Write your name here

Surname	Other names
MODEL ANSWERS	

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number   Candidate Number

Mathematics

Paper 3 (Calculator)

Foundation Tier

Wednesday 8 November 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference
1MA1/3F

Total Marks

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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 be used**.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

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 ▶

P 4 9 3 8 6 A 0 1 2 0

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   Write 3758 correct to the nearest 1000

$7 > 5$ therefore round up

4000

(Total for Question 1 is 1 mark)

2   Simplify $1y + 3y - 2y$

$1 + 3 - 2 = 2$

$2y$

(Total for Question 2 is 1 mark)

3   Write down all the factors of 18

1×18
2×9
3×6
✗ 4
✗ 5

$1, 2, 3, 6, 9, 18$

(Total for Question 3 is 2 marks)

4 The table gives information about the prices of cinema tickets.

Cinema ticket	Price
adult ticket	£7.80
child ticket	£5.80
family ticket (for 4 people)	£24.30

Mr Edwards and his 3 children go to the cinema.

It is cheaper for Mr Edwards to buy 1 family ticket rather than 4 separate tickets.

(a) How much cheaper?

Family ticket = £24.30

Seperate ticket = 1adult + 3children
= 7.80 + 5.80×3
= 7.80 + 17.40
= 25.20

25.20 − 24.30
= £0.90

(3)

The film starts at 6.45 pm.
The film lasts 102 minutes.

102 − 60 = 42

(b) What time does the film finish?

102min = 1h 42min

6.45pm + 1h = 7.45 pm

7.45 + 42min = 8.27pm

8.27pm

(2)

(Total for Question 4 is 5 marks)

5 Thais has a large bottle of shampoo.
There are 2 litres of shampoo in the large bottle.

Thais also has some empty small bottles.
Each small bottle can be completely filled with 150 ml of shampoo.

How many small bottles can be completely filled with shampoo from the large bottle?
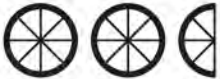
$$2l = 2000 \, ml$$

$$2000 \div 150 = 13.\dot{3}$$

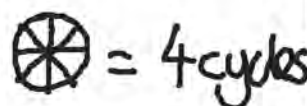so it will completely fill 13 bottle with some left over.

13 bottles

(Total for Question 5 is 3 marks)

6 The incomplete pictogram shows information about the number of cycles sold in a shop on Tuesday, on Wednesday and on Thursday.

Tuesday	⊛
Wednesday	⊛ ⊛ ◖
Thursday	⊛ ◖
Friday	⊛ ⊛
Saturday	⊛ ⊛ ⊛ ◖

Key:
⊛ = 4 cycles

A total of 20 cycles were sold on Tuesday, Wednesday and Thursday.

8 cycles were sold on Friday. $- \quad 8 \div 4 = 2 \, wheels$
15 cycles were sold on Saturday. $- \quad 15 \div 4 = 3\frac{3}{4} \, wheels$

Use this information to complete the pictogram.

$$20 \, cycles = 1 + 2.5 + 1.5 = 5 \qquad 20 \div 5 = 4$$

so 1 wheel represent 4 cycles

(Total for Question 6 is 3 marks)

7
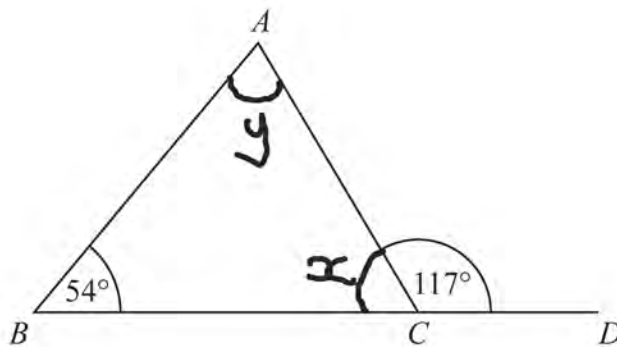
BCD is a straight line.
ABC is a triangle.

Show that triangle *ABC* is an isosceles triangle.
Give a reason for each stage of your working.

$x = 180 - 117 = 63°$ angles on a straight line add up to 180°

$y = 180 - 63 - 54 = 63°$ angles in a triangle add up to 180°
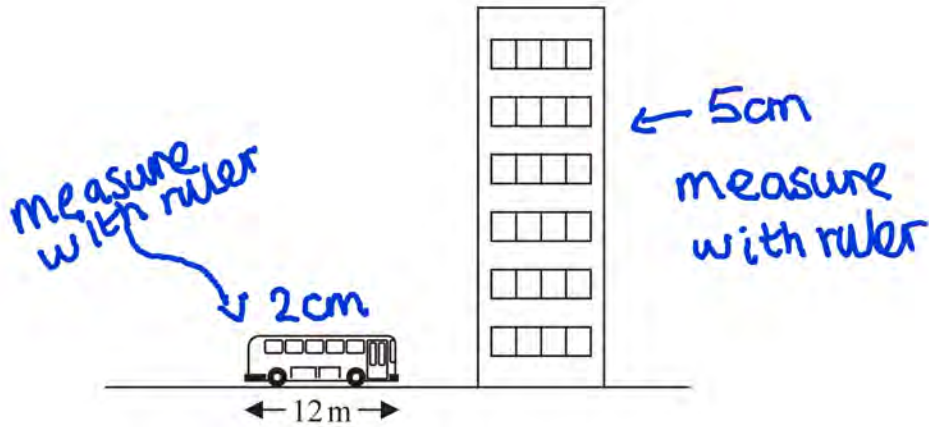
x and y are equal (both 63°)

Two angles in this triangle are equal therefore it is an isosceles triangle

base angles are equal

(Total for Question 7 is 4 marks)

8

measure with ruler ↓ 2cm

← 5cm *measure with ruler*

← 12 m →

The picture shows a bus next to a building.
The bus has a length of 12 m.

The bus and the building are drawn to the same scale.

Work out an estimate for the height, in metres, of the building.

$$\div 2 \left(\begin{array}{c} 2\,cm = 12m \\ 1\,cm = 6m \\ 5\,cm = 30m \end{array} \right) \div 2$$

×5 (...) ×5

.... **30** .... m

(Total for Question 8 is 2 marks)

P 4 9 3 8 6 A 0 6 2 0

9 Nidah writes down two <u>different</u> prime numbers.

She adds together her two numbers.
Her answer is a square number less than 30

Find two prime numbers that Nidah could have written down.

Square numbers less than 30:
1, 4, 9, 16, 25

Prime numbers
2, 3, 5, 7, 11, 13, 17, 19, 23

All Solutions:

$7 + 2 = 9$

$5 + 11 = 16$
$3 + 13 = 16$
$2 + 23 = 25$

.... , ...

(Total for Question 9 is 2 marks)

10 Jim thinks of a number.

x = number

$\frac{2}{3}$ of Jim's number is 48

Work out $\frac{5}{6}$ of Jim's number.

$$\frac{2}{3} \times x = 48$$

$$x = \frac{48 \times 3}{2} = 72$$

$$\frac{5}{6} \times 72 = 12 \times 5 = 60$$

60

(Total for Question 10 is 2 marks)

P 4 9 3 8 6 A 0 7 2 0

11 Jack's driving school has two offers.

Offer 1	Offer 2
First driving lesson free	All driving lessons
All other driving lessons normal price	5% off the normal price

The normal price of a driving lesson is £24

Douglas is going to have 12 driving lessons.

Which is the cheaper offer for 12 driving lessons, Offer 1 or Offer 2?
You must show how you get your answer.

Offer 1

12 lessons = 1 lesson free
and 11 paid

$= 11 \times 24 = £264$

Offer 2

5% off of £24
$= 0.95 \times 24 = £22.80$

12 lessons
$= 22.80 \times 12$
$= £273.60$

$264 < 273.60$
therefore offer 1 is cheaper

(Total for Question 11 is 3 marks)

12 2.5 kg of apples cost £3.60

Work out the cost of 3.5 kg of apples.

÷2.5 (2.5 kg = £3.60) ÷2.5
        1 kg = £1.44
×3.5 (3.5 kg = £5.04) ×3.5

£ 5.04

(Total for Question 12 is 2 marks)

13 (a) Complete the table of values for $y = \frac{1}{2}x - 1$

$\frac{1}{2}x - 1 \quad -1 = -\frac{1}{2} - 1 = -1.5$
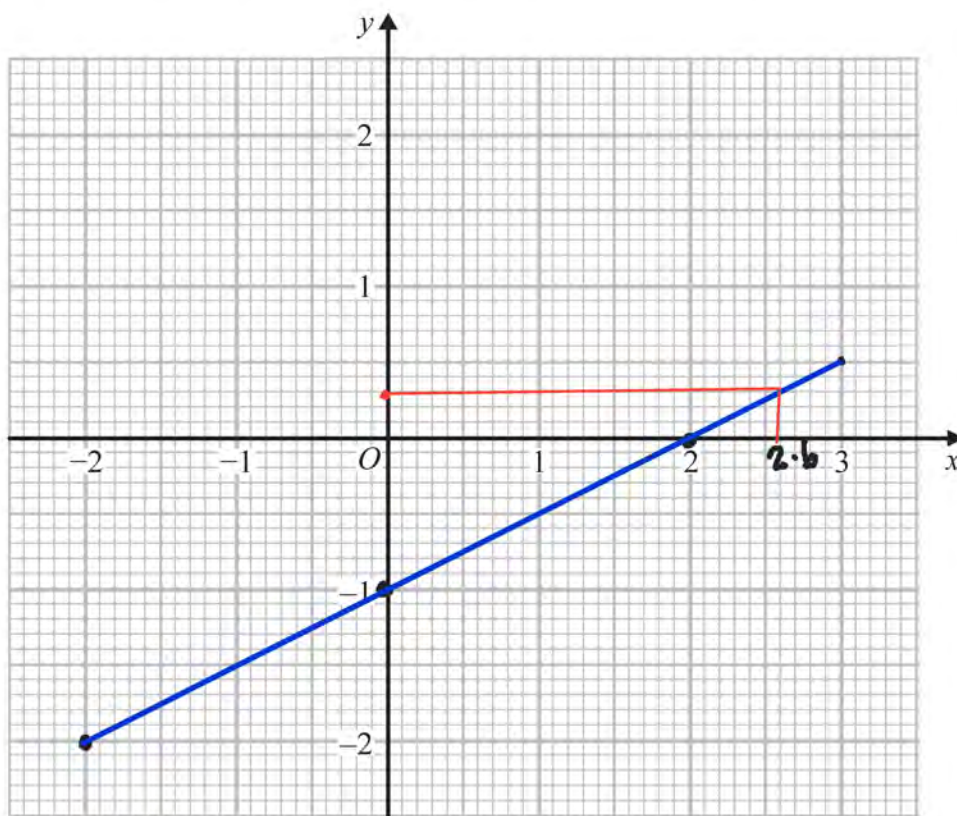
$\frac{1}{2} \times 0 \quad -1 = 0 - 1 = -1$ $\qquad \frac{1}{2} \times 1 - 1 = \frac{1}{2} - 1 = 0.5$

$\frac{1}{2} \times 3 \quad -1 = \frac{3}{2} - 1 = 0.5$

x	-2	-1	0	1	2	3
y	-2	-1.5	-1	-0.5	0	0.5

(2)

(b) On the grid, draw the graph of $y = \frac{1}{2}x - 1$ for values of x from -2 to 3

(2)

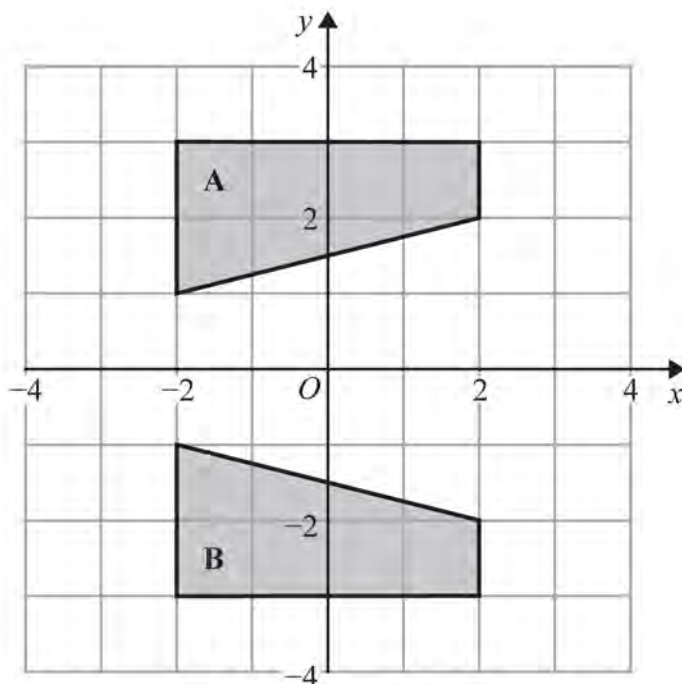(c) Use your graph to find the value of x when $y = 0.3$

$x = \underline{\quad 2 \cdot 6 \quad}$

(1)

(Total for Question 13 is 5 marks)

14

Describe fully the single transformation that maps shape **A** onto shape **B**.

Reflection in the x axis

(Total for Question 14 is 2 marks)

15 The ratio of the cost of one metre of cotton fabric to the cost of one metre of silk fabric is 2 : 5

Complete the table of costs.

cotton : silk
2 : 5
1 : 2.5   so silk is 2.5 x the
            price of cotton

	2 m	6 m	8 m	9 m
cotton fabric	£6	£18	£24	£27
silk fabric	£15	£45	£60	£67.50

×3 ×4 ×4.5   ×2.5

(Total for Question 15 is 3 marks)

16 Chloe has a van.

She is going to use the van to deliver boxes.
Each box is a cuboid, 40 cm by 30 cm by 35 cm.
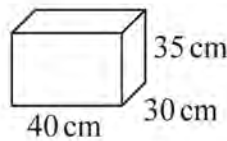
The space for boxes in the van has

maximum length   2.4 m $= 240\,cm$
maximum width   1.5 m $= 150\,cm$
maximum height   1.4 m $= 140\,cm$

The space for boxes is empty.
Chloe wants to put as many boxes as possible into the van.

She can put 3 boxes into the van in one minute.
Assume that the space for boxes is in the shape of a cuboid.

(a) Work out how many minutes it should take Chloe to put as many boxes as possible
into the van.

$240 \div 40 = 6$ 6 boxes maximum in length
$150 \div 30 = 5$ 5 boxes maximum in width
$140 \div 35 = 4$ 4 boxes maxium in height

$6 \times 5 \times 4 = 120$ total boxes

$\times 40 \left(\begin{array}{l} 3\ \text{boxes} = 1\,\text{min} \\ \rightarrow 120\ \text{boxes} = 40\,\text{min} \end{array} \right) \times 40$

...................**40**................... minutes

(4)

The space for boxes might **not** be in the shape of a cuboid.

(b) Explain how this could affect the time it would take Chloe to put as many boxes as
possible into the van.

It would take more time as a different arrange-
ment may be required

(1)

(Total for Question 16 is 5 marks)

17 (a) Factorise $4m + 12$

4 is the highest factor of 4m and 12

$4(m + 3)$

$4m \div 4$
$= m$

$12 \div 4$
$= 3$

$4(m+3)$

(1)

expression	equation	formula	identity
inequality	term	factor	multiple

(b) Choose two words from the box above to make this statement correct.

$5y$ is a __term__ in the __expression__ $3x + 5y$
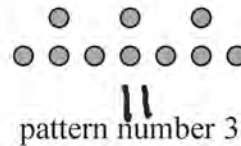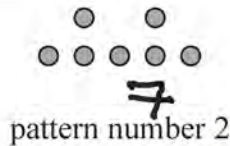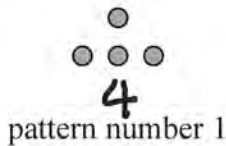
no = sign

(2)

(Total for Question 17 is 3 marks)

18 Here is a sequence of patterns made with counters.

4
pattern number 1

7
pattern number 2

11
pattern number 3

(a) Find an expression, in terms of n, for the number of counters in pattern number n.

$4, 7, 11$

Difference $= +3 +3$

0th term $= 4 - 3$
$= 1$

0 in 0 → work out 0th term
↓ ↓
work put
out n in
difference

$3n + 1$

(2)

Bayo has 90 counters.

(b) Can Bayo make a pattern in this sequence using all 90 of his counters?
You must show how you get your answer.

$3n + 1 = 90$
$-1 \quad -1$

$3n = 89$

$n = \dfrac{89}{3} = 29.\dot{6}$

90 counters exactly is not in the sequence therefore Bayo can't use all of his counters

(2)

(Total for Question 18 is 4 marks)

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

19 The table shows information about the heights of 80 children.

Height (h cm)	Frequency
$130 < h \leqslant 140$	4
$140 < h \leqslant 150$	11
$150 < h \leqslant 160$	24
$160 < h \leqslant 170$	22
$170 < h \leqslant 180$	19

[handwritten:] 4 +11
15 +24
39
+22 ← 40.5 is between these numbers
61 +19
80

(a) Find the class interval that contains the median.

[handwritten:] Median = $\dfrac{\text{Total freq} + 1}{2}$ = $\dfrac{80+1}{2}$ = $\dfrac{81}{2}$ $160 < h \leqslant 170$

= 40.5

(1)

(b) Draw a frequency polygon for the information in the table.
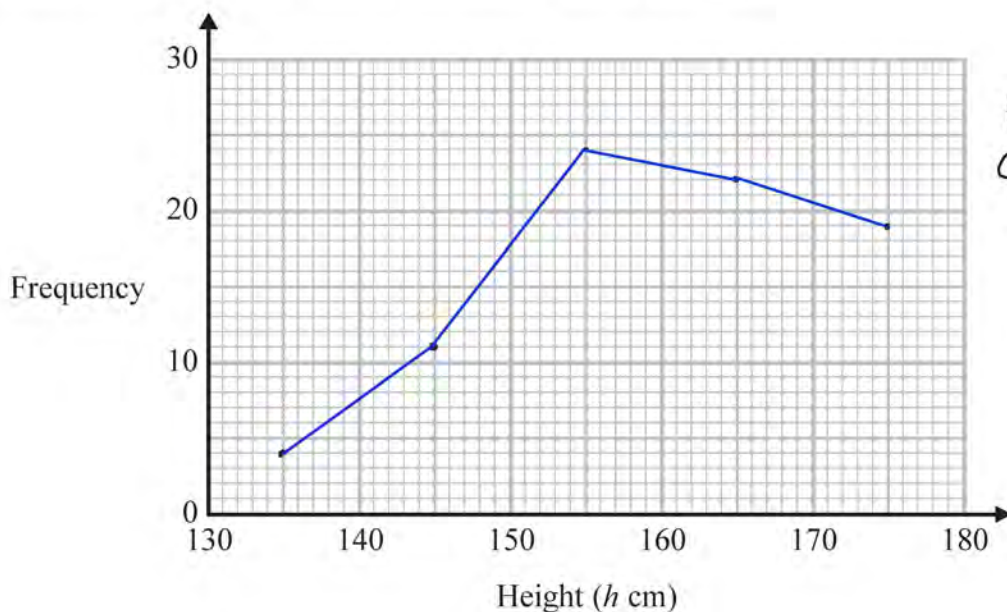
[handwritten:] Plot at midpoint of intervals

(2)

(Total for Question 19 is 3 marks)

20 In London, 1 litre of petrol costs 108.9p
In New York, 1 US gallon of petrol costs $2.83

   1 US gallon = 3.785 litres
   £1 = $1.46

In which city is petrol better value for money, London or New York?
You must show your working.

London :   1ℓ = £1.089
          3·785 = £4.121865
    £1 = $1.46
    £4.12·· = $6.0179229

In London, 1 US gallon costs $6.02

In New York, 1 US gallon costs $2.83

    so petrol is cheaper in New York
    2·83 < 6·02

(Total for Question 20 is 3 marks)

21 A gold bar has a mass of 12.5 kg.

The density of gold is 19.3 g/cm³

Work out the volume of the gold bar.
Give your answer correct to 3 significant figures.

          12·5 kg
          = 12500g

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Vol} = \frac{\text{mass}}{\text{density}} = \frac{12500}{19·3} \quad 3\text{sf} = 647.66\text{cm}^3$$

                                    648

............648............ cm³

(Total for Question 21 is 3 marks)

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

22 There are only blue pens, green pens and red pens in a box.

The ratio of the number of blue pens to the number of green pens is 2 : 5
The ratio of the number of green pens to the number of red pens is 4 : 1

There are less than 100 pens in the box.

What is the greatest possible number of red pens in the box?

Blue   Green

2 : 5 ×4

8 : 20

Green : Red

4 : 1 ×5

20 : 5

Blue to Green to Red

8 : 20 : 5

8+20+5 = 33

33 parts

33×3 = 99 — could be 99 pens

red parts

5 × 3

= 15

15 red

(Total for Question 22 is 3 marks)

23 (a) Find the value of the $\frac{1}{x}$ reciprocal of 1.6
    Give your answer as a decimal.

(use calculator)

$$\frac{1}{1.6} = \frac{5}{8} = 0.625$$

0.625

(1)

Jess rounds a number, x, to one decimal place.
The result is 9.8

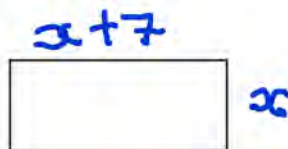(b) Write down the error interval for x.

lower bound $\leq x <$ upper bound

$9.75 \leq x < 9.85$ ✓ numbers in this interval all round to 9.8

(2)

(Total for Question 23 is 3 marks)
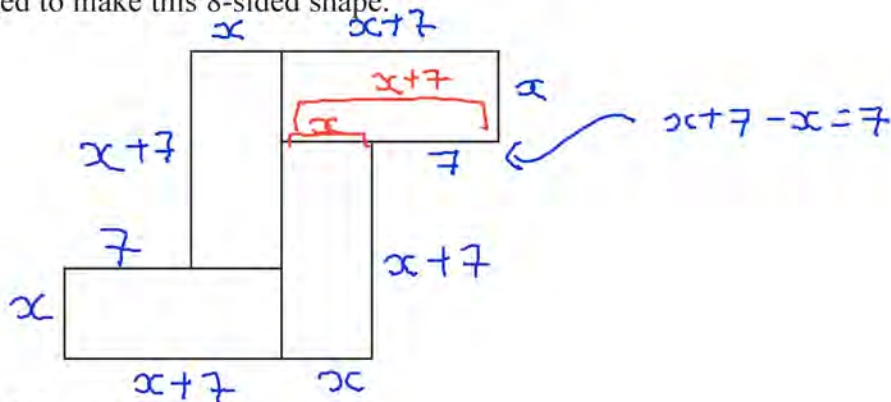
PMT

PhysicsAndMathsTutor.com

24 Here is a rectangle.

$x+7$

x

The length of the rectangle is 7 cm longer than the width of the rectangle.

4 of these rectangles are used to make this 8-sided shape.

x $x+7$

$x+7$

$x+7$

x

$x+7-x=7$

7

$x+7$

7

x

$x+7$ x

The perimeter of the 8-sided shape is 70 cm.

Work out the area of the 8-sided shape.

Perimeter = $x+7+x+7+x+x+7+x+7+x+7+x+x+7$

$= 8x + 42$

$8x + 42 = 70$

$8x = 28$

$x = 3.5$ cm = width

$x+7 = 10.5$ = length

Area of 1 rectangle = 10.5×3.5

$= 36.75$

Area of 4 rectangles = 147 cm²

............147............ cm²

(Total for Question 24 is 5 marks)

17

Turn over ▶

P 4 9 3 8 6 A 0 1 7 2 0

25 Work out $(13.8 \times 10^7) \times (5.4 \times 10^{-12})$

Give your answer as an ordinary number.

$$13.8 \times 5.4 = 74.52$$
$$10^7 \times 10^{-12} = 10^{-6}$$

$$74.52 \times 10^{-5} = 0.0007452$$

$$0.0007452$$

(Total for Question 25 is 2 marks)

26 When a drawing pin is dropped it can land point down or point up.

Lucy, Mel and Tom each dropped the drawing pin a number of times.

The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	Mel	Tom
point down	31	53	16
point up	14	27	9

Rachael is going to drop the drawing pin once.

(a) Whose results will give the best estimate for the probability that the drawing pin will land point up?
Give a reason for your answer.

Mel, because she carried out the most throws

(1)

Stuart is going to drop the drawing pin twice.

(b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

$31 + 53 + 16 = 100$ total number of landing down
$14 + 27 + 9 = 50$ total number of landing up
$100 + 50 = 150$ total number of throws

$\frac{100}{150} = \frac{2}{3}$ = probability lands down

$\frac{50}{150} = \frac{1}{3}$ = probability lands up

$\frac{1}{3} \times \frac{2}{3} = \frac{2}{9}$

(2)

(Total for Question 26 is 3 marks)

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

27 Solve the simultaneous equations

$$x + 3y = 12$$
$$5x - y = 4 \quad \times 3$$

$$x + 3y = 12 \quad +$$
$$15x + 3y = 12$$
$$\overline{}$$
$$16x = 24$$

$$x = \frac{24}{16} = \frac{3}{2}$$

Using equ 1

$$\frac{3}{2} + 3y = 12$$
$$3y = 10.5$$
$$y = 3.5$$

x = 1.5

y = 3.5

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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