary before the increase.

5% increase → 100% + 5% = 105% of original Salary

÷105 (HK$ 252 000 = 105%) ÷105

2400 = 1%

×100 (240 000 = 100%) ×100

Jalina's Salary before increase
HK$ 240 000

HK$ **240 000**

(3)

(Total for Question 21 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

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