Please check the examination details below before entering your candidate information

Candidate surname | Other names

Pearson Edexcel
International GCSE

Centre Number | Candidate Number

Tuesday 19 May 2020

Morning (Time: 2 hours) | Paper Reference **4MA1/1FR**

Mathematics A
Paper 1FR
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* ▶

Pearson

International GCSE Mathematics

Formulae sheet – Foundation Tier

Area of trapezium $= \dfrac{1}{2}(a + b)h$
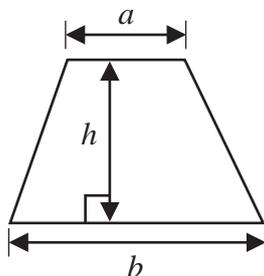
Volume of prism = area of cross section × length
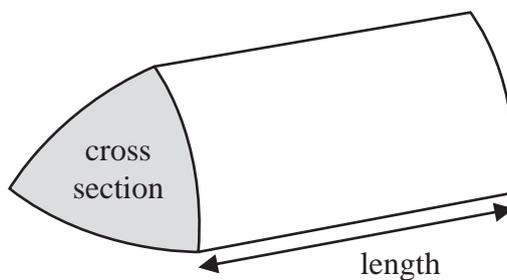
Volume of cylinder $= \pi r^2 h$

Curved surface area of cylinder $= 2\pi rh$
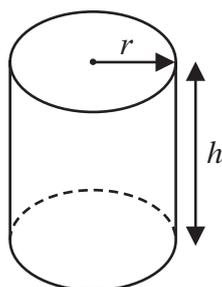
P 6 2 6 5 1 A 0 2 2 4

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a shape made of squares.
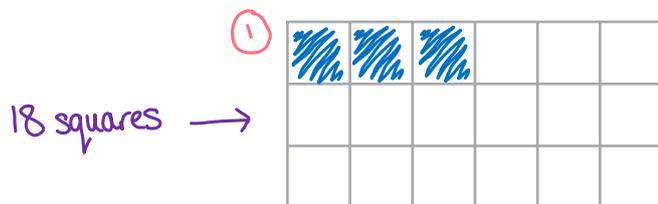
18 squares →

(a) Shade $\frac{1}{6}$ of the shape. $18 \times \frac{1}{6} = 3$ so shade 3 squares

(1)

(b) Change $\frac{19}{5}$ into a mixed number.

$$\frac{19}{5} = \frac{15}{5} + \frac{4}{5} = 3 + \frac{4}{5}$$

↑ whole   ↑ remainder

$3\frac{4}{5}$

(1)

$\frac{7}{11}$ of a class walk to school.

(c) What fraction of the class do **not** walk to school?

'whole class' is equal to 1.

$$1 - \frac{7}{11} = \frac{11}{11} - \frac{7}{11} = \frac{4}{11}$$

← denominators are the same, so subtract numerators

$\frac{4}{11}$

(1)

(d) Write down a fraction that is equivalent to $\frac{7}{9}$

$$\frac{7}{9} = \frac{2 \times 7}{2 \times 9} = \frac{14}{18}$$

↳ '2' could be any number

$\frac{14}{18}$

(1)

(e) Write 0.03 as a fraction.

$$0.03 = \frac{0.03}{1} = \frac{0.03 \times 100}{1 \times 100} = \frac{3}{100}$$

multiply top and ↑ bottom by 100

$\frac{3}{100}$

(1)

(Total for Question 1 is 5 marks)

P 6 2 6 5 1 A 0 3 2 4

2 The pictogram gives information about the number of eggs laid by Ellie's chickens in April, in May and in June.
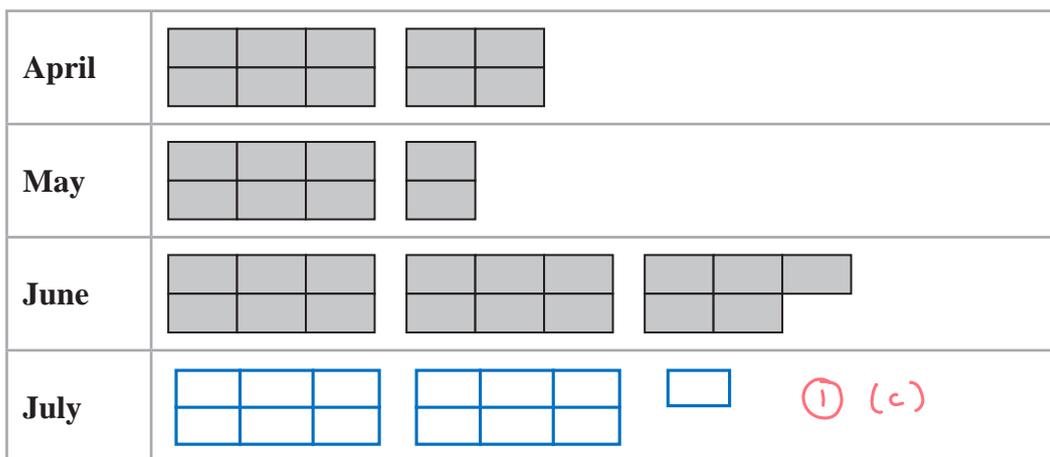
April	
May	
June	
July	① (c)

represents 24 eggs

(a) How many eggs were laid by Ellie's chickens in April?

6 boxes = 24 eggs   April = 10 boxes
24 ÷ 6 = 4   10 × 4 = 40 eggs
so 1 box = 4 eggs

40 ①

....
(1)

Ellie's chickens laid more eggs in June than in May.

(b) How many more?

May = 8 boxes   8 × 4 = 32 eggs
June = 17 boxes   17 × 4 = 68 eggs

① 68 – 32 = 36 eggs   (36 more eggs in June)
    ↑   ↑
   June   May

36 ①

....
(2)

Ellie's chickens laid 52 eggs in July.

(c) Show this information on the pictogram.

52 ÷ 4 = 13 boxes

                      group the boxes into groups
13/6 = 2 groups of 6 of 6, like the pictogram shows
     and 1 remaining. (see pictogram).

(1)

(Total for Question 2 is 4 marks)

3 The diagram shows five shaded shapes on a grid of squares.

A   B   C   D   E
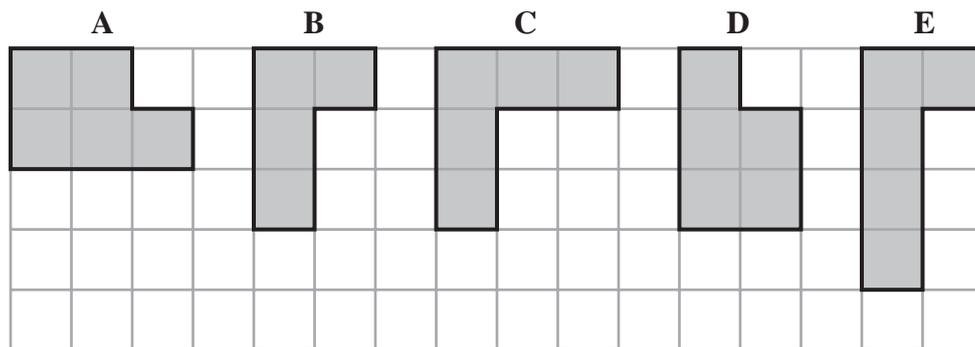
Two of the shapes are congruent. ← *congruent = exactly the same shape and size*

(a) Write down the letters of these shapes.

.... *A* .... and .... *D* .... ①

**(1)**

(b) On the square grid below, draw a shape that is similar to but is **not** congruent to shape **B**.

← *the same shape but NOT the same size.*

②
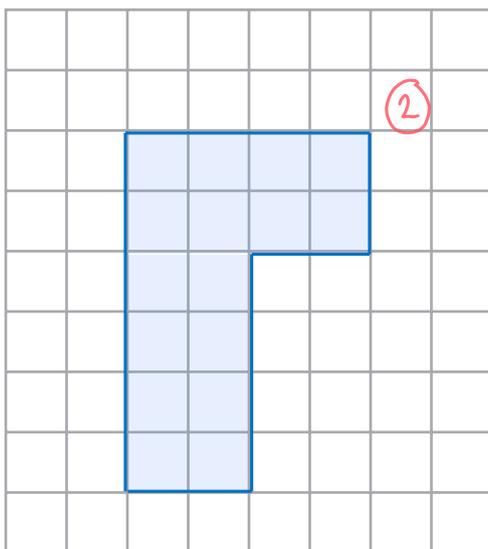
(2)

All of the shapes on the grid have 6 sides.

(c) Write down the mathematical name for a shape that has 6 sides.

.... *hexagon* ① ....

(1)

(Total for Question 3 is 4 marks)

4 There are 12 beads in a bag.

       6 of the beads are green
       4 of the beads are blue
       2 of the beads are pink

Peter takes at random a bead from the bag.

(a) Circle the word in the list below that best describes the likelihood that the bead is green.

   impossible   unlikely   (evens)   likely   certain

$\frac{6}{12}$ = half the beads are green **(1)**

(b) On the probability scale, mark with a cross (×) the probability that the bead is orange.

there are no orange beads in the
bag, so the probability is zero.

     0                    $\frac{1}{2}$ 1
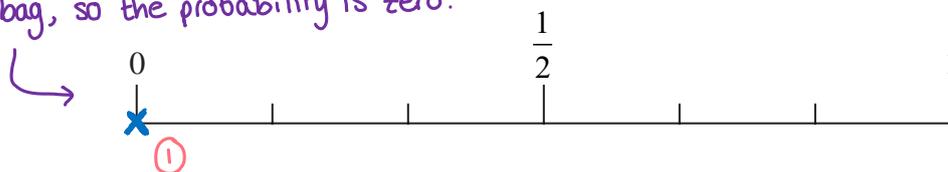
(1)

(c) On the probability scale, mark with a cross (×) the probability that the bead is blue.

÷2

$\frac{4}{12} = \frac{2}{6}$

÷2

    0   ¹/₆   ²/₆ $\frac{1}{2}$ ⁴/₆   ⁵/₆   1
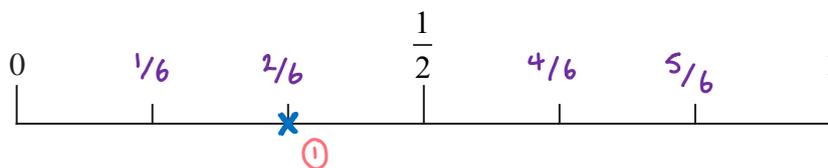
(1)

(d) On the probability scale, mark with a cross (×) the probability that the bead is green or pink.

green pink
↓   ↓
$\frac{6+2}{12} = \frac{8}{12}$

$\frac{8}{12} = \frac{4}{6}$

    0   ¹/₆   ²/₆ $\frac{1}{2}$ ⁴/₆   ⁵/₆   1

(1)
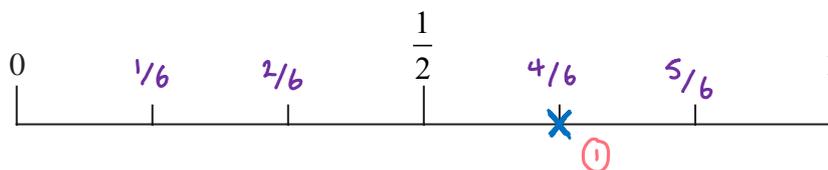
(Total for Question 4 is 4 marks)

6

P 6 2 6 5 1 A 0 6 2 4

5 (a) Simplify $w + w + w + w - w$

$\underbrace{\qquad}_{+4}$ $\underbrace{\qquad}_{-1}$

$4w - w = 3w$

$3w$ ①

(1)

(b) Simplify $4 \times a \times 2$

$\underbrace{\quad}_{}$ $\underbrace{\quad}_{}$

$4a \times 2 = 8a$

multiply integer parts: $4 \times 2 = 8$

$8a$ ①

(1)

(c) Simplify $f \times f \times f \times f \times f$

1 2 3 4 5

f^5 ← f 'to the power of 5'
means
f multiplied by itself
5 times

f^5 ①

(1)

(d) Simplify $4c + 4h + 5c - 6h$

Parts with the
same variable
(letter) can be
added / subtracted.

$4c + 5c = 9c$
$4h - 6h = -2h$ $\Big]$ $9c - 2h$

① ①

$9c - 2h$

(2)

(e) Factorise $10d + 15$

The highest common
factor of 10 and 15
is 5

$10 \div 5 = 2$ $\quad$ $15 \div 5 = 3$
$\downarrow$ $\qquad$ $\downarrow$
$5(2d + 3)$

$5(2d + 3)$ ①

(1)

(f) Make t the subject of $e = 7t + g$

↑
write it as $t = .$

$-g \Big($ $\begin{array}{l} e = 7t + g \\ e - g = 7t \end{array}$ ①

$\div 7 \Big($ $\dfrac{e - g}{7} = t$

$t = \dfrac{e-g}{7}$ ①

(2)

(Total for Question 5 is 8 marks)

6 Candles cost £3.05 each.
Theo has £30 to spend on candles.
He buys as many candles as he can for £30

Work out how much change Theo should get.

$30 \div 3.05 = 9.83.$ ① So Theo can get 9 whole candles

$9 \times 3.05 = 27.45$ 9 candles cost £27.45

$30 - 27.45 = 2.55$ ① the change is £2.55

£ .... 2.55 ①

(Total for Question 6 is 3 marks)

7
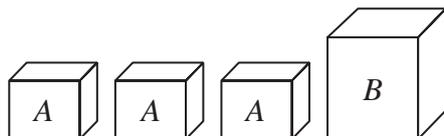
Diagram **NOT** accurately drawn

The diagram shows four parcels.
The total weight of the four parcels is 8.3 kg.

The weight of the parcel labelled *B* is 3.2 kg.
Each of the three parcels labelled *A* have the same weight.

(a) Work out the weight of each of the parcels labelled *A*.

$$8.3 = 3A + B$$
$$8.3 = 3A + 3.2 \qquad B = 3.2$$
$$-3.2 \quad 5.1 = 3A$$
$$1.7 = A \qquad \div 3 \quad ①$$

.... 1.7 ① .... kg

(2)

Here are another three parcels.
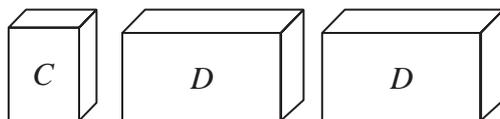
Diagram **NOT** accurately drawn

The total weight of the three parcels is 9.45 kg.

Each of the two parcels labelled *D* have the same weight.

The weight of each parcel labelled *D* is 3× the weight of the parcel labelled *C*.

(b) Work out the weight of the parcel labelled *C*.

$$9.45 = 2D + C$$
$$9.45 = 2(3c) + C \qquad D = 3 \times c \text{ so replace } D \text{ with } 3c$$
$$9.45 = 6c + c$$
$$9.45 = 7c \quad ①$$
$$\div 7 \quad 1.35 = C$$

.... 1.35 ① .... kg

(2)

(Total for Question 7 is 4 marks)

8 There are 150 people at an international conference.
These 150 people were each asked to say what their main method of transport was to get to the conference.
The two-way table shows some information about these people and their answers.

① 29 − 17 = 12

③

	bus	train	plane	total
men	12	15	53	80
women	17	28	25	70
total	29	43	78	150

③ 80 − 15 − 12 = 53

④ 150 − 80 = 70

(a) Complete the two-way table.   ② 43 − 15 = 28

⑤ 70 − 28 − 17 = 25

Follow the steps
in the order shown.
(Other orders will work too!)

⑥ 150 − 29 − 43 = 78

(3)

One of the men from these 150 people is selected at random.

(b) Write down the probability that this man's main method of transport was train.

Men = 80 people

Men who use the train = 15 people   (from the table)

Therefore $\frac{15}{80}$ men use the train

$\frac{15}{80}$

(1)

(Total for Question 8 is 4 marks)

9 A box is to be filled with cartons.

4 cm
**carton**
4 cm
4 cm

box
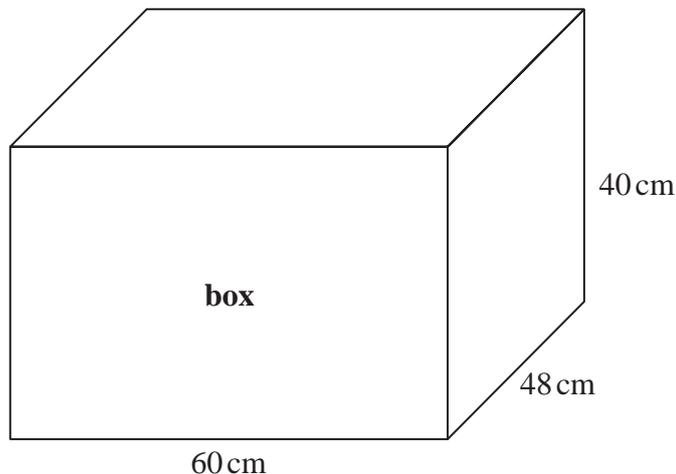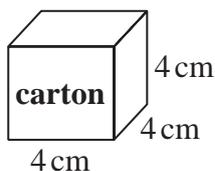
40 cm

48 cm

60 cm

Diagram **NOT** accurately drawn

Each carton is a cube that measures 4 cm by 4 cm by 4 cm.
The box is a cuboid that measures 60 cm by 48 cm by 40 cm.

Work out the number of cartons that can completely fill the box.

VOLUME

width × length × height

Work out how many cartons fit into the box's volume

Volume of carton = 4 × 4 × 4 = 64 cm³ ①

Volume of box = 60 × 48 × 40 = 115 200 cm³

① 115 200 ÷ 64 = 1800 cartons

— OR —

Work out how many cartons fit along each edge.

60 ÷ 4 = 15 cartons along width
48 ÷ 4 = 12 cartons along depth
40 ÷ 4 = 10 cartons along height
① 15 × 12 × 10 = 1800

Alternative 2 marks
for method. ①

1800 ①

(Total for Question 9 is 3 marks)

Turn over ▶

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

10 The diagram shows a square and an isosceles triangle.

Diagram **NOT** accurately drawn

6 cm

6 cm

6 cm
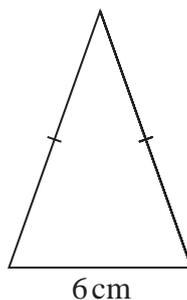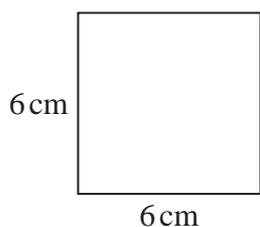
The square has sides of length 6 cm.
The base of the isosceles triangle is 6 cm.

The perimeter of the square is equal to the perimeter of the isosceles triangle.

The shaded shape is made by putting three of the isosceles triangles around the square as shown in the diagram below.

Diagram **NOT** accurately drawn

9   9

9   9

9   9

6
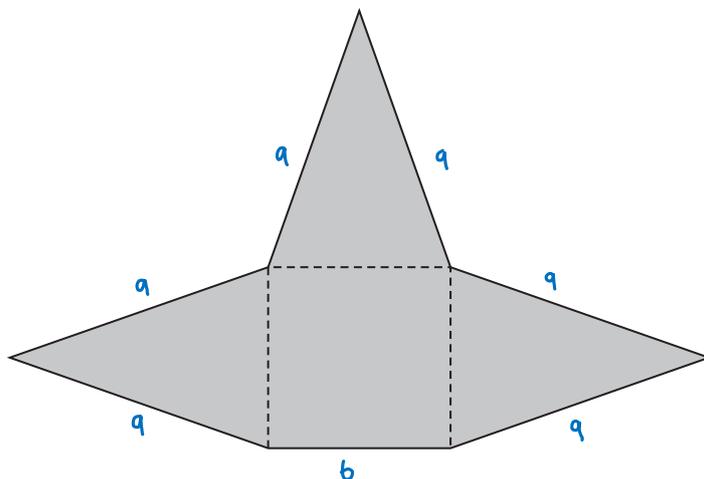
Work out the perimeter of the shaded shape.
Show your working clearly.
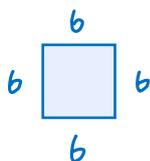
Perimeter of square = 4 × 6 = 24 cm ①
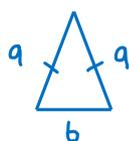
perimeter of square = perimeter of triangle

Long side of triangle = $\frac{24 - 6}{2}$ = 9 ①

Perimeter of shaded shape = (6 × 9) + 6 ①
(see diagram)   = 60 cm

60 ①   cm

(Total for Question 10 is 4 marks)

11 On the grid, draw the graph of $y = 3x - 2$ for values of x from –1 to 4

x	–1	0	1	2	3	4
y	–5	–2	1	4	7	10

$(3 \times -1) - 2$

$(3 \times 0) - 2$

$(3 \times 1) - 2$

$(3 \times 2) - 2$

$(3 \times 3) - 2$

$(3 \times 4) - 2$
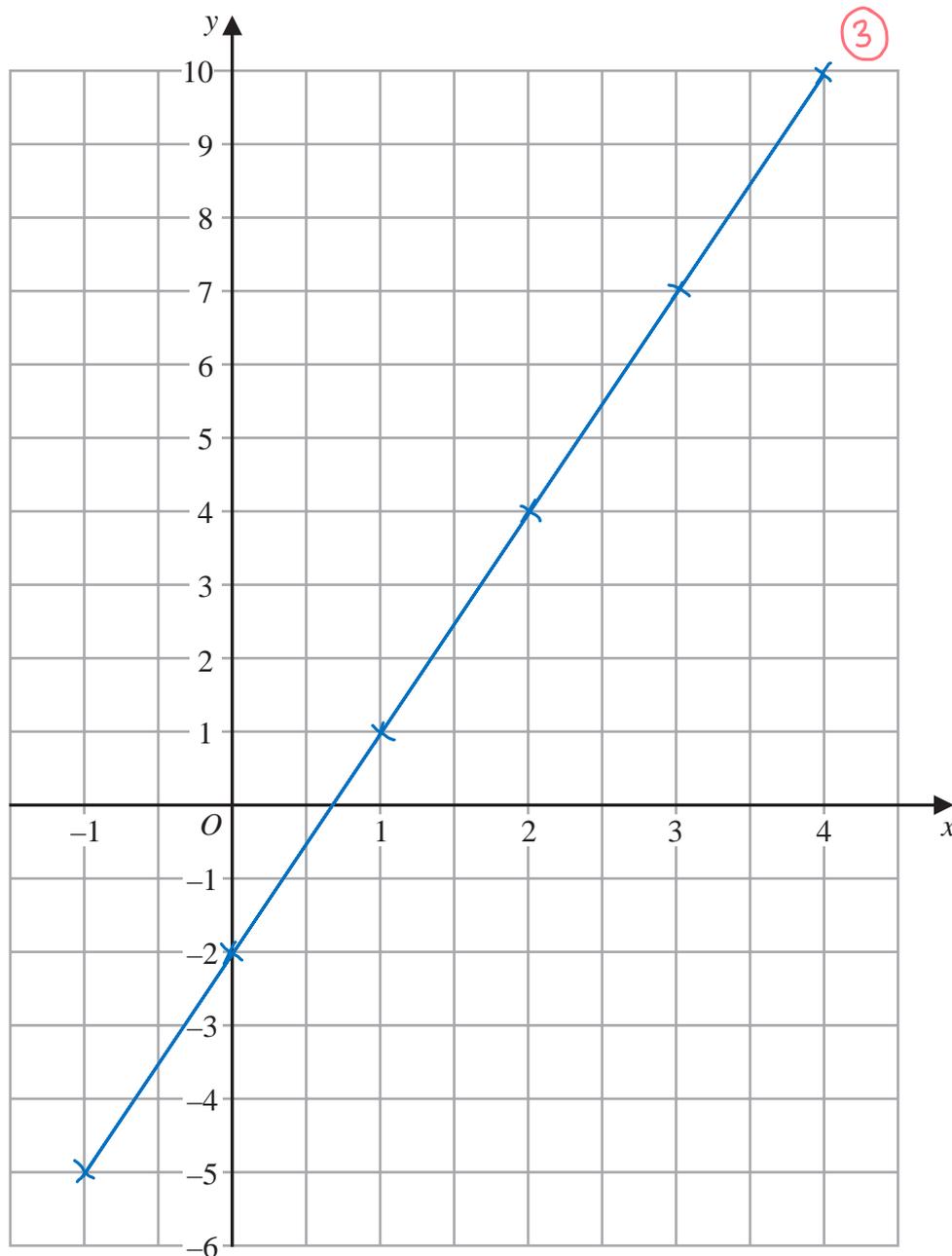
(Total for Question 11 is 3 marks)

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

12 $\mathscr{E}$ = {whole numbers from 1 to 15}

A = {even numbers}

B = {3, 6, 9, 12, 15}

Complete the Venn diagram for the sets $\mathscr{E}$, A and B.

numbers in A and B

$\mathscr{E}$

1

A B

5   2   4

7   8   6   3

11   12   9

13   10

14   15

numbers
between
1-15 that
are not in
A or B
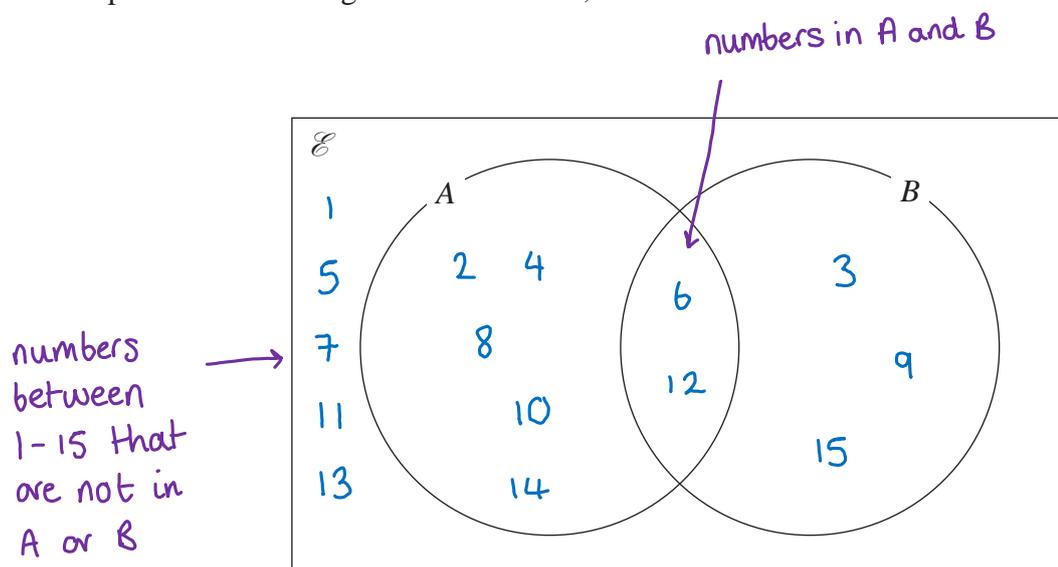
(Total for Question 12 is 3 marks)

13 Find which is larger

32% of 450   or $\dfrac{2}{5}$ of 375

You must show all your working.

$32\% = \dfrac{32}{100} = 0.32$

$0.32 \times 450 = 144$ ① $\dfrac{2}{5} \times 375 = 150$ ①

$150 > 144$ therefore '$\dfrac{2}{5}$ of 375' is larger than '32% of 450'

$\dfrac{2}{5}$ of 375 ①

(Total for Question 13 is 3 marks)

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

14 Find the lowest common multiple (LCM) of 20 and 35

List multiples of each

Split numbers into common factors

20
  10   2
  2 5

35
  7   5
       ↳ This has already been included
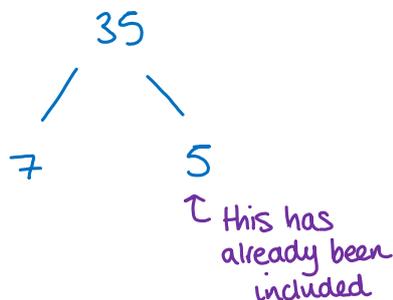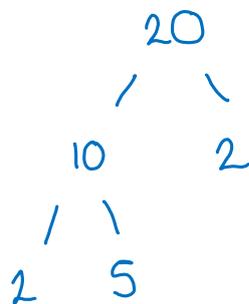
OR

20	35
40	70
60	105
80	(140)
100	
120	
(140)	

$2 \times 2 \times 5 \times 7 = 140$

140

(Total for Question 14 is 2 marks)

15

O
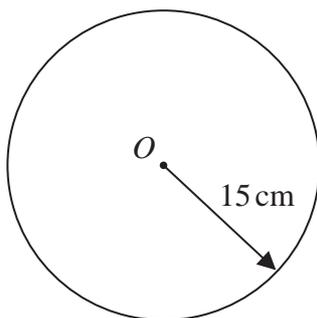
15 cm

Diagram **NOT** accurately drawn

The diagram shows a circle, centre O, with radius 15 cm.

Work out the area of the circle.
Give your answer in cm² correct to the nearest whole number.

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

Area $= \pi \times 15 \times 15$ ①

$= \pi \times 225$ ← put this into a calculator, or use $\pi \approx 3.1415...$

$= 706.8...$

≈ 707 ⤸ .8 is bigger than .5, so round up

707 ① cm²

(Total for Question 15 is 2 marks)

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

16 The graph below can be used to change between euros and dirham.

200 dirham →

= 47 euros
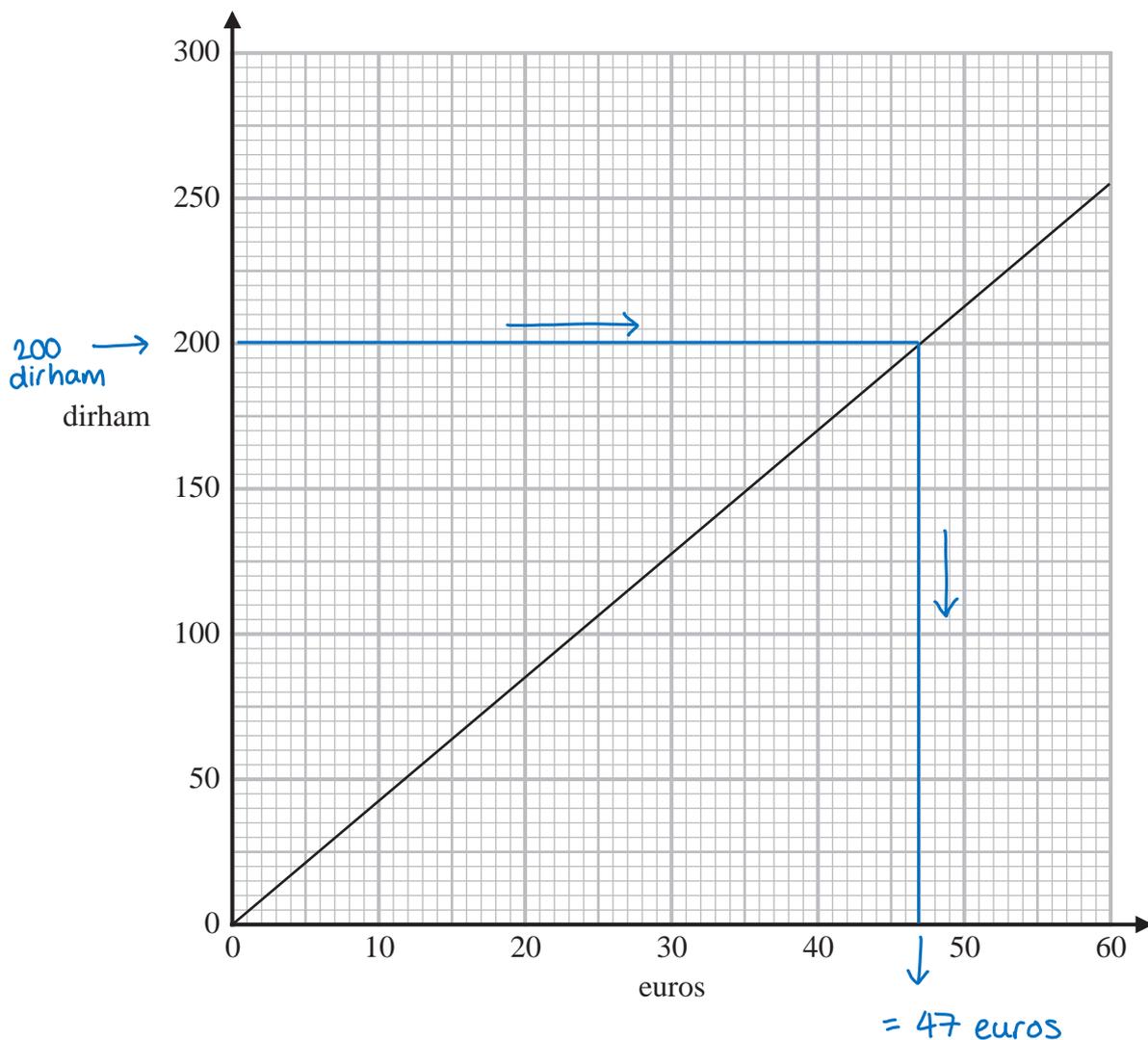
(a) Use the graph to change 200 dirham to euros.

See graph. ↑

47 euros

(1)

The price of a jacket is 90 euros in France and 400 dirham in the United Arab Emirates.

(b) In which of these countries is the jacket cheaper?
You must show your working.

400 Dirham = 2 × 200 Dirham

= 2 × 47 euros (using previous question)

= 94 euros

The jacket is 90 euros in France, so it is cheaper in France

France

(2)

(Total for Question 16 is 3 marks)

17 Show that $3\dfrac{3}{4} \times \dfrac{7}{9} = 2\dfrac{11}{12}$

$$3\tfrac{3}{4} = 3\left(\tfrac{4}{4}\right) + \tfrac{3}{4} = \tfrac{12}{4} + \tfrac{3}{4} = \tfrac{15}{4} \quad ①$$

$$\tfrac{15}{4} \times \tfrac{7}{9} = \tfrac{15 \times 7}{4 \times 9} = \tfrac{105}{36} \quad ①$$

$$\tfrac{105}{36} = \tfrac{72}{36} + \tfrac{33}{36} = 2 + \tfrac{33}{36} = 2\tfrac{11}{12} \quad ① \qquad \overset{\div 3}{\overbrace{}} \; \tfrac{33}{36} = \tfrac{11}{12} \; \underset{\div 3}{\underbrace{}}$$

↗ whole part   ↑ remainder

(Total for Question 17 is 3 marks)

**18** Using ruler and compasses only, construct the bisector of angle *ABC*.
You must show all your construction lines.

① Place compass on B and draw arcs on BA and BC
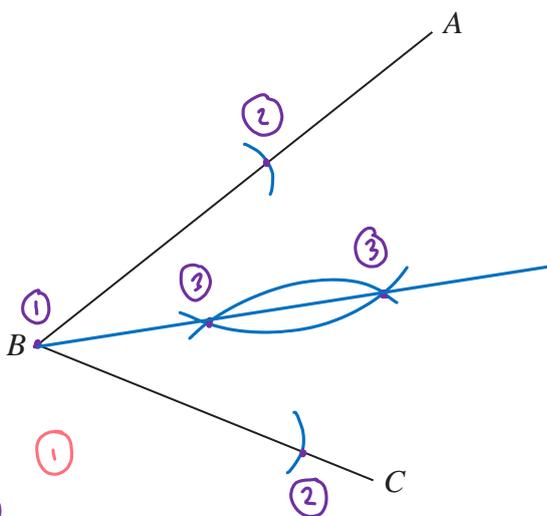
② Place compass where these arcs meet the lines and draw 2 more arcs at the centre.

③ Place a ruler where these arcs meet and draw a line through B.

A

②

B

③   ③

①

②

C

①

①

①

(Total for Question 18 is 2 marks)

19 (a) Simplify $h^7 \times h^2$

$$x^a \times x^b = x^{a+b}$$

$$h^7 \times h^2 = h^{7+2}$$
$$= h^9$$

h^9

(1)

$G = c^2 - 4c$

(b) Find the value of G when $c = -5$

$$G = c^2 - 4c$$
$$= (-5)^2 - 4(-5)$$
$$= 25 - (-20)$$
$$= 45$$

$G =$ 45

(2)

(c) Solve $\dfrac{5x-3}{4} = 2x + 3$

Show clear algebraic working.

$$\frac{5x-3}{4} = 2x+3 \quad ①$$

$$\left) \times 4 \right.$$

$$5x - 3 = 4 \times (2x+3)$$
$$5x - 3 = 8x + 12 \quad ① \left) -5x \right.$$
$$-3 = 3x + 12 \quad \left) -12 \right.$$
$$-15 = 3x \quad \left) \div 3 \right.$$
$$-5 = x$$

$x =$ -5 ①

(3)

(Total for Question 19 is 6 marks)

20 The table gives information about the length of time, in minutes, that each of 60 students took to travel to school on Monday.

midpoints:

	Length of time (*t* minutes)	Frequency
5	$0 < t \leqslant 10$	4
15	$10 < t \leqslant 20$	10
25	$20 < t \leqslant 30$	15
35	$30 < t \leqslant 40$	25
45	$40 < t \leqslant 50$	6

Work out an estimate for the mean length of time taken by these 60 students to travel to school on Monday.
Give your answer correct to one decimal place.

mean = $\dfrac{\text{sum of entries}}{\text{no. of entries}}$ "estimate" so work out the midpoints of each range

sum of entries = $5 \times 4 + 15 \times 10 + 25 \times 15 + 35 \times 25 + 45 \times 6$
= 1690 ②

mean = $\dfrac{1690^{①}}{60}$ = 28.166... = 28.2 (1 d.p)
             ↑
          .6 > .5 so round up

given in question

.... 28.2 .... minutes

(Total for Question 20 is 4 marks)

21 In 2017, the population of a village was 7500
In 2019, the population of the village was 8265

(a) Work out the percentage increase in the population of the village from 2017 to 2019

$8265 - 7500 = 765 \leftarrow$ increase

$\dfrac{765}{7500} \times 100 = 10.2 \%$

↑
original population

........10.2........%

(3)

In a sale, normal prices are reduced by 30%
The sale price of a T-shirt was 31.50 euros.

(b) Work out the normal price of the T-shirt.

$100\% - 30\% = 70\% \leftarrow$ Sale price is 70% of
original price

$\dfrac{31.50}{0.7} = 45$ ②

↑

$70\% = 07$

45 ①

........45........ euros

(3)

(Total for Question 21 is 6 marks)

22 Point *A* has coordinates (–3, 11)
   Point *B* has coordinates (47, *b*)
   The midpoint of *AB* has coordinates (*a*, –19)

   Find the value of *a* and the value of *b*.

midpoint AB $= \dfrac{x_A + x_B}{2}, \dfrac{y_A + y_B}{2}$

$a = \dfrac{-3 + 47}{2} = 22$ ①

$-19 = \dfrac{11 + b}{2}$

$-38 = 11 + b$ $\bigg\}\times 2$

$-49 = b$ $\bigg)\ -11$

$a =$ .... 22 ①

$b =$ .... −49

(Total for Question 22 is 2 marks)

23 Pedro drove from Toulouse to Montpellier in 2 hours 42 minutes.
   He drove at an average speed of 90 km/hour.

   Janine drove from Toulouse to Montpellier along the same route as Pedro.
   The journey took her 3 hours.

   Work out Janine's average speed for the journey.

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

2hrs 42 mins $=$ 2.7 hrs $=$ 162 mins ①

$2 + \dfrac{42}{60} = 2.7 \qquad (2\times60)+42 = 162$

90 km/hr $\times$ 2.7 hr $=$ 243 km ① $\leftarrow$ distance from T to M

243 km $\div$ 3hrs $=$ 81 km/hr ①

↑

Janine's speed

.... 81 .... ① km/hour

(Total for Question 23 is 4 marks)

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

24 Harold bought an antique clock for £1200
The clock increased in value by 8% per year.

Find the value of the clock exactly 3 years after Harold bought the clock.
Give your answer correct to the nearest £.

increase by 8% = 100% + 8% = 108%
                 ↑
        original value

1200 × 1·08 × 1·08 × 1·08 = 1511·6544 ②
       ↑   ↑   ↑   = 1512 ∠ ·6 > ·5 so round up
   year 1   year 2   year 3

£ .... 1512 ①

(Total for Question 24 is 3 marks)

25 A box is put on a horizontal table.

The face of the box in contact with the table is a square of side 1.5 metres.
The pressure on the table due to the box is 34.8 newtons/m²

Work out the force exerted by the box on the table.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

1·5 [ ]   area = 1·5 × 1·5 = 2·25m² ①
1·5

×2·25   34·8 = $\frac{\text{force}}{2·25}$

34·8 × 2·25 = force ①

= 78·3 N

.... 78·3 ① newtons

(Total for Question 25 is 3 marks)

26 Alex makes 80 cakes to sell.
He makes chocolate cakes, lemon cakes and fruit cakes where

$$\frac{\text{number of}}{\text{chocolate cakes}} \quad : \quad \frac{\text{number of}}{\text{lemon cakes}} \quad : \quad \frac{\text{number of}}{\text{fruit cakes}} \quad = \quad 3 : 2 : 5$$

Alex sells

all of the chocolate cakes

$\frac{3}{4}$ of the lemon cakes

$\frac{7}{8}$ of the fruit cakes

The profit he makes on each cake he sells is shown in the table.

Type of cake	Profit per cake he sells
chocolate	£2.00
lemon	£1.70
fruit	£2.40

Work out the total profit that Alex makes from the cakes he sells.

total parts in ratio = 3 + 2 + 5 = 10

so 10 parts represents 80 cakes

chocolate $\frac{3}{10} \times 80 = 24$ ①

  $24 \times 2.00 = 48$

lemon. $\frac{2}{10} \times 80 = 16$ ①

  $\frac{3}{4} \times 16 \times 1.70 = 20.4$

fruit : $\frac{5}{10} \times 80 = 40$ ①

  $\frac{7}{8} \times 40 \times 2.40 = 84$ ①

profit = 84 + 20.4 + 48 = £152.40

£ ....152.40......... ①

(Total for Question 26 is 5 marks)

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

27 The diagram shows a regular octagon *ABCDEFGH*.
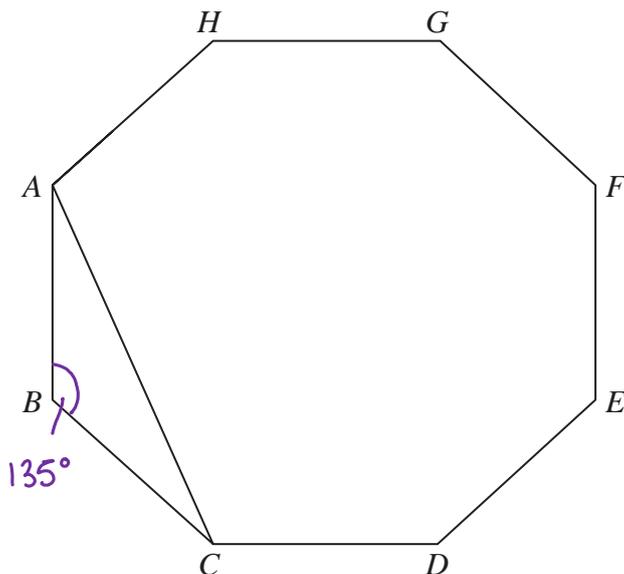
Diagram **NOT**
accurately drawn

135°

Work out the size of angle *HAC*.

Interior angle of n-sided shape $= 180 - \dfrac{360}{n}$

$180 - \dfrac{360}{8} = 135°$ ① $\leftarrow$ $A\hat{B}C$

$B\hat{A}C = \dfrac{180 - 135}{2}$ $\leftarrow$ angles in a triangle sum to 180°

$\phantom{B\hat{A}C} \leftarrow$ $B\hat{A}C = B\hat{C}A$ ①

$\phantom{B\hat{A}C} = 22.5°$

$H\hat{A}C = 135 - 22.5$

$\phantom{H\hat{A}C} = 112.5°$

..................112.5......... ① °

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS