

Write your name here

Surname

Model Answers

Other names

**Pearson Edexcel**

Centre Number

Candidate Number

Level 1/Level 2 GCSE (9–1)

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# Mathematics

## Paper 1 (Non-Calculator)

**Foundation Tier**

Thursday 24 May 2018 – Morning

**Time: 1 hour 30 minutes**

Paper Reference

**1MA1/1F**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. 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.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**



### Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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P 4 8 5 2 7 A 0 1 2 4



Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 6324 correct to the nearest thousand.

*3 is less than 5 so round down*

*6324 → 6000 to nearest 1000*

*6000*

(Total for Question 1 is 1 mark)

2 (a) Write the following numbers in order of size.

Start with the smallest number.

-6                  6                  -5                  0                  12

*-6, -5, 0, 6, 12*

(1)

(b) Write the following numbers in order of size.

Start with the smallest number.

0.078                  0.78                  0.87                  0.708

*0.078, 0.708, 0.78, 0.87*

(1)

(Total for Question 2 is 2 marks)

3 Write 20% as a fraction.

$$20\% = \frac{20}{100} = \frac{1}{5}$$

*Handwritten work shows the simplification of 20/100 to 1/5 by dividing both numerator and denominator by 20.*

*1/5*

(Total for Question 3 is 1 mark)

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4 Here is a list of four fractions.

$$\frac{4}{16}$$

$$\frac{2}{8}$$

$$\frac{15}{60}$$

$$\frac{3}{9}$$

One of these fractions is **not** equivalent to  $\frac{1}{4}$

Write down this fraction.

$$\frac{4}{16} = \frac{1}{4}$$

*(Handwritten: divide 4 by 4)*

$$\frac{2}{8} = \frac{1}{4}$$

*(Handwritten: divide 2 by 2)*

$$\frac{15}{60} = \frac{1}{4}$$

*(Handwritten: divide 15 by 15)*

$$\frac{3}{9} = \frac{1}{3}$$

*(Handwritten: divide 3 by 3)*

$$\frac{3}{9}$$

(Total for Question 4 is 1 mark)

5 Write down the first even multiple of 7

multiples of 7 : 7, 14, 21, ...  
*(Handwritten: 2 x 7 = 14)*

14 is the first even multiple of 7

$$14$$

(Total for Question 5 is 1 mark)

6 (a) Simplify  $3 \times 4t$

$$3 \times 4t = 12t$$

$$12t$$

(1)

(b) Simplify  $8a - 3a + 2a$

$$8a - 3a + 2a = 5a + 2a = 7a$$

$$7a$$

(1)

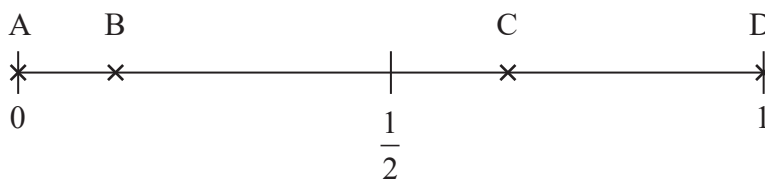
(Total for Question 6 is 2 marks)

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- 7 Here is a probability scale.  
It shows the probability of each of the events A, B, C and D.



- (a) Write down the letter of the event that is certain.

certain  $\rightarrow$  probability = 1

D

(1)

- (b) Write down the letter of the event that is unlikely.

unlikely  $\rightarrow$  probability greater than 0, but less than  $\frac{1}{2}$

B

(1)

There are 12 counters in a bag.

- 3 of the counters are red.
- 1 of the counters is blue.
- 2 of the counters are yellow.
- The rest of the counters are green.

Caitlin takes at random a counter from the bag.

- (c) Show that the probability that this counter is yellow or green is  $\frac{2}{3}$

$$\begin{aligned} \text{no. yellow counters} &= 2 \\ \text{no. green counters} &= 12 - 3 - 1 - 2 = 6 \\ \text{total no. counters} &= 12 \end{aligned}$$

$$\begin{aligned} P(\text{yellow or green}) &= p(\text{yellow}) + p(\text{green}) \\ &= \frac{2}{12} + \frac{6}{12} \\ &= \frac{8}{12} = \frac{2}{3}. \end{aligned} \tag{3}$$

(Total for Question 7 is 5 marks)



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8 3 kg of meat costs £54  
Nina buys 2 kg of the meat.

Work out how much Nina pays.

$$\begin{aligned} 3 \text{ kg meat} &= \text{£}54 \\ 1 \text{ kg meat} &= \text{£}18 \end{aligned} \quad \div 3$$

$$2 \text{ kg meat} = 2 \times \text{£}18 = \text{£}36$$

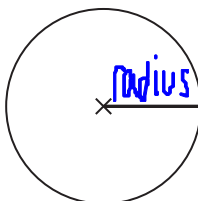
Nina pays £36

£ 36

(Total for Question 8 is 2 marks)

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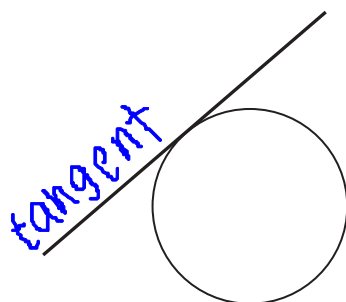
9 The centre of this circle is marked with a cross (×).



(a) Write down the mathematical name of the straight line shown in the circle.

radius  
(1)

(b) Write down the mathematical name of the straight line that is touching the circle.



tangent  
(1)

(Total for Question 9 is 2 marks)

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10 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

£1280 for 4 return plane tickets

£640 for the villa

£220 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

plane tickets = £1280

villa = £640

car hire = £220

$$\begin{array}{r} \text{total cost of holiday} = \\ 1280 \\ \quad 640 \\ + \quad 220 \\ \hline 2140 \\ \hline \end{array}$$

total cost of holiday = £2140

4 people → each person pays  $\frac{2140}{4} = £535$

Tim pays £535.

£ 535

(Total for Question 10 is 3 marks)

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11 Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

Example: 6

factors of 6: ① 6  
                  2 ③

↳ 1 and 3 are odd  
statement incorrect

6  
.....  
(1)

(b) All the digits in odd numbers are odd.

Example: 23

digits of 23: ② 3

↳ 2 is even  
statement incorrect

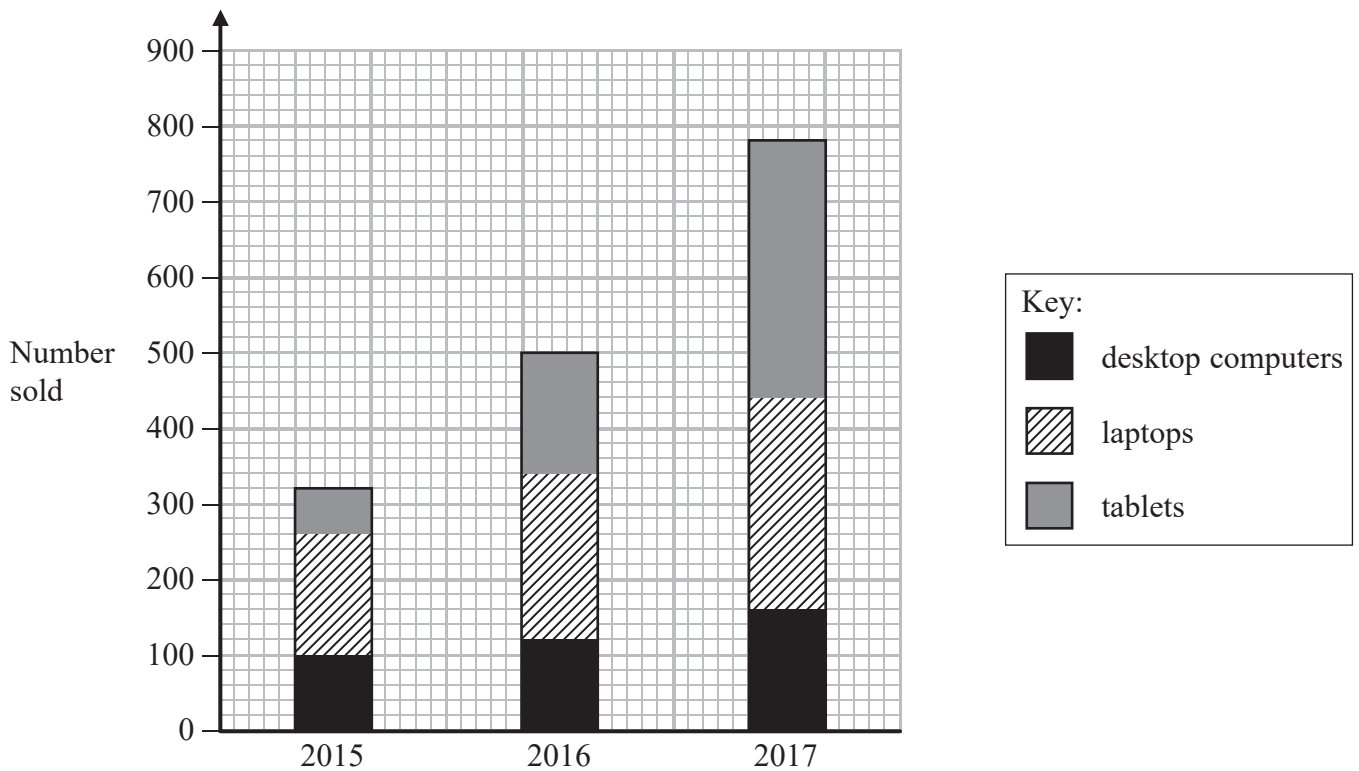
23  
.....  
(1)

(Total for Question 11 is 2 marks)



12 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.



(a) Write down the number of desktop computers sold in 2015

from bar chart 2015 column,  
no. desktop computers sold = 100

100  
.....  
(1)

(b) Work out the total number of laptops sold in the 3 years.

total no. laptops sold   
 2015: no. sold = 260 - 100 = 160  
 2016: no. sold = 340 - 120 = 220  
 2017: no. sold = 440 - 160 = 280

160  
220  
+ 280  
-----  
660  
|

660  
.....  
(3)

(c) State the item that had the greatest increase in sales over the 3 years.

Give a reason for your answer.

Tablets had the greatest increase in sales. No. sold in 2015 = 320 - 260 = 60

No. sold in 2017 = 780 - 440 = 340

Increase in sales = 340 - 60 = 280

Alternative answer:

Tablets. Bars get proportionally larger over time (most in 2017 and least in 2015).

(2)

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Alex says,

“In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers.”

(d) Is Alex correct?

You must justify your answer.

Alex is incorrect. We don't know the prices of the items or how much profit the shop makes from the sale of each item.

(1)

(Total for Question 12 is 7 marks)

13 A piece of wire is 240 cm long.

Peter cuts two 45 cm lengths off the wire.

He then cuts the rest of the wire into as many 40 cm lengths as possible.

Work out how many 40 cm lengths of wire Peter cuts.

Wire is 240 cm long

$$240 - (2 \times 45) = 240 - 90 = 150 \text{ cm}$$

$$\frac{150}{40} = \frac{15}{4} = 3 \frac{3}{4} = 3.75$$

Peter cuts 3 40cm lengths.

3

(Total for Question 13 is 3 marks)



14 Gavin, Harry and Isabel each earn the same monthly salary.

Each month,

Gavin **saves** 28% of his salary and spends the rest of his salary

Harry spends  $\frac{3}{4}$  of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.

You must show how you get your answer.

Say Gavin, Harry and Isabel all have a monthly salary of £1000

Gavin: saves 28%      28% of £1000 =  $0.28 \times 1000 = £280$

Harry: spends  $\frac{3}{4}$  so saves  $\frac{1}{4}$        $\frac{1}{4}$  of £1000 =  $\frac{1}{4} \times 1000 = £250$

Isabel: saves : spends  
3 : 7      sum parts 3+7 = 10

$\frac{3}{10}$  of £1000 =  $\frac{1000}{10} \times 3 = 100 \times 3 = £300$

Isabel saves the most.

(Total for Question 14 is 4 marks)

15 Work out 15% of 160 grams.

$$\frac{15}{100} \times 160 = \frac{15}{\cancel{100}} \times \frac{\cancel{160}}{1} = \frac{\cancel{15}^3}{\cancel{100}_5} \times \frac{8}{1} = 3 \times 8 = 24 \text{ grams}$$

15 and 5 divisible by 3  
100 and 160 divisible by 20

Alternative:

15% of 100 grams = 10% + 5% of 160 grams

10% =  $\frac{160}{10} = 16$  grams      5% =  $\frac{1}{2}$  of 10% =  $\frac{16}{2} = 8$  grams

..... 24 ..... grams

15% = 16 + 8 = 24 grams

(Total for Question 15 is 2 marks)

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16  $P = 4x + 3y$

$$x = 5$$

$$y = -2$$

(a) Work out the value of  $P$ .

$$P = 4x + 3y \quad x = 5, y = -2$$

$$P = 4(5) + 3(-2) = 20 + (-6) = 20 - 6 = 14$$

$$P = 14$$

$$P = 14$$

(2)

(b) Expand  $4e(e + 2)$

$$4e(e + 2) = 4e^2 + 8e$$

$$4e^2 + 8e$$

(2)

(c) Solve  $3(m - 4) = 21$

$$3(m - 4) = 21 \quad \text{expand brackets}$$

$$3m - 12 = 21 \quad \text{rearrange}$$

$$3m = 33 \quad \text{divide both sides by 3}$$

$$m = 11$$

$$m = 11$$

(2)

(Total for Question 16 is 6 marks)



17 There are some chocolates in a box.

$\frac{1}{4}$  of the chocolates contain nuts.

The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.

Give your answer in the form  $1 : n$

$$\frac{1}{4} \text{ contain nuts} \rightarrow \frac{3}{4} \text{ do not contain nuts} \quad 1 - \frac{1}{4} = \frac{4}{4} - \frac{1}{4} = \frac{3}{4}$$

ratio of contains nuts : do not contain nuts

$$\times 4 \left( \frac{1}{4} : \frac{3}{4} \right) \times 4$$

$$1 : 3$$

1:3

(Total for Question 17 is 2 marks)

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18  $A = \{\text{multiples of 5 between 14 and 26}\}$

$B = \{\text{odd numbers between 14 and 26}\}$

(a) List the members of  $A \cup B$

$A = \{\text{multiples of 5 between 14 and 26}\} = 15, 20, 25$

$B = \{\text{odd numbers between 14 and 26}\} = 15, 17, 19, 21, 23, 25$

$A \cup B$   $\rightarrow$  union (or)  
 $\rightarrow$  numbers in A or B or both

15, 17, 19, 20, 21, 23, 25

15, 17, 19, 20, 21, 23, 25

(2)

(b) Describe the members of  $A \cap B$

$A \cap B$  : odd multiples of 5 between 14 and 26

$\rightarrow$  numbers in set A and B  
 intersection (and)

15, 25

15, 25

(1)

(Total for Question 18 is 3 marks)



19 (a) Work out  $2\frac{1}{7} + 1\frac{1}{4}$

1. Convert mixed numbers to improper fractions
2. find common denominator
3. Add

$$2\frac{1}{7} = \frac{14}{7} + \frac{1}{7} = \frac{15}{7}$$

$$1\frac{1}{4} = \frac{4}{4} + \frac{1}{4} = \frac{5}{4}$$

$$\begin{array}{r} \times 4 \quad \left( \frac{15}{7} + \frac{5}{4} \right) \quad \times 2 \\ \hline \frac{60}{28} + \frac{35}{28} = \frac{95}{28} \end{array}$$

$$\frac{95}{28}$$

(2)

(b) Work out  $1\frac{1}{5} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

1. Convert to mixed number to improper fraction
2. flip second fraction and multiply
3. Convert to mixed number

$$1. \quad 1\frac{1}{5} = \frac{5}{5} + \frac{1}{5} = \frac{6}{5}$$

$$2. \quad \frac{6}{5} \div \frac{3}{4} = \frac{6}{5} \times \frac{4}{3} \quad \text{cancel common factors: } \frac{2}{5} \times \frac{4}{1} = \frac{2}{5} \times 4 = \frac{8}{5}$$

$$3. \quad \frac{8}{5} = 1\frac{3}{5}$$

$$1\frac{3}{5}$$

(2)

(Total for Question 19 is 4 marks)

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20 In a village

the number of houses and the number of flats are in the ratio 7 : 4

the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.

How many houses are there in the village?

flats : bungalows

$$\begin{array}{c} 8 : 5 \\ \times 10 \quad \quad \times 10 \\ \hline 80 : 50 \end{array}$$

houses : flats

$$\begin{array}{c} 7 : 4 \\ \times 20 \quad \quad \times 20 \\ \hline 140 : 80 \end{array}$$

140 houses

140

(Total for Question 20 is 3 marks)



- 21 Renee buys 5 kg of sweets to sell.  
She pays £10 for the sweets.

Renee puts all the sweets into bags.  
She puts 250 g of sweets into each bag.  
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

$$\begin{aligned}
 5 \text{ kg} &= 5000 \text{ g} \\
 5000 \div 250 &= 20 \text{ bags of sweets} \\
 65 \text{ p} &= £0.65 \\
 20 \times 0.65 &= £13 \text{ from selling all bags of sweets} \\
 \text{Renee's profit} &= 13 - 10 = £3 \\
 \text{percentage profit} &= \frac{\text{amount of profit}}{\text{amount spent}} \times 100\% \\
 &= \frac{3}{10} \times 100\% = 30\%
 \end{aligned}$$

..... 30 .....

(Total for Question 21 is 4 marks)

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22 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour. For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

$$3069.25 \approx 3000 \text{ miles}$$

Estimate: round all numbers to 1 or 2 sig. figs

$$15.12 \approx 15 \text{ miles per hour}$$

↳  $\approx 20$  miles per hour if to 1 sf.

$$\text{miles per day} = 8 \times 15 = 120$$

$$\text{number of days} = 3000 \div 120 = 25$$

$$12 \overline{) 300} \begin{matrix} 25 \\ \end{matrix}$$

approximately 25 days

25  
-----  
(3)

Juan trains for the race. The average speed he can cycle at increases. It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

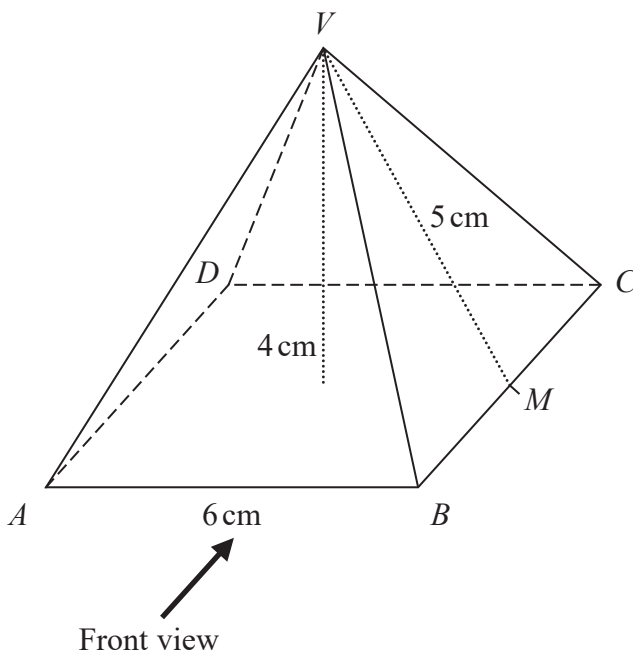
Less days → speed =  $\frac{\text{distance}}{\text{time}}$  if speed increases but distance stays same, time taken decreases. Juan will cycle more miles per day so race will take less days. (1)

(Total for Question 22 is 4 marks)

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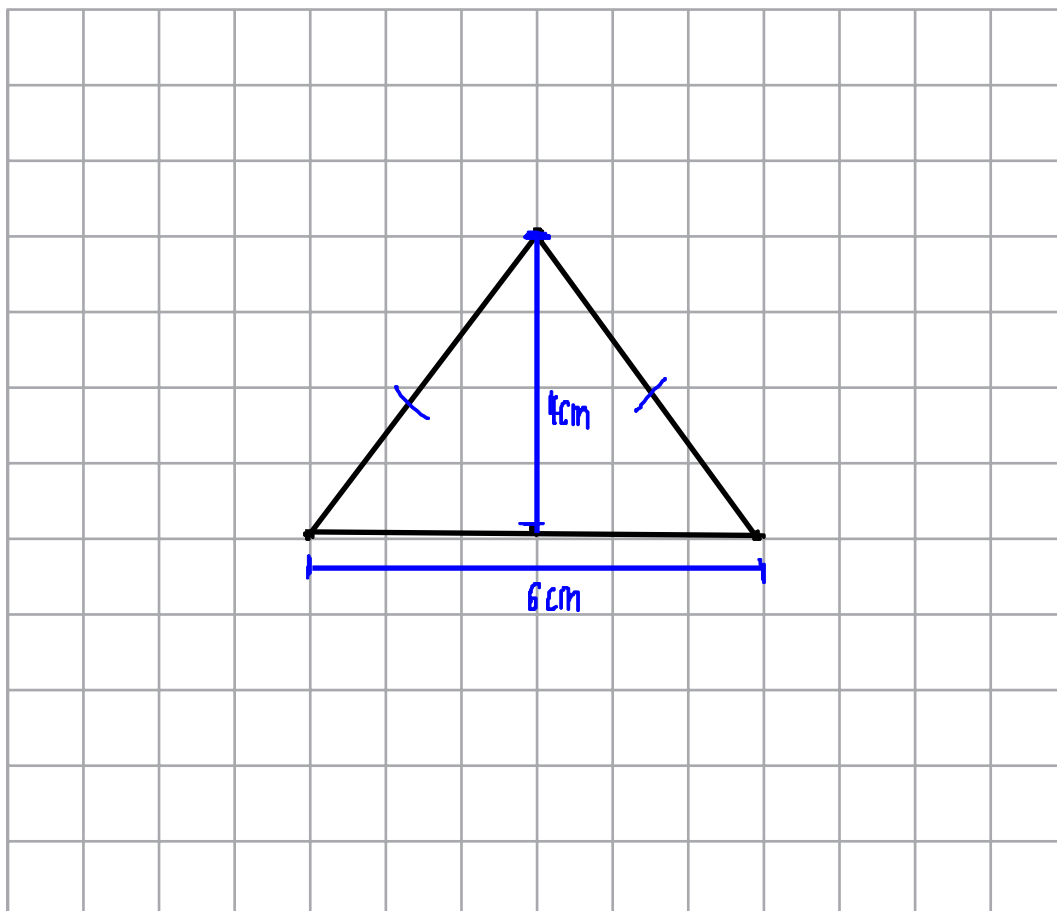
23 Here is a solid square-based pyramid,  $VABCD$ .



The base of the pyramid is a square of side 6 cm.  
 The height of the pyramid is 4 cm.  
 $M$  is the midpoint of  $BC$  and  $VM = 5$  cm.

(scale : 1 square = 1 cm)

(a) Draw an accurate front elevation of the pyramid from the direction of the arrow.



(2)



(b) Work out the total surface area of the pyramid.

$$\text{area of base} = 6 \times 6 = 36 \text{ cm}^2$$

$$\begin{aligned} \text{area of triangle} &= \frac{1}{2} \times b \times h \\ &= \frac{1}{2} \times 6 \times 5 = 15 \end{aligned}$$

$$\begin{aligned} 4 \text{ triangular faces: total area} &= 4 \times 15 = 60 \text{ cm}^2 \\ \text{total surface area of pyramid} &= 36 + 60 = 96 \text{ cm}^2 \end{aligned}$$

$$96 \text{ cm}^2$$

(4)

(Total for Question 23 is 6 marks)

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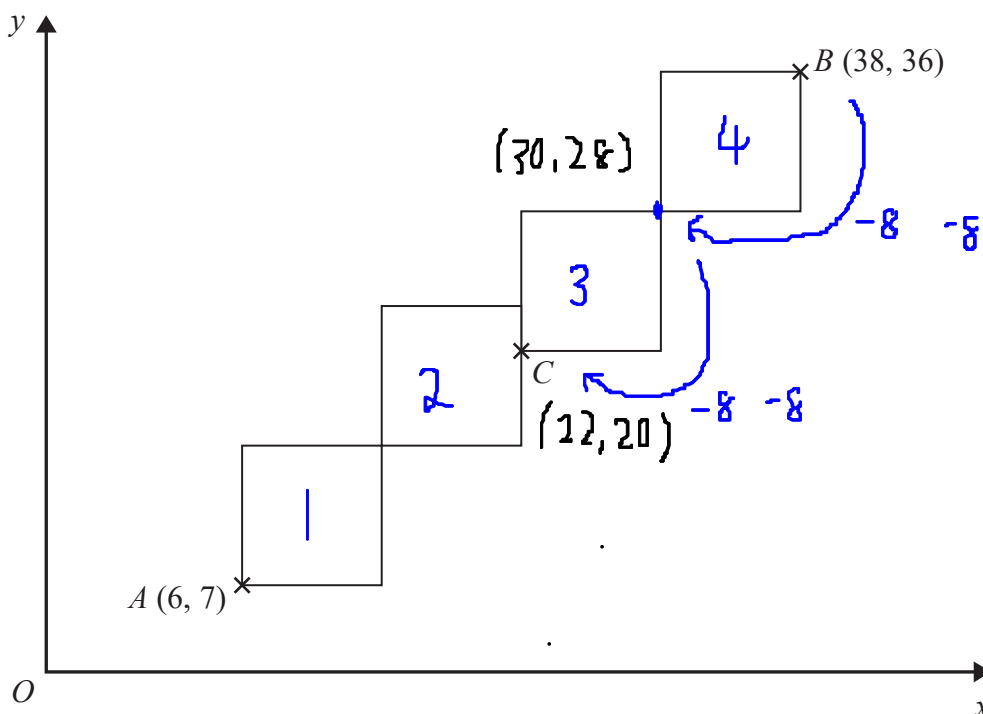
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24 A pattern is made from four identical squares.

The sides of the squares are parallel to the axes.



Point A has coordinates (6, 7)  
 Point B has coordinates (38, 36)  
 Point C is marked on the diagram.

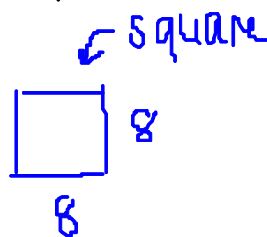
Work out the coordinates of C.

↔ distance in x direction

$$38 - 6 = 32 \text{ units}$$

$$32 = 4 \times \text{length side of a square}$$

$$\text{length of side} = \frac{32}{4} = 8 \text{ units}$$



$$x\text{-coordinate} = 38 - (2 \times 8) = 22$$

$$y\text{-coordinate} = 36 - (2 \times 8) = 20$$

$$C: (22, 20)$$

( 22 , 20 )

(Total for Question 24 is 5 marks)

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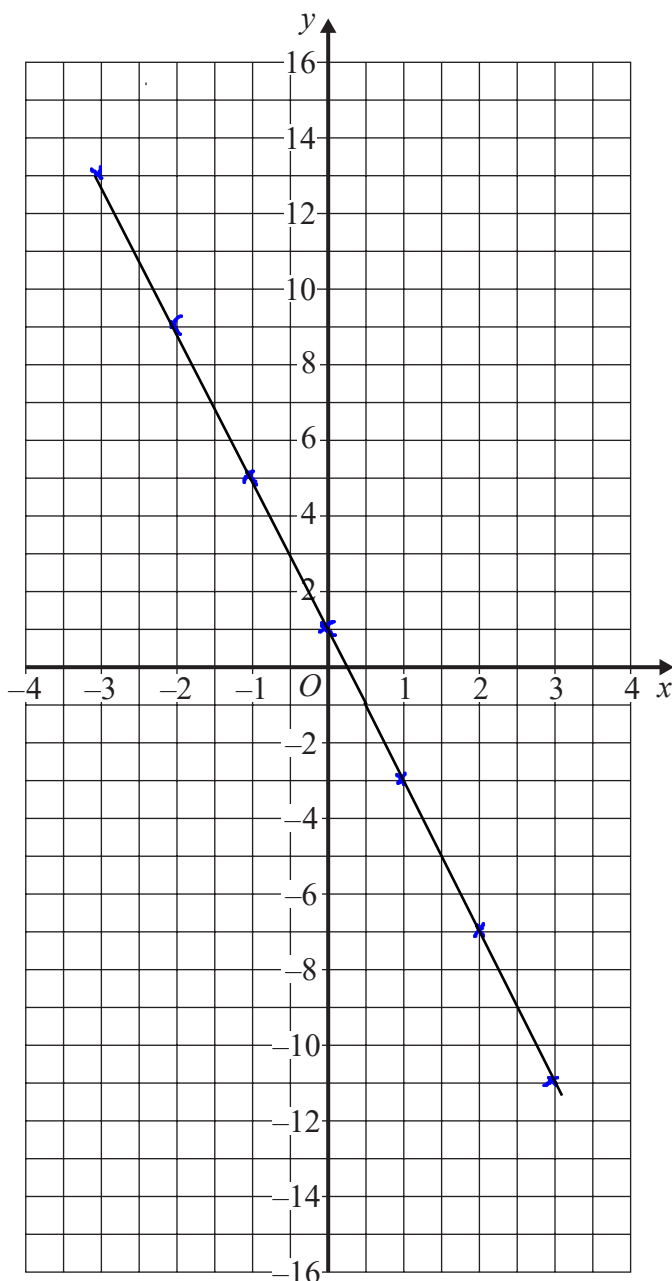


25 On the grid below, draw the graph of  $y = 1 - 4x$  for values of  $x$  from  $-3$  to  $3$

$$y = 1 - 4x$$

$x$	-3	-2	-1	0	1	2	3
$y$	13	9	5	1	-3	-7	-11

1. Create table of values
2. Plot points
3. Join points with straight line



(Total for Question 25 is 3 marks)

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$$26 \quad \mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$$

Work out  $2\mathbf{a} + \mathbf{b}$  as a column vector.

$$2\mathbf{a} = 2 \begin{pmatrix} 5 \\ 2 \end{pmatrix} = \begin{pmatrix} 2 \times 5 \\ 2 \times 2 \end{pmatrix} = \begin{pmatrix} 10 \\ 4 \end{pmatrix}$$

multiply top and bottom numbers by 2

$$2\mathbf{a} + \mathbf{b} = \begin{pmatrix} 10 \\ 4 \end{pmatrix} + \begin{pmatrix} -1 \\ 7 \end{pmatrix} = \begin{pmatrix} 10-1 \\ 4+7 \end{pmatrix} = \begin{pmatrix} 9 \\ 11 \end{pmatrix}$$

add top and bottom numbers separately

$$\begin{pmatrix} 9 \\ 11 \end{pmatrix}$$

(Total for Question 26 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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