LJH Solutions and Mark Schemes

Write your name here

Surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 2 (Calculator)

Foundation Tier

Thursday 7 June 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference
1MA1/2F

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
80

ND061529787

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 ▶

P48863A

6/7/7/7/8/7/1/c2/1/

P 4 8 8 6 3 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 $\frac{4}{50}$ as a percentage.

$\frac{4}{50}$ ×2 → $\frac{8}{100}$ = 8%

B1

8 ..... %

(Total for Question 1 is 1 mark)

2 Write 1.59 correct to 1 decimal place.

B1

1.6 .....

(Total for Question 2 is 1 mark)

3 Work out the value of 3^5

$3^5 = 3 \times 3 \times 3 \times 3 \times 3$

A1

243 .....

(Total for Question 3 is 1 mark)

4 Write down a 6 digit number that has 4 as its thousands digit.
You can only use the digit 4 once.

eg 6 1 (4) 2 0 8

C1

any 6 digit number with digit 4 in correct place

61(4)208 .....

(Total for Question 4 is 1 mark)

5 (a) Change 35 cm to mm.

1 cm = 10 mm

cm ⇄ mm (×10 / ÷10)

35 × 10

A1

350 mm

(1)

(b) Change 7700 millilitres to litres.

1 L = 1000 ml

L ⇄ ml (×1000 / ÷1000)

7700 ÷ 1000

A1

7.7 litres

(1)

(c) Change 0.32 kilograms to grams.

1 kg = 1000 g

kg ⇄ g (×1000 / ÷1000)

0.32 × 1000

A1

320 grams

(1)

(Total for Question 5 is 3 marks)

6 Margaret is thinking of a number.
She says,

"My number is odd. It is a factor of 36 and a multiple of 3"

There are two possible numbers Margaret can be thinking of.

Write down these two numbers.

factors of 36

1 and 36
2 and 18
3 and 12
4 and 9
6

factor pairs

1, 2, (3) 4, 6, (9) 12, 18, 36

M1 lists at least six correct factors of 36

M1 identifies any multiple of three from list of factors

A1 both

3 9

(Total for Question 6 is 3 marks)

7 Mohsin, Yusuf and Luke are going to play a game.
At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place
M	Y	L
M	L	Y
Y	M	L
Y	L	M
L	Y	M
L	M	Y

M1 any 4 correct combinations

A1 all six correct.

Key

M = Mohsin
Y = Yusuf
L = Luke

(Total for Question 7 is 2 marks)

8 Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

pens $30 \div 6 = 5$

$5 \times 82p = £4.10$

P1 process to find any total

pencils $30 \div 15 = 2$

$2 \times 45p = £0.90$

P1 process to find any three totals

rulers $30 \div 10 = 3$

$3 \times £1.25 = £3.75$

A1 all totals correct

pencil cases $30 \times 37p = £11.10$

+

M1 adds their four costs together

Total spent = £19.85

A1 cao

£ 19.85

(Total for Question 8 is 5 marks)

9 Emily drives 186 miles in 3 hours.

(a) What is her average speed?

$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$= \frac{186}{3}$

P1 we of correct formula

A1 cao 62 mph

(2)

Sarah drives at an average speed of 58 mph for 4 hours.

(b) How many miles does Sarah drive?

$S = 58$

$T = 4$

$\text{Distance} = \text{Speed} \times \text{Time}$

$= 58 \times 4$

$= 232$

P1 we of correct formula

A1 cao 232 miles

(2)

(Total for Question 9 is 4 marks)

10 (a) Write down all the prime numbers between 20 and 30

B1 B1

23, 29

(2)

Catherine says,

"2 is the only even prime number."

(b) Is Catherine right?
You must give a reason for your answer.

C1

Yes. 2 has only two factors, itself and one and therefore it is prime. All other even numbers have a factor of two meeting their total number of factors more than two and so they are not prime.

(1)

(Total for Question 10 is 3 marks)

11 (a) Solve $x + x + x = 51$

$3x = 51 \quad [\div 3$

$x = 17$

A1 cao

$x =$ 17

(1)

(b) Solve $\frac{y}{4} = 3$ $[\times 4$

$y = 12$

A1 cao

$y =$ 12

(1)

(c) Solve $2f + 7 = 18$ $[-7$

$2f = 11 \quad [\div 2$

$f = \frac{11}{2}$

$f = 5\frac{1}{2}$ or 5.5

A1 cao

$f =$ $5\frac{1}{2}$

(1)

(Total for Question 11 is 3 marks)

12 A group of football fans were asked what their half time snack was.

The table below gives information about their answers.

Snack	Number of fans
burger	11
pie	17
hot dog	8

A1 all angles correct

$\times 10^\circ = 110^\circ$

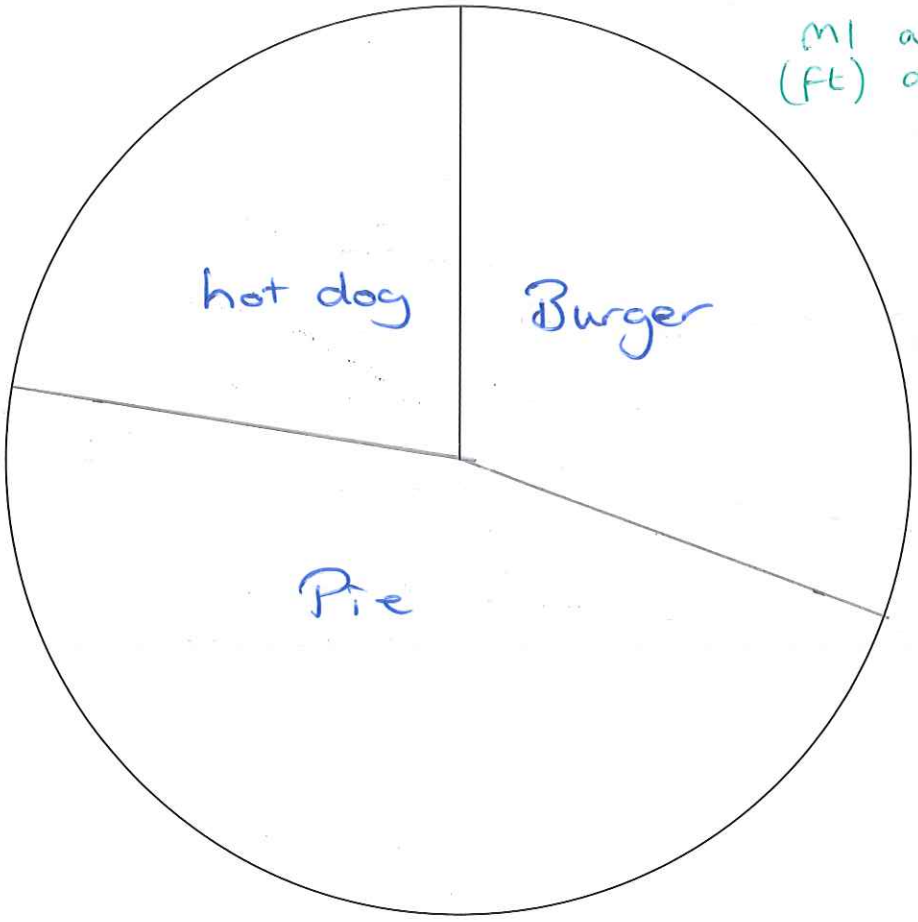
$\times 10^\circ = 170^\circ$

$\times 10^\circ = 80^\circ$

Draw an accurate pie chart for this information.

total fans = 36

$\frac{360^\circ}{36} = 10^\circ$ Each fan gets 10°



M1 any one (ft) angle correct

A1 fully correct pie chart

(Total for Question 12 is 3 marks)

13 A scout group has a raffle to raise money for charity.
There is 1 prize to be won in the raffle.

Laura buys 12 raffle tickets.
A total of 350 raffle tickets are sold.

Find the probability that Laura does **not** win the prize.

$P(\text{Laura wins}) = \frac{12}{350}$ B1 338 seen

$P(\text{Laura does not win}) = \frac{338}{350}$

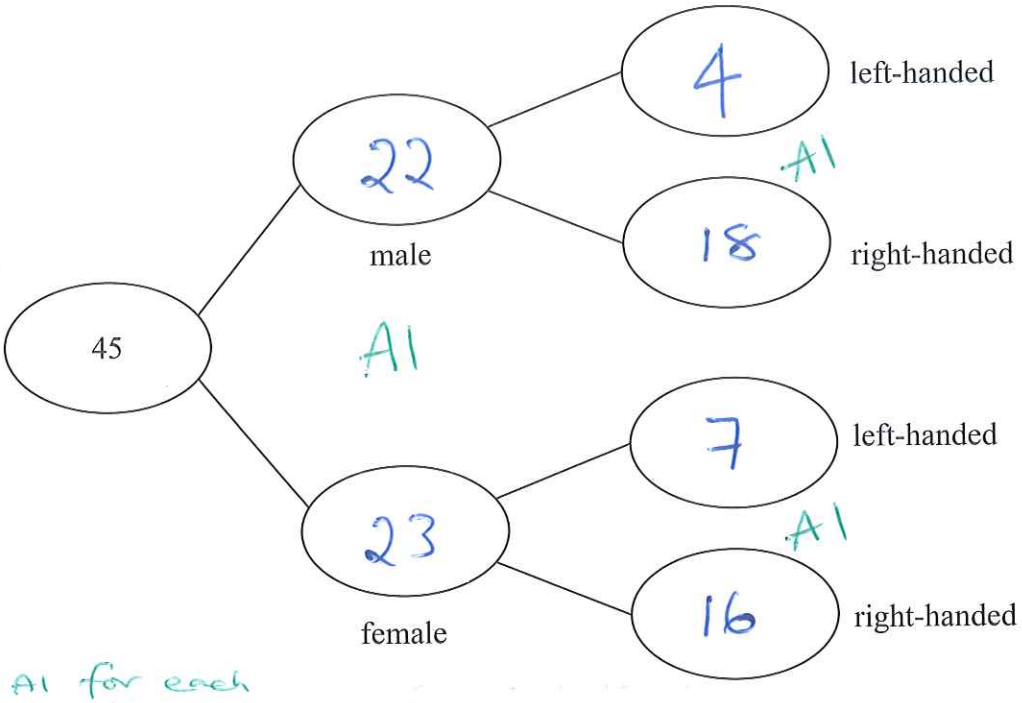
$\left(\frac{169}{175}\right)$ $\frac{338}{350}$ A1 oe

(Total for Question 13 is 2 marks)

14 Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male.
16 of the 34 right-handed workers are female.

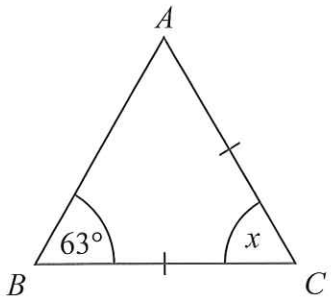
Complete the frequency tree for this information.



(award A1 for each correct pair)

(Total for Question 14 is 3 marks)

15 Mary needs to work out the size of angle x in this diagram.



She writes

$x = 63°$ because base angles of an isosceles triangle are equal.

Mary is wrong.

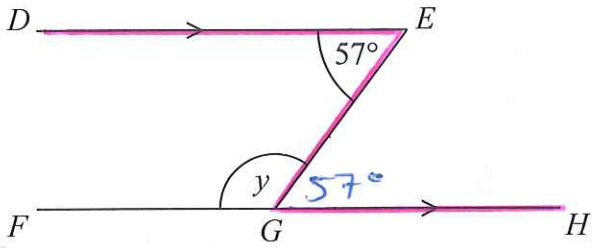
(a) Explain why.

angle $B\hat{A}C = 63°$ because the base angles are at the base of the two equal sides. $x = 180° - (63° + 63°)$

C1 any correct explanation

(1)

William needs to work out the size of angle y in this diagram.



William writes

Working	**Reason**
angle $EGH = 57°$	because corresponding angles are equal
$y = 180° - 57°$ $y = 123°$	because angles on a straight line add up to 180°

One of William's reasons is wrong.

(b) Write down the correct reason.

C1 word alternate essential

$E\hat{G}H = 57°$ because alternate angles are equal

(1)

(Total for Question 15 is 2 marks)

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency
19	5 A1 ca0
20	x 7 = 140
21	x 3 = 63
22	x 1 = 22

The total number of buttons is 320

Complete the table.

20 x 7 + 21 x 3 + 22 x 1 = 225 buttons

320 − "225" = 95 buttons M1 ft

there are a total of 95 buttons in bags which contain 19 buttons

"95" ÷ 19 = 5 M1 ft

there are 5 bags of 19 buttons

(Total for Question 16 is 3 marks)

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter
110 g caster sugar
275 g plain flour
75 g chocolate chips

Lucas has the following ingredients.

900 g butter
1000 g caster sugar
1000 g plain flour
225 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

M1 any two correct calculations

Butter 900 ÷ 225 = 4 batches of 30 biscuits

Caster Sugar 1000 ÷ 110 = 9.1 batches of 30 biscuits

Plain flour 1000 ÷ 275 = 3.6 batches of 30 biscuits

Choc. Chips 225 ÷ 75 = 3 batches of 30 biscuits

greatest number of biscuits Lucas can make

"3" x 30 = 90 biscuits

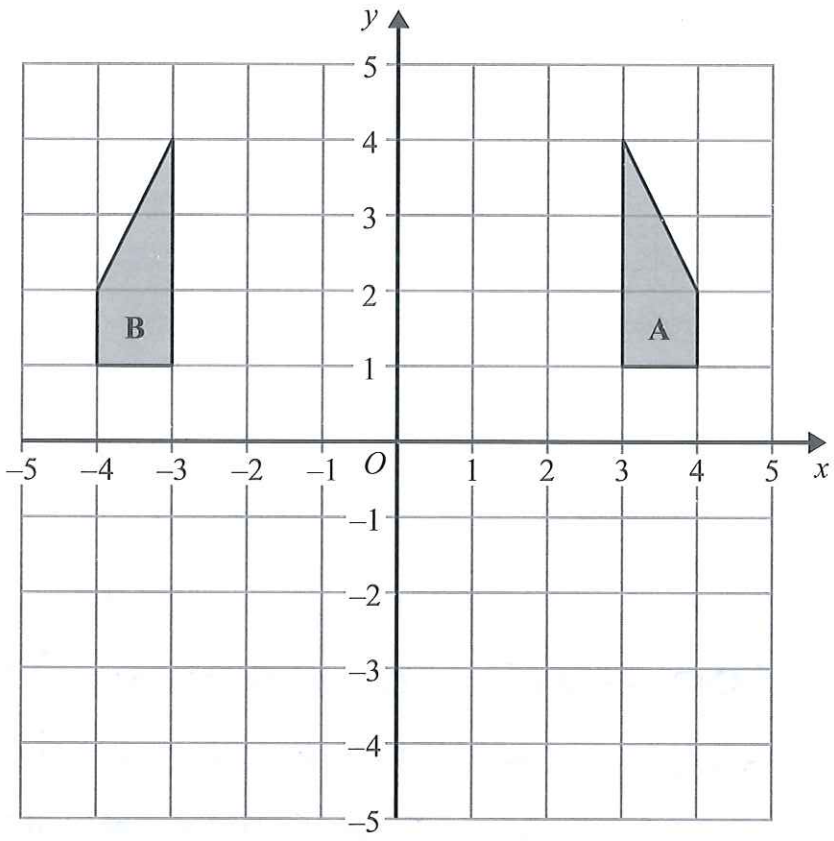
M1 ft

A1 cao

90

(Total for Question 17 is 3 marks)

18



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

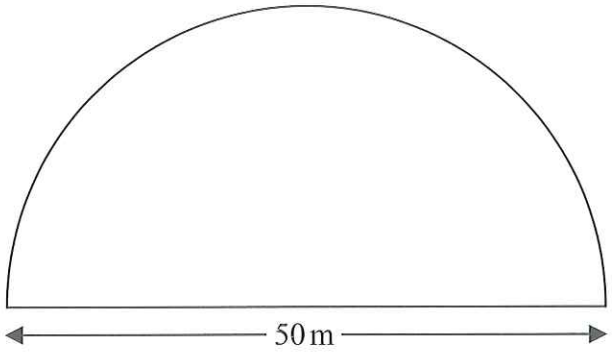
reflection in y-axis (or x=0 line)

B1 B1

note if more than one transformation named score B0 B0

(Total for Question 18 is 2 marks)

19 A farmer has a field in the shape of a semicircle of diameter 50 m.



d = 50

The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.

3 days 3 × £180 = £540

Fence needed = ½ Circumference + diameter
= ½ × πd + d P1
= ½ × 50π + 50
= 25π + 50
= 128.5398... m A1

Jim needs 129 m of fence
"129 ×" £29.86 = £3851.94 M1 ft
total cost
= "£3851.94" + £540 M1 ft
= £4391.94

Accept £4378 → £4392 A1

£ 4391.94

(Total for Question 19 is 5 marks)

20 (a) Simplify $m^3 \times m^4$

$= m^{3+4}$

$= m^7$

m^7 B1

(1)

(b) Simplify $(5np^3)^3$

$= 125n^3p^9$

B1 B1

$125n^3p^9$

(2)

(c) Simplify $\dfrac{32q^9r^4}{4q^3r}$

$= \dfrac{8 \not{32} \not{q}\not{q}\not{q}\not{q}\not{q}\not{q}\not{q}\not{q}\not{q} \not{r}\not{r}\not{r}\not{r}}{\not{4}\not{q}\not{q}\not{q}\not{r}}$ M1

$= 8q^6r^3$ ~~A1~~

(2)

(Total for Question 20 is 5 marks)

21 (a) Find the lowest common multiple (LCM) of 40 and 56

40 80 120 160 200 240 280 320 360 ....

56 112 168 224 280

M1 lists at least 4 multiples of each number

A1

280

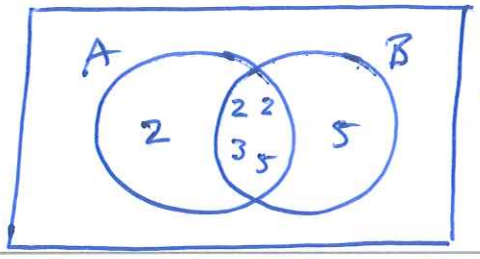
(2)

$A = 2^3 \times 3 \times 5$ $B = 2^2 \times 3 \times 5^2$

$= 2 \times 2 \times 2 \times 3 \times 5$ $= 2 \times 2 \times 3 \times 5 \times 5$

(b) Write down the highest common factor (HCF) of A and B.

A = 120 B = 300



HCF = 2 × 2 × 3 × 5

= $2^2 \times 3 \times 5$

= 60

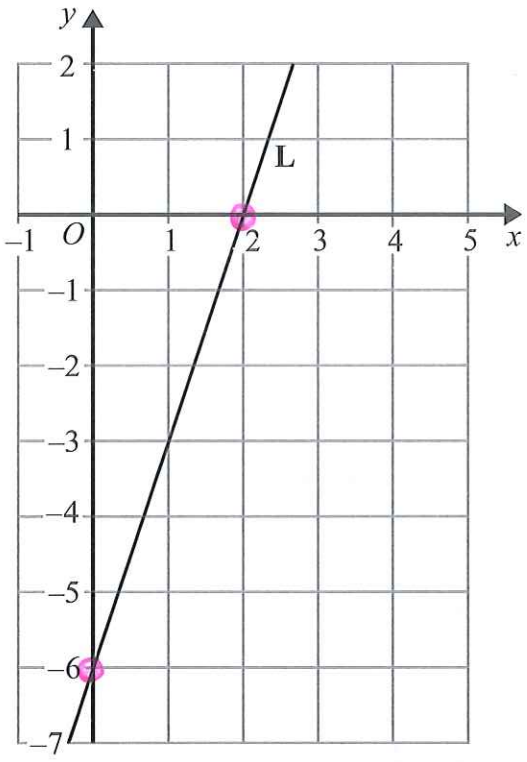
A1

60

(1)

(Total for Question 21 is 3 marks)

22 The line L is shown on the grid.



Find an equation for L.

$y = mx + c$

y-intercept, $c = -6$ B1

gradient, $m = \frac{\text{rise}}{\text{run}} = \frac{6}{2} = 3$ M1

equation of L $y = 3x - 6$

A1 cao

$y = 3x - 6$

(Total for Question 22 is 3 marks)

23 Raya buys a van for £8500 plus VAT at 20%

Raya pays a deposit for the van.
She then pays the rest of the cost in 12 equal payments of £531.25 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

P1 process to find 20% of £8500

20% of £8500 = £1700

Cost of van plus ~~deposit~~ VAT = £8500 + £1700
= £10200 A1

12 monthly payments, 12 × £531.25
= £6375

Deposit = Total cost (inc. VAT) − 12 monthly payments
= "£10,200" − £6,375 M1 ft
= £3825

Deposit : 12 equal payments (total)

3825 : 6375

÷25 ÷25

153 : 255

M1 any correct ratio

÷3 ÷3

51 : 85

÷17 ÷17

3 : 5

A1 cao

3 : 5

(Total for Question 23 is 5 marks)

24 (a) Complete the table of values for $y = x^2 - x - 6$

x	–3	–2	–1	0	1	2	3
y	6	0	–4	– 6	–6	–4	0

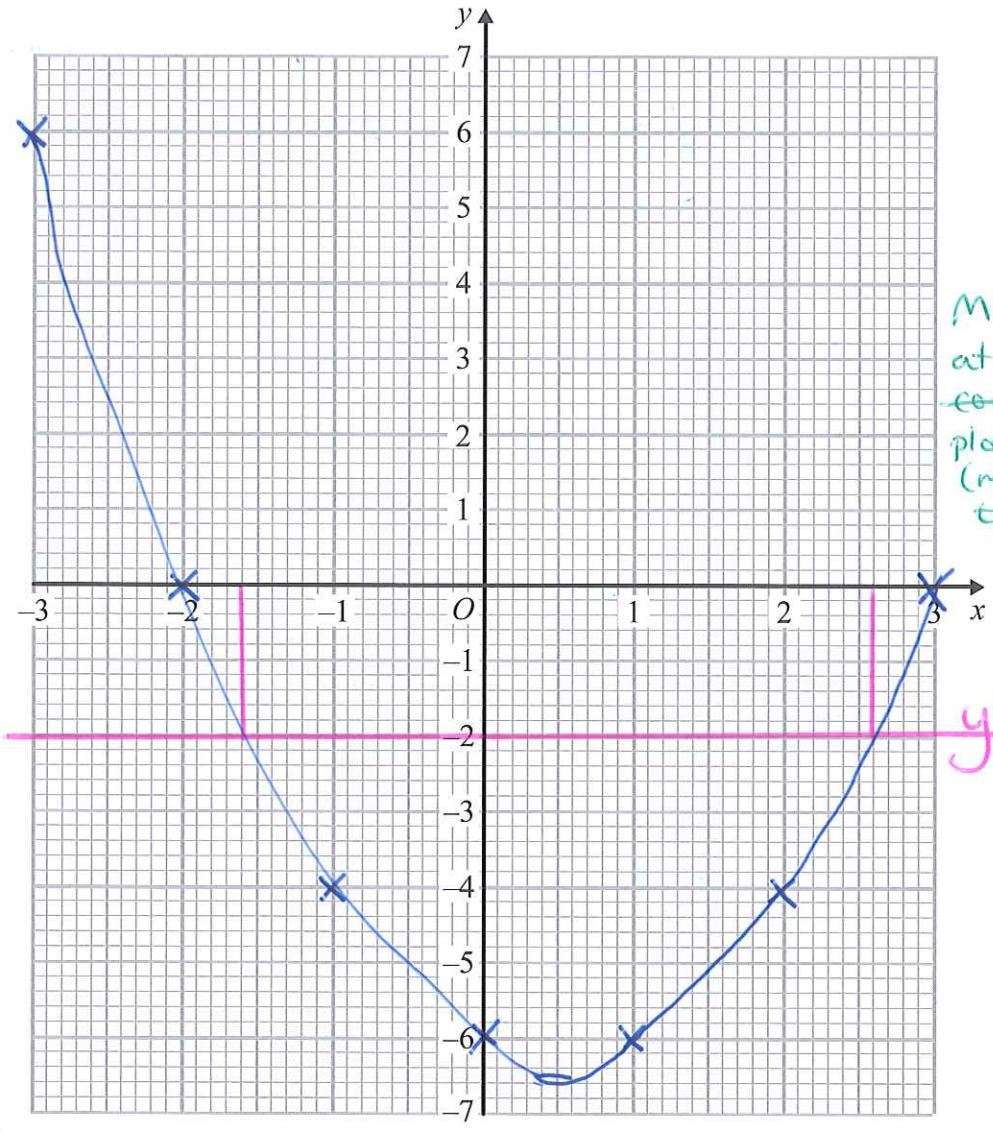
B1 any 2 correct
B1 all correct

Tip for using calculator
type (–2 =)
now type (ANS² – ANS – 6 =)

(2)

(b) On the grid, draw the graph of $y = x^2 - x - 6$ for values of x from –3 to 3

(2)



M1 ft
at least 4 ~~correct~~ points plotted (may ft their table)
A1 fully correct graph with smooth curve
y = –2

(c) Use your graph to find estimates of the solutions to the equation $x^2 - x - 6 = -2$

M1 Line $y = -2$ drawn on graph

A1 both ± 0.2

$x = 2.6$ or $x = -1.6$

(2)

(Total for Question 24 is 6 marks)

25 A force of 70 newtons acts on an area of 20 cm^2

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

The force is increased by 10 newtons.
The area is increased by 10 cm^2

Helen says,

"The pressure decreases by less than 20%"

Is Helen correct?
You must show how you get your answer.

Pressure before increase

Force = 70 Newtons

Area = 20 cm^2

Pressure = $\frac{\text{Force}}{\text{Area}}$

$= \frac{70}{20}$

$= 3.5$ N/cm^2

Pressure after increase

Force = 80 Newtons

Area = 30 cm^2

Pressure = $\frac{\text{Force}}{\text{Area}}$

$= \frac{80}{30}$

$= 2.\dot{6}$ N/cm^2

M1 either pressure correctly calculated

% change = $\frac{\text{Actual change in pressure}}{\text{pressure before increase}} \times 100$

$= \frac{"3.5 - 2.\dot{6}"}{3.5} \times 100$

$= \frac{0.8\dot{3}}{3.5} \times 100$

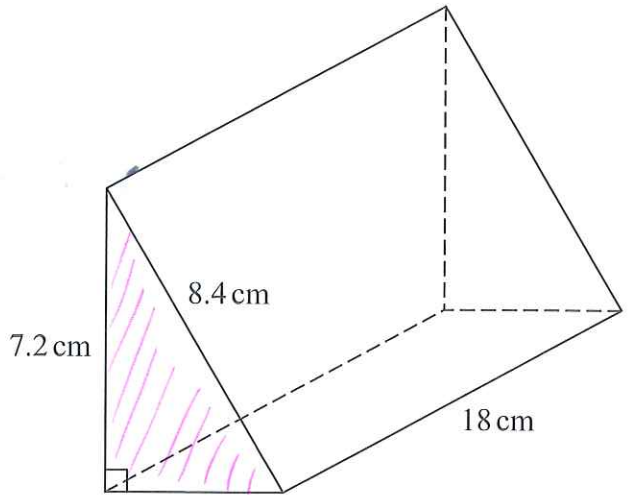
$= 23.8\%$ (1dp) A1ft correct % change for their values

Helen is not correct
The pressure decreases by 23.8% which is more than 20%

C1

(Total for Question 25 is 3 marks)

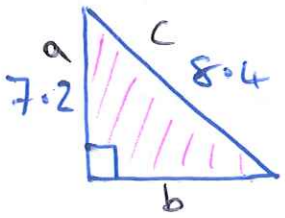
26 Here is a triangular prism.



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

Volume prism = Area end face × length

Area end face triangle = $\frac{\text{base} \times \text{perpendicular height}}{2}$



Use pythagoras' theorem to find length of base

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

$7.2^2 + b^2 = 8.4^2$

$b^2 = 8.4^2 - 7.2^2$

$b^2 = 18.72$

$b = \sqrt{18.72}$

$= 4.32666\ldots$ cm A1

P1 use of pythagoras' theorem to find missing base

Area end face triangle = $\frac{\sqrt{18.72} \times 7.2}{2}$ M1 ft

$= 15.57598\ldots$ cm^2

Volume prism = 15.57598×18 M1 ft

$= 280.3676\ldots$ cm^3

$= 280$ (3sf)

A1 cao

280 cm^3

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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