Pearson

WEEK 3 TASKS

(Higher 4-6)

Remember that you will have one paper in which you cannot use a calculator and two papers where a calculator is allowed. It is important that you are comfortable with using a calculator and know when it is appropriate to do so.

Don’t forget to take your calculator to the calculator exams and don’t forget to actually use it!

WEEK 3 TASK 1

Estimated completion time = 25 minutes.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The first five terms of an arithmetic sequence are

1 4 7 10 13

Write down an expression, in terms of n, for the nth term of this sequence.

.....

(Total for Question 1 is 2 marks)

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2 Show that $2\frac{1}{3} \times 3\frac{3}{4} = 8\frac{3}{4}$

(Total for Question 2 is 3 marks)

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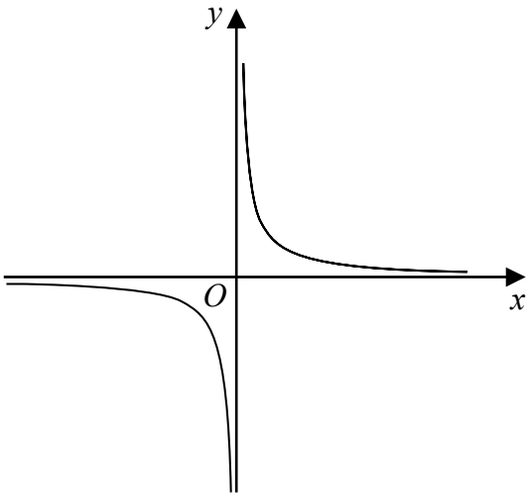
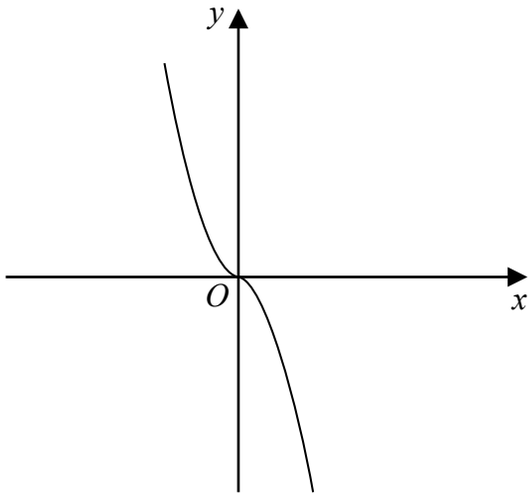
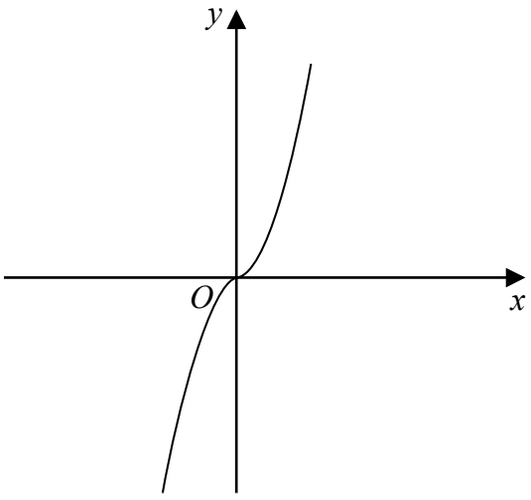
3 The diagram shows four graphs.



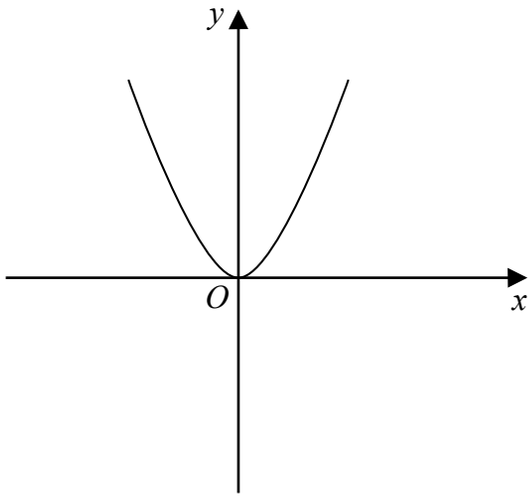
Graph **A**



Graph **B**



Graph **C**



Graph **D**

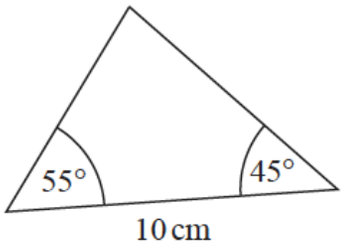
Each of the equations in the table is the equation of one of the graphs.

Complete the table.

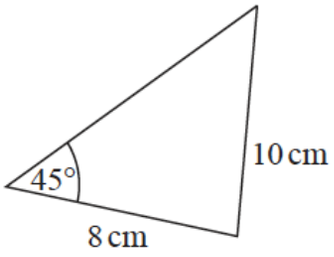
Equation	**Letter of graph**
$y = -x^3$	
$y = x^3$	
$y = x^2$	
$y = \frac{1}{x}$	

(Total for Question 3 is 2 marks)

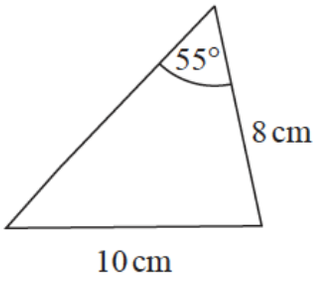
4 The diagram shows four triangles.



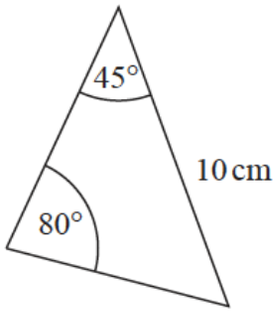
Triangle **A**



Triangle **B**



Triangle **C**



Triangle **D**

Two of these triangles are congruent.

Write down the letters of these two triangles.

..... and.....

(Total for Question 4 is 1 mark)

---

5 Sean pays £10 for 24 chocolate bars.

He sells all 24 chocolate bars for 50p each.

Work out Sean's percentage profit.

..... %

(Total for Question 5 is 3 marks)

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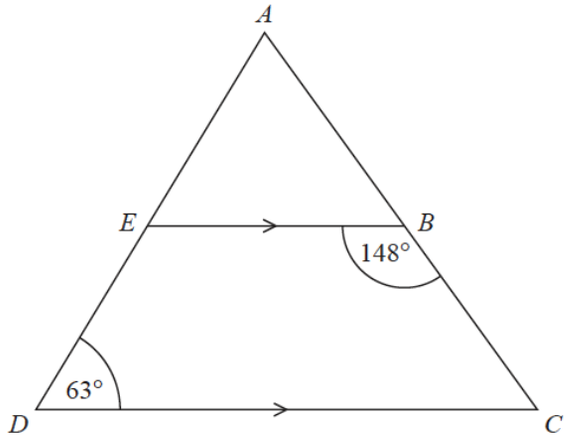
6 *ADC* is a triangle.

AED and *ABC* are straight lines.
EB is parallel to *DC*.

Angle *EBC* = 148°
Angle *ADC* = 63°



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

(Total for Question 6 is 5 marks)

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7 The table shows information about the heights, in cm, of a group of Year 9 girls.

least height	150 cm
median	165 cm
greatest height	170 cm

This stem and leaf diagram shows information about the heights, in cm, of a group of 15 Year 9 boys.

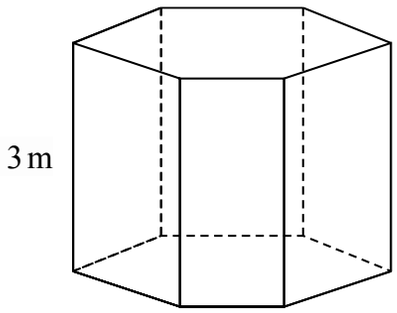
15	8 9 9
16	4 5 7 7 8
17	0 3 4 4 7
18	0 2

Key: 15 | 8 represents 158 cm

Compare the distribution of the heights of the girls with the distribution of the heights of the boys.

(Total for Question 7 is 3 marks)

8 The diagram shows a prism placed on a horizontal floor.



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

The prism has height 3 m
The volume of the prism is 18 m^3

The pressure on the floor due to the prism is 75 newtons/m^2

Work out the force exerted by the prism on the floor.

..... newtons

(Total for Question 8 is 3 marks)

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9 Write these numbers in order of size.
Start with the smallest number.

6.72×10^5 67.2×10^{-4} 672×10^4 0.000 672

....

(Total for Question 9 is 2 marks)

---

10 Given that $\frac{a}{b} = \frac{2}{5}$ and $\frac{b}{c} = \frac{3}{4}$

find $a : b : c$

.....

(Total for Question 10 is 3 marks)

TOTAL FOR PAPER IS 27 MARKS

WEEK 3 TASK 2

Estimated completion time = 30 minutes.

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

***1** Write 60 as a product of its prime factors.

.....

(Total for Question 1 is 2 marks)

***2** (*a*) Expand and simplify $3(2y - 5) + 7(y + 2)$

.....

(2)

(*b*) Factorise fully $6x^2 + 15x$

.....

(2)

(*c*) Make *g* the subject of the formula $f = 3g + 11$

.....

(2)

(Total for Question 2 is 6 marks)

***3** Solve $5x - 14 = 52 - x$

$x =$ .....

(Total for Question 3 is 3 marks)

***4** Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

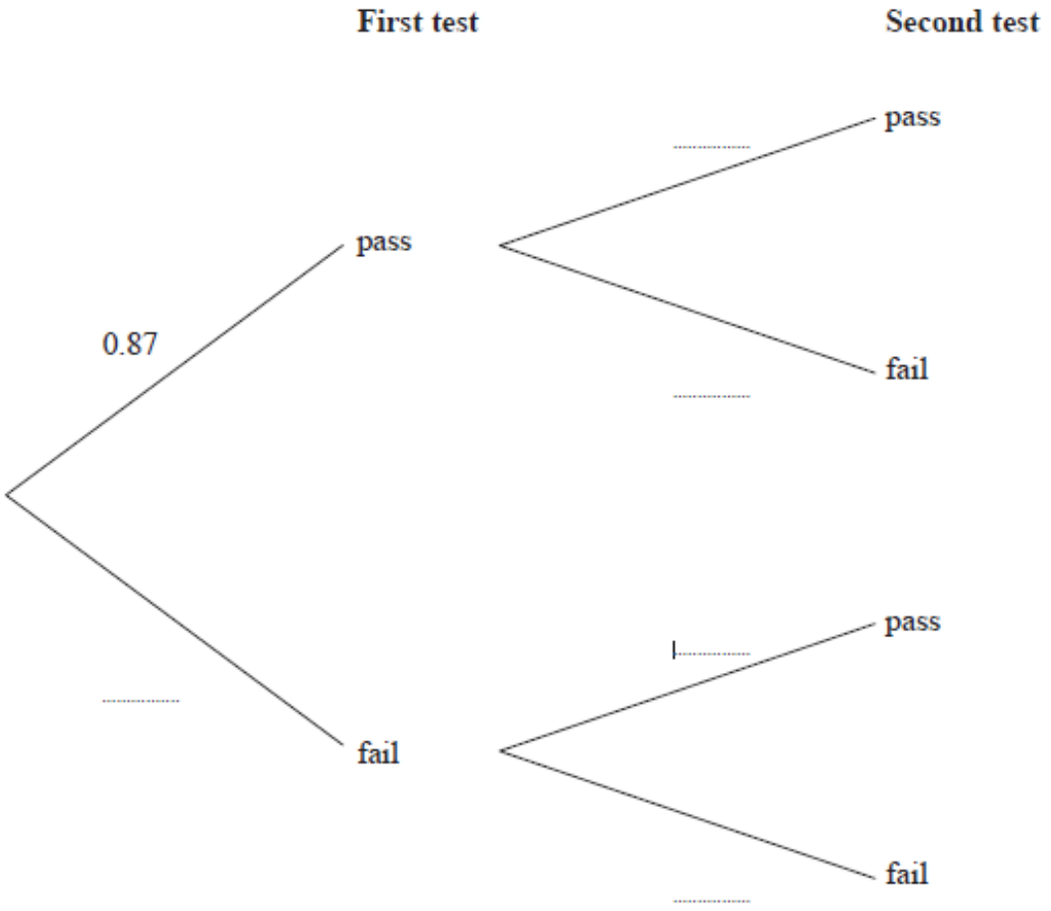
..... kg

(Total for Question 4 is 3 marks)

5 Shakir has to complete two tests.
He can either pass or fail each test.

The probability that he will pass the first test is 0.87
If he passes the first test the probability he will pass the second test is 0.94
If he fails the first test the probability he will pass the second test is 0.73

Complete the probability tree diagram for this information.



(Total for Question 5 is 2 marks)

***6** Work out the value of $\dfrac{25-\sqrt{43.87}}{6+2.1^2}$

Write down all the figures on your calculator display.

.....

(Total for Question 6 is 2 marks)

***7** Tamsin buys a house with a value of £150 000
The value of Tamsin's house increases by 4% each year.
Rachel buys a house with a value of £160 000
The value of Rachel's house increases by 1.5% each year.
At the end of 2 years, whose house has the greater value?
You must show how you get your answer.

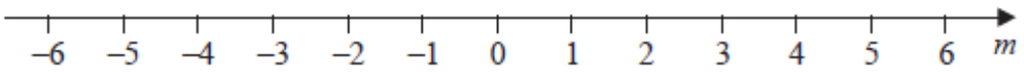
(Total for Question 7 is 4 marks)

***8** Andrew invests £4500 in a savings account for 2 years.
The account pays compound interest at a rate of 3.4% per year.
Calculate how much Andrew has in this savings account at the end of the 2 years.

£.....

(Total for Question 8 is 2 marks)

***9** On the number line below, show the inequality $-4 \leq m < 1$



(Total for Question 9 is 2 marks)

***10** There are 48 counters in a bag.
There are only red counters and blue counters in the bag.

number of red counters : number of blue counters = 1 : 2

Helen has to work out how many red counters are in the bag.
She says,

"There are 24 red counters in the bag because 1 is half of 2 and 24 is half of 48"

Is Helen correct?
You must give a reason for your answer.

.....

.....

.....

(Total for Question 10 is 1 mark)

***11** Karen is organising a party for a charity.

She spends

£100 on food
£120 on a hall
£80 on a DJ.

Karen sells 54 tickets for the party.
Each ticket costs £7.50
Work out the percentage profit Karen makes for the charity.

.....%

(Total for Question 11 is 4 marks)

TOTAL FOR PAPER IS 31 MARKS

WEEK 3 TASK 3

Estimated completion time = 25 minutes.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (*a*) Write 84 as a product of its prime factors.

..... **(2)**

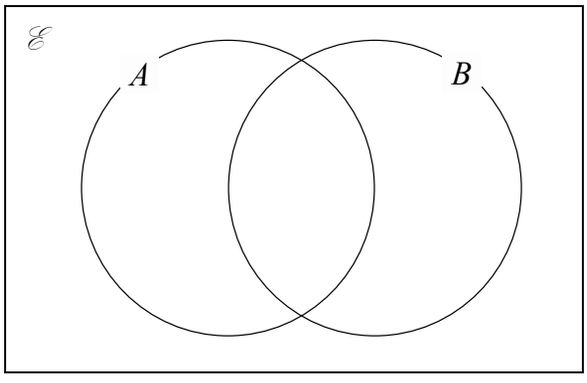
(*b*) Find the lowest common multiple (LCM) of 60 and 84

..... **(2)**

---

2 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{even numbers}\}$
$B = \{\text{factors of } 10\}$

(*a*) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set, $\mathscr{E}$

(*b*) Find the probability that this number is in the set $A \cap B$

..... **(2)**

.

3 Carlo puts tins into small boxes and into large boxes.

He puts 6 tins into each small box.
He puts 20 tins into each large box.

Carlo puts a total of 3000 tins into the boxes so that

number of tins in small boxes : number of tins in large boxes = 2 : 3

Carlo says that less than 30% of the boxes filled with tins are large boxes.

Is Carlo correct?
You must show all your working.

(Total for Question 3 is 5 marks)

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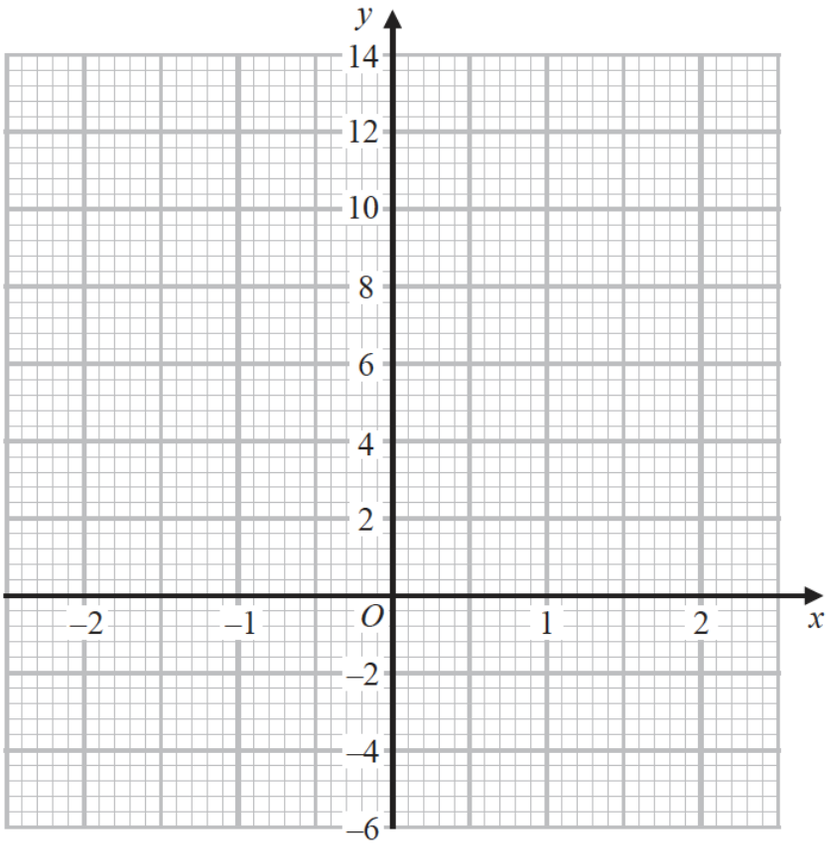
4 (*a*) Complete the table of values for $y = 5 - x^3$

x	–2	–1	0	1	2
y		6			

(2)

(*b*) On the grid below, draw the graph of $y = 5 - x^3$ for values of x from –2 to 2

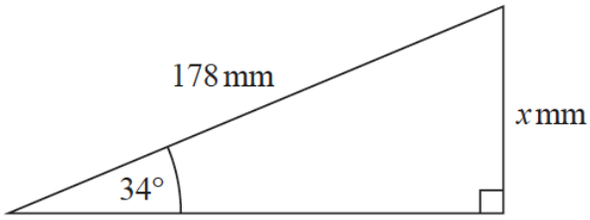


(2)

(Total for Question 4 is 4 marks)

.

5



Work out the value of x.
Give your answer correct to 1 decimal place.

.....

(Total for Question 5 is 2 marks)

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6 $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Find $2\mathbf{a} - 3\mathbf{b}$ as a column vector.

$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

(Total for Question 6 is 2 marks)

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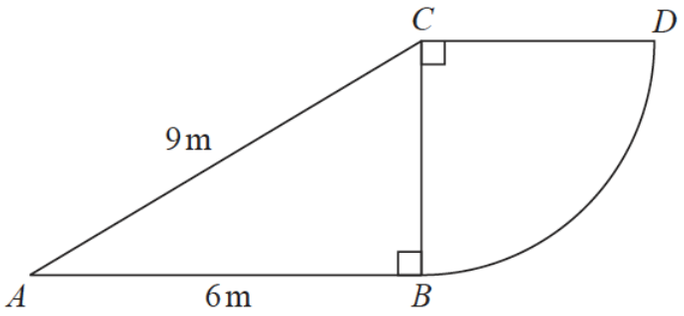
7 The diagram shows a right-angled triangle and a quarter circle.



The right-angled triangle ABC has angle $ABC = 90°$
The quarter circle has centre C and radius CB.

Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

..... m^2

(Total for Question 7 is 4 marks)

TOTAL FOR PAPER IS 26 MARKS

.

WEEK 3 TASK 4

Estimated completion time = 30 minutes.

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

***1** Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(*a*) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.

..... g

(4)

Jonny's assumption is wrong.
72% of the people will drink coffee.

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

.....

.....

.....

(1)

(Total for Question 1 is 5 marks)

***2** (*a*) Simplify $(m^2)^3$

.....

(1)

(*b*) Simplify $x^5 \times x^8$

.....

(1)

(*c*) Expand $4p(p^2 + 3p)$

.....

(2)

(Total for Question 2 is 4 marks)

***3** (*a*) Write 468 000 in standard form.

.....

(1)

(*b*) Write 5.037×10^{-4} as an ordinary number.

.....

(1)

(Total for Question 3 is 2 marks)

***4** Ali buys packs of balloons and boxes of pencils.

There are 30 balloons in each pack.
There are 24 pencils in each box.

Ali buys exactly the same number of balloons and pencils.
Work out how many packs of balloons and how many boxes of pencils she could have bought.

You must show all your working.

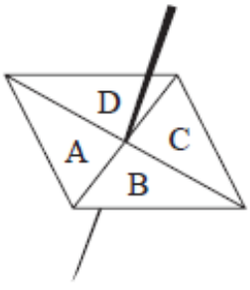
..... packs of balloons

..... boxes of pencils

(Total for Question 4 is 3 marks)

***5** Here is a biased spinner.

The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.



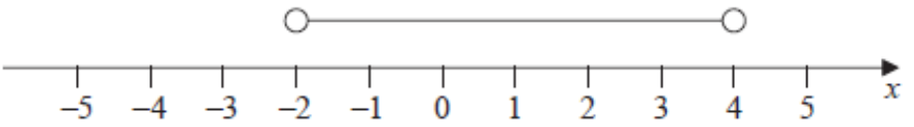
Letter	A	B	C	D
Probability	0.4	0.21	0.32	0.07

Luka will spin the spinner 200 times.
Work out an estimate for the number of times the spinner will land on A.

.....

(Total for Question 5 is 2 marks)

***6** Jenna is asked to show the inequality $-3 < x \leq 4$ on a number line.
Here is her answer.



(*a*) Write down two mistakes Jenna has made.

1.....

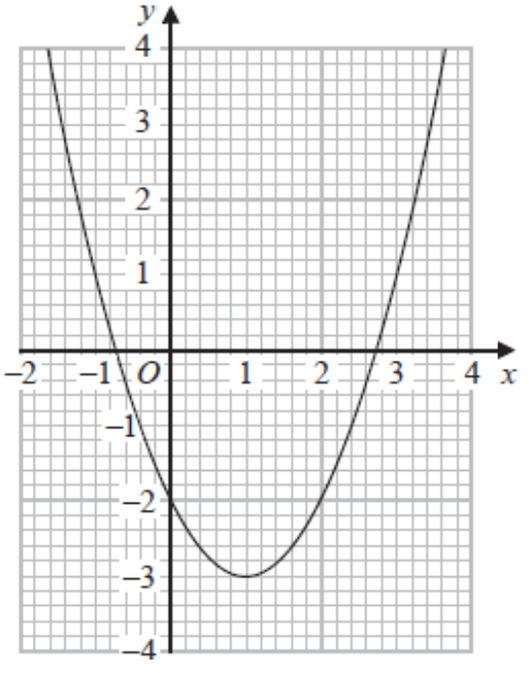
.....

2.....

.....

(Total for Question 6 is 2 marks)

***7** Here is the graph of $y = x^2 - 2x - 2$



Write down the coordinates of the turning point on the graph of $y = x^2 - 2x - 2$

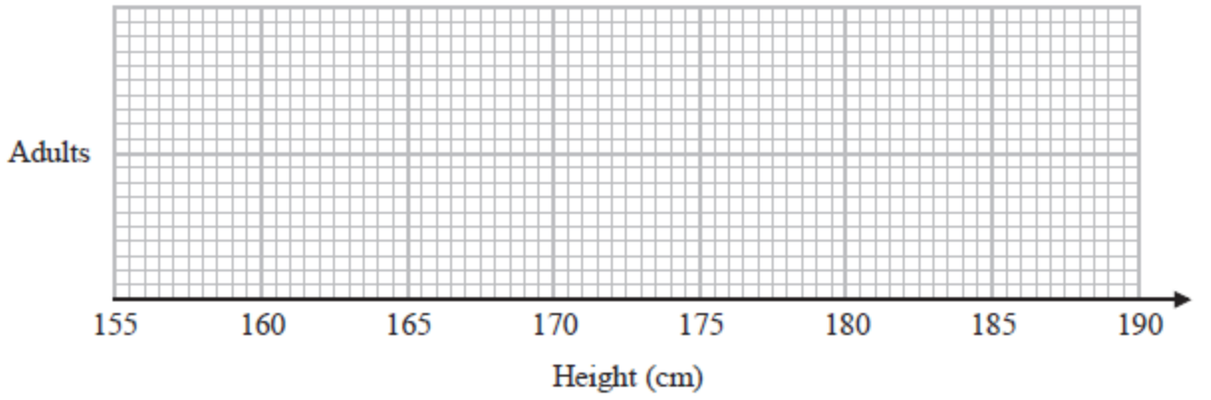
(..... , ...)

(Total for Question 7 is 1 mark)

8 The table shows some information about the heights of a group of adults.

least height	169 cm
greatest height	186 cm
median	177 cm
lower quartile	174 cm
upper quartile	180 cm

On the grid, draw a box plot for the information in the table.



(Total for Question 8 is 3 marks)

***9** A solid cuboid is made of metal.

The metal has a density of 9 g/cm^3
The volume of the cuboid is 72 cm^3

Work out the mass of the cuboid.

..... g

(Total for Question 9 is 2 marks)

***10** Riley travelled by car and by aeroplane.

He travelled 143 miles by car at an average speed of 55 miles per hour.
Riley then travelled for 5 hours and 20 minutes by aeroplane.

Work out, in hours and minutes, Riley's total travelling time.

..... hours ..... minutes

(Total for Question 10 is 3 marks)

---

11 Some people were asked if they wanted a new television.

70% of the people said yes.
80% of the people who said yes wanted a television with a large screen.

What percentage of the people asked said they wanted a television with a large screen?

.....%

(Total for Question 11 is 2 marks)

***12** A company orders a large number of plates from a factory.
It would take 30 hours to make all the plates using 4 machines.
How many machines are needed to make all the plates in 6 hours?

.....

(Total for Question 12 is 2 marks)

TOTAL FOR PAPER IS 31 MARKS

WEEK 3 TASK 5

Estimated completion time = 25 minutes.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (*a*) Simplify $n^3 \times n^5$

..... **(1)**

(*b*) Simplify $\dfrac{c^3 d^4}{c^2 d}$

..... **(2)**

(*c*) Solve $\dfrac{5x}{2} > 7$

..... **(2)**

---

2 Andy cycles a distance of 30 km at an average speed of 24 km/h.
He then runs a distance of 12 km at an average speed of 8 km/h.

Work out the total time Andy takes.
Give your answer in hours and minutes.

..... hours ..... minutes

(Total for Question 2 is 3 marks)

3 A number, m, is rounded to 1 decimal place.
The result is 9.4

Complete the error interval for m.

..... $\leqslant m <$ .....

(Total for Question 3 is 2 marks)

---

4 Maisie knows that she needs 3 kg of grass seed to make a rectangular lawn 5 m by 9 m.

Grass seed is sold in 2 kg boxes.

Maisie wants to make a rectangular lawn 10 m by 14 m.
She has 5 boxes of grass seed.

(*a*) Has Maisie got enough grass seed to make a lawn 10 m by 14 m?
You must show all your working.

(4)

Maisie opens the 5 boxes of grass seed.

She finds that 4 of the boxes contain 2 kg of grass seed.
The other box contains 1 kg of grass seed.

(*b*) Does this affect whether Maisie has enough grass seed to make her lawn?
Give a reason for your answer.

.....

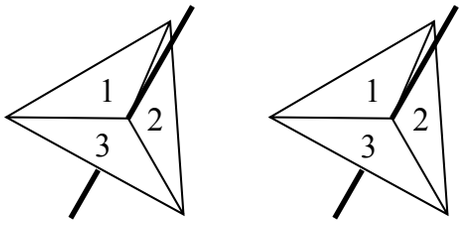
.....

.....

(1)

(Total for Question 4 is 5 marks)

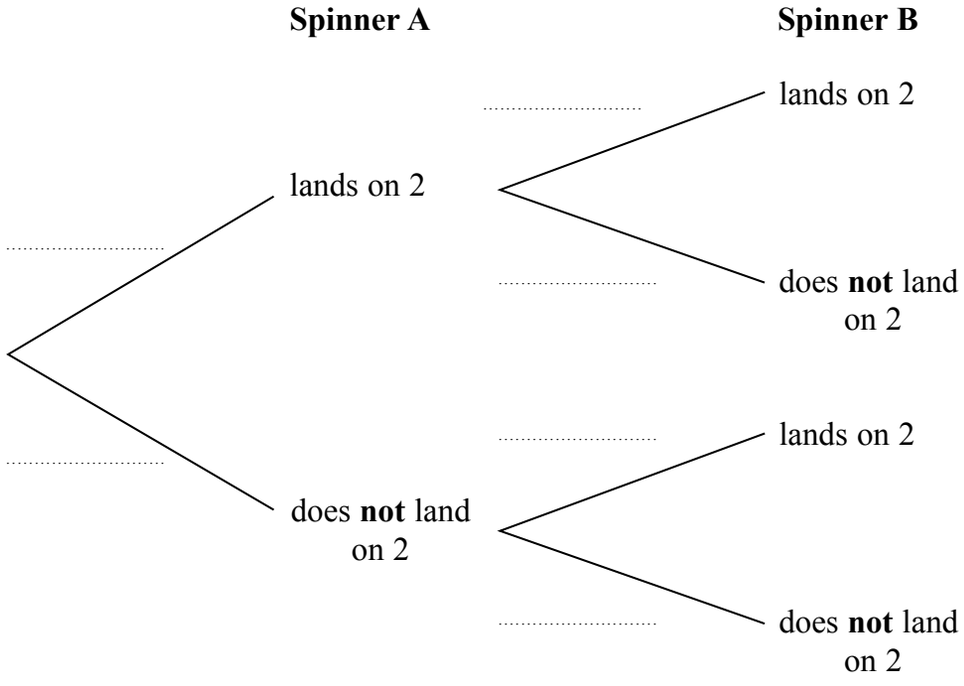
5 Amanda has two fair 3-sided spinners.



Spinner A **Spinner B**

Amanda spins each spinner once.

(*a*) Complete the probability tree diagram.



(2)

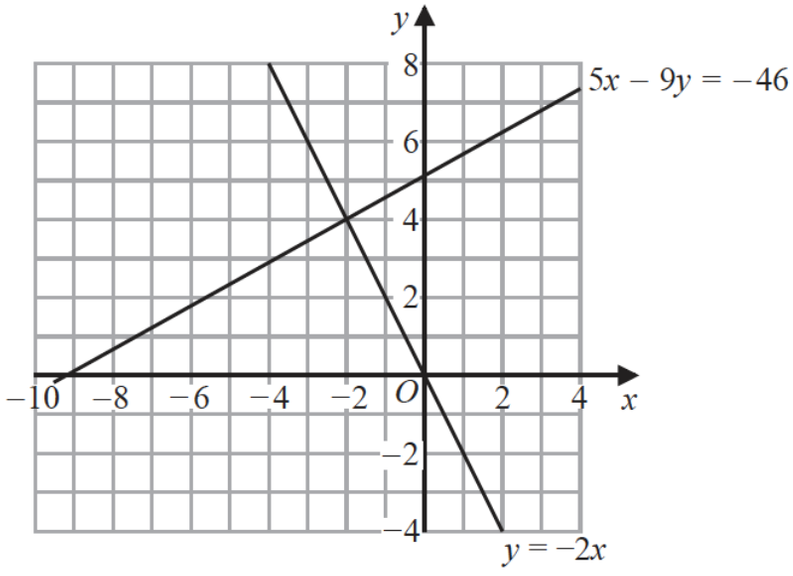
(*b*) Work out the probability that Spinner A lands on 2 and Spinner B does **not** land on 2

.....

(2)

(Total for Question 5 is 4 marks)

6



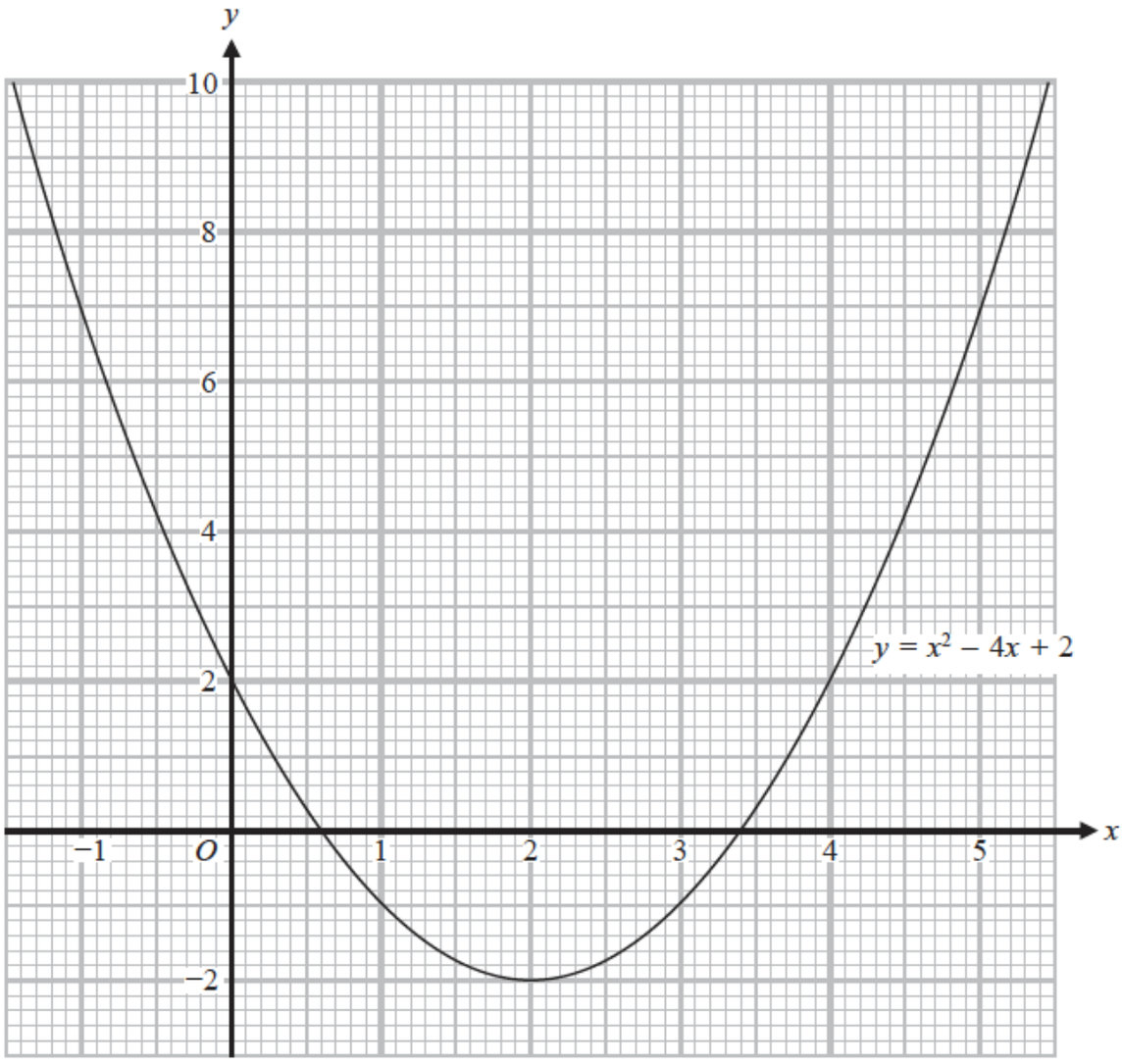
(*a*) Use these graphs to solve the simultaneous equations

$$5x - 9y = -46$$
$$y = -2x$$

x = ...

y = ...

(1)



(*b*) Use this graph to find estimates for the solutions of the quadratic equation $x^2 - 4x + 2 = 0$

.....

(2)

(Total for Question 6 is 3 marks)

TOTAL FOR PAPER IS 22 MARKS

Pearson

WEEK 3 MARKSCHEMES

(Higher 4-6)

WEEK 3 TASK 1

Question 1 (Total 2 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	1 4 7 10 13 3 3 3 3	M1	This mark is given for a method to use differences to find the coefficient of n
	$3n - 2$	A1	This mark is given for the correct answer only

Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$2\frac{1}{3} = \frac{7}{3}$, $3\frac{3}{4} = \frac{15}{4}$	M1	This mark is given for a conversion to improper fractions
	$\frac{7}{3} \times \frac{15}{4} = \frac{105}{12}$	M1	This mark is given for a method to find the multiplication as a single improper fraction
	$\frac{105}{12} = 8\frac{9}{12} = 8\frac{3}{4}$	A1	This mark is given for the correct working to show the result as required

Question 3 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Equation / **Letter of graph** $y = x^3$ — **B** $y = x^3$ — **C** $y = x^3$ — **D** $y = \frac{1}{x}$ — **A**	B2	This mark is given for all four graphs correct (B1 is given for two or three graphs correct)

Question 4 (Total 1 mark)

Part	Working or answer an examiner might expect to see	Mark	Notes
	A and **D**	C2	This mark is given for the correct answer only

Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$24 \times 50\text{p} = £12$ $£12 - £10 = £2$	M1	This mark is given for a process to find the overall profit
	$\frac{2}{10} \times 100$	M1	This mark is given for a method to find the percentage profit
	20%	A1	This mark is given for the correct answer only

Question 6 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$AEB = 63$	M1	This mark is given for a method to find the size of angle *AEB*
	Corresponding angles are equal	C1	This mark is given for a correct reason stated
	$BCD = 180 - 148 = 32$	M1	This mark is given for a method to find the size of angle *EBA*
	Angles on a straight line add up to 180	C1	This mark is given for a correct reason stated
	$EAB = 180 - 63 - 32 = 85$ Angles in a triangle add up to 180	A1	This mark is given for the correct answer with a correct reason stated

Question 7 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	Range of the girls = 170 – 150 = 20 Range of the boys = 182 – 158 = 24 Median of the girls = 165 Median of the boys = 168	B1	This mark is given for identifying the range of the girls' heights or the range of the boys' heights or the median of the boys' heights
	For example: the median for girls (165) is less than the median for boys (168)	C1	This mark is given for a correct comparison of medians
	For example: the range for girls (20) is smaller than the range for boys (24)	C1	This mark is given for a correct comparison of ranges

Question 8 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$18 \div 3 = 6$	M1	This mark is given for method to find the area of the base of the prism
	$75 = \frac{\text{Force}}{6}$	M1	This mark is given for a method to substitute into the formula $\text{Pressure} = \frac{\text{Force}}{\text{Area}}$
	Force $= 75 \times 6 = 450$	A1	This mark is given for the correct answer only

Question 9 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$67.2 \times 10^{-4} = 6.72 \times 10^{-3}$ $672 \times 10^{4} = 6.72 \times 10^{6}$ $0.000672 = 6.72 \times 10^{-4}$	M1	This mark is given for converting each number into standard form
	0.000672, 67.2×10^{-4}, 6.72×10^{5}, 672×10^{4}	A1	This mark is given for all terms in the correct order

Question 10 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{2}{5} \times 3$ and $\frac{3}{4} \times 5$	P1	This mark is given for a process to find a multiplier to equate the fractions in terms of b
	$\frac{6}{15}$ and $\frac{15}{20}$	P1	This mark is given for a process to use these terms to find the ratio
	6 : 15 : 20	A1	This mark is given for the correct answer only

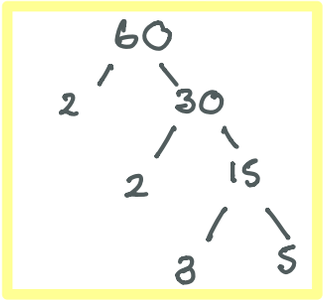
WEEK 3 TASK 2

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

***1** Write 60 as a product of its prime factors.



1 mark for complete factor tree - one error allowed

Final mark

$2^2 \times 3 \times 5$ or $2 \times 2 \times 3 \times 5$

(Total for Question 1 is 2 marks)

***2** (*a*) Expand and simplify $3(2y - 5) + 7(y + 2)$

1 mark for either of these

$6y - 15 + 7y + 14$

$= 6y + 7y - 15 + 14$

Final mark

$13y - 1$

(2)

(*b*) Factorise fully $6x^2 + 15x$

1, 6 1, 15
2, 3 3, 5

2 marks $3x(2x + 5)$

(2)

(*c*) Make *g* the subject of the formula $f = 3g + 11$

$f = 3g + 11$
$-11 \quad -11$

1 mark

$\frac{f - 11}{3} = \frac{3g}{3}$

Final mark

$g = \frac{f - 11}{3}$

(2)

(Total for Question 2 is 6 marks)

***3** Solve $5x - 14 = 52 - x$

✓ x ✓ x

$5x - 14 = 52 - x$

$+x \qquad +x$

$6x - 14 = 52$

$+14 \quad +14$

$6x = 66$

$x = \frac{66}{6} = 11$

1 mark

1 mark

Final mark

$x =$ 11

(Total for Question 3 is 3 marks)

***4** Last year a family recycled 800 kg of household waste.
57% of this waste was paper and glass.

weight of paper recycled : weight of glass recycled = 12 : 7

Calculate the weight of glass the family recycled.

800kg

P + G: 57% of 800

$= 0.57 \times 800$

$= 456$kg

1 mark

P : G

12 : 7

456 ÷ 19 = 24

12 x 24 : 7 x 24

288 : 168

1 mark

168 kg

(Total for Question 4 is 3 marks)

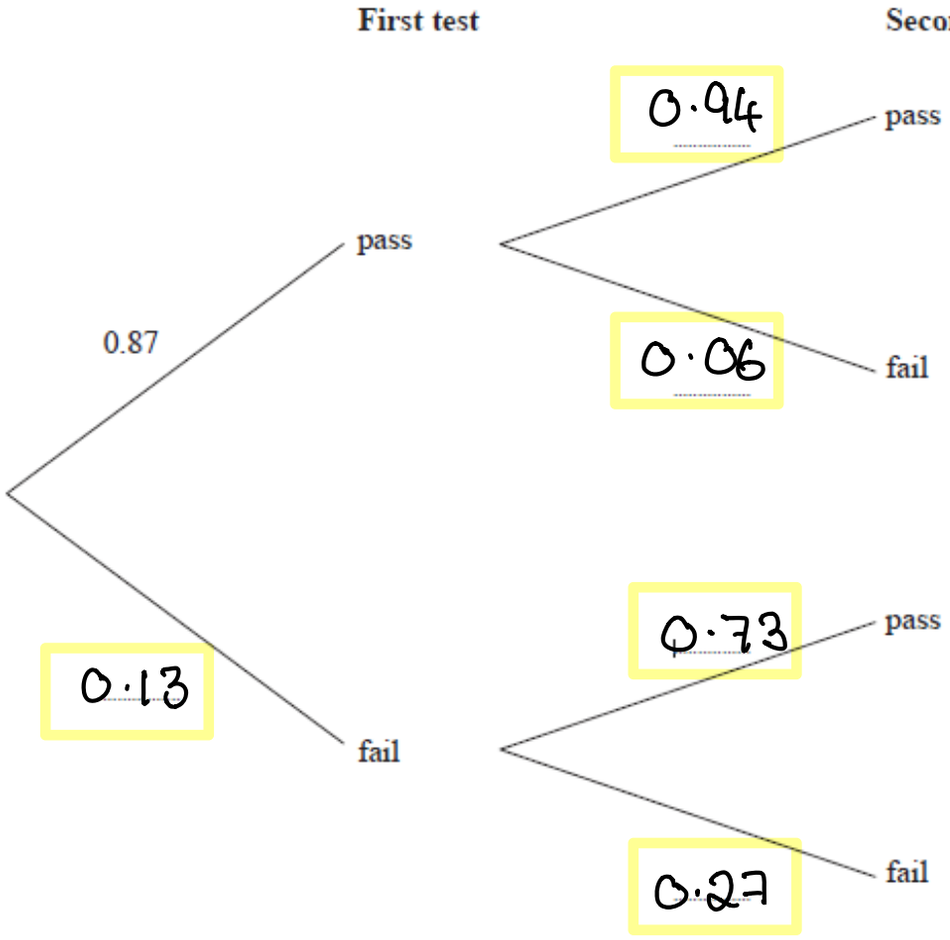
Final mark. Answer in the range 167.9 to 168

SPECIAL CASE: if 288 is shown as the final answer award 2 marks.

5 Shakir has to complete two tests.
He can either pass or fail each test.

The probability that he will pass the first test is 0.87
If he passes the first test the probability he will pass the second test is 0.94
If he fails the first test the probability he will pass the second test is 0.73

Complete the probability tree diagram for this information.



2 marks for all values correct

1 mark for at least two correct values

(Total for Question 5 is 2 marks)

***6** Work out the value of $\dfrac{25-\sqrt{43.87}}{6+2.1^2}$

Write down all the figures on your calculator display.

$= \dfrac{18.37655679}{10.41}$

1 mark for either of these

1.765279923

Final mark. Must be at least 3 decimal places.

(Total for Question 6 is 2 marks)

***7** Tamsin buys a house with a value of £150 000
The value of Tamsin's house increases by 4% each year.
Rachel buys a house with a value of £160 000
The value of Rachel's house increases by 1.5% each year.
At the end of 2 years, whose house has the greater value?
You must show how you get your answer.

Tamsin

Yr 1 $150000 \times 1.04 = 156000$

Yr 2 $156000 \times 1.04 = 162240$

1 mark for one year for either Rachel OR Tamsin

1 mark for two years for either Rachel OR Tamsin

Rachel

Yr 1 $160000 \times 1.015 = 162400$

Yr 2 $162400 \times 1.015 = 164836$

1 mark for two years for BOTH Rachel and Tamsin

Rachel $164836 > 162240$

(Total for Question 7 is 4 marks)

1 mark for Rachel WITH correct figures

***8** Andrew invests £4500 in a savings account for 2 years.
The account pays compound interest at a rate of 3.4% per year.
Calculate how much Andrew has in this savings account at the end of the 2 years.

100 + 3·4 = 103·4% → 1·034

Yr 1 4500 × 1·034 = 4653

Yr 2 4653 × 1·034 = 4811·202

1 mark

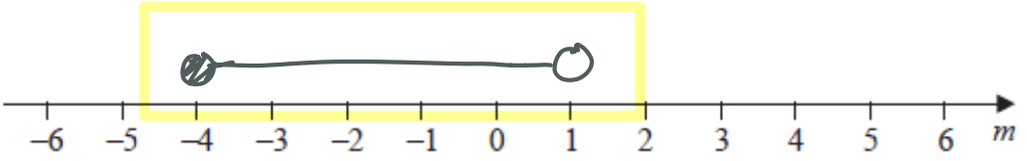
Final mark

£ 4811·20

(Total for Question 8 is 2 marks)

***9** On the number line below, show the inequality $-4 \leq m < 1$

2 marks for fully correct diagram.
1 mark can be awarded for either correct circles or line from -4 to 1



(Total for Question 9 is 2 marks)

***10** There are 48 counters in a bag.
There are only red counters and blue counters in the bag.
number of red counters : number of blue counters = 1 : 2
Helen has to work out how many red counters are in the bag.
She says,
"There are 24 red counters in the bag because 1 is half of 2 and 24 is half of 48"
Is Helen correct?
You must give a reason for your answer.

48 ÷ 3 = 16
16 : 32

No, the fraction of red counters is one third not one half.

1 mark for 'no' WITH valid reason

(Total for Question 10 is 1 mark)

***11** Karen is organising a party for a charity.

She spends

£100 on food
£120 on a hall
£80 on a DJ.

Karen sells 54 tickets for the party.
Each ticket costs £7.50
Work out the percentage profit Karen makes for the charity.

Spends 100 + 120 + 80 = £300

Tickets = 54 × 7·50 = £405

1 mark

Profit = 405 − 300 = 105

1 mark

% profit = $\frac{105}{300} \times 100$

1 mark

= 35%

Final mark

35

.....%

(Total for Question 11 is 4 marks)

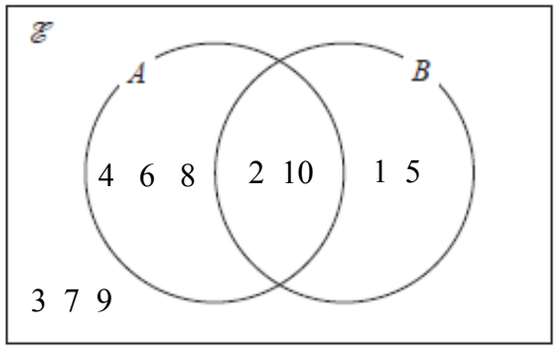
TOTAL FOR PAPER IS 31 MARKS

WEEK 3 TASK 3

Question 1 (Total 4 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	$2 \times 2 \times 3 \times 7$	M1	This mark is given for a 2, 2 3 and 7 seen
		A1	This mark is given for the correct answer only
(b)	60, 120, 180, 240, 300, 360, 420 … 84, 168, 252, 336, 420 … **or** $84 = 2 \times 2 \times 3 \times 7$ $60 = 2 \times 2 \times 3 \times 5$ LCM $= 2 \times 2 \times 3 \times 5 \times 7$	M1	This mark is given for a method to find the LCM
	420	A1	This mark is given for the correct answer only

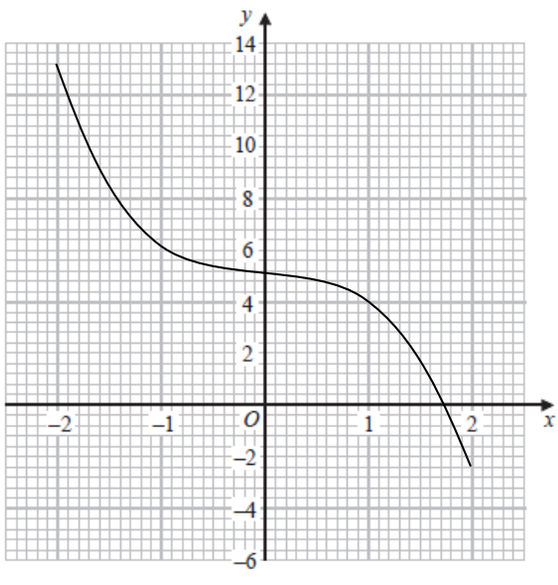
Question 2 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		M1	This mark is given for 2 and 10 correctly placed in the intersection
		M1	This mark is given for 4, 6 and 8 placed in A only or 1 and 5 placed in B only or 3, 7 and 9 placed in $(A \cup B)'$
		C1	This mark is given for all numbers correctly placed in the Venn diagram
(b)	$n(A \cap B) = 2$	M1	This mark is given for a method to identify the number of elements in $A \cap B$
	$\frac{2}{10}$	A1	This mark is given for the correct answer only

Question 3 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$3000 \div 5 = 600$	P1	This mark is given for a start to the process to solve the problem
	1200 : 1800	P1	This mark is given for a process to find the ratio of the number of tins in small boxes to the number of tins in large boxes
	$\frac{1200}{6} : \frac{1800}{20} = 200 : 90$	P1	This mark is given for a process to find the ratio of the number of small boxes to the number of large boxes
	$\frac{90}{290} = 0.3103448\ldots \approx 31\%$	P1	This mark is given for a process to find to find the percentage of tins in large boxes
	Carlo is not correct; 31% of the boxes filled with tins are large boxes	C1	This mark is given for a valid conclusion supported by correct working

Question 4 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	<table><tr><td>x</td><td>–2</td><td>–1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>y</td><td>**13**</td><td>6</td><td>**5**</td><td>**4**</td><td>**–3**</td></tr></table>	B2	These marks are given for all 4 points correct (B1 is given for two or three points correct)
(b)		B1	This mark is given for five points plotted correctly
		A1	This mark is given for a fully correctly plotted graph

Question 5 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\sin 34° = \frac{x}{178}$ $x = 178 \times \sin 34°$ $x = 178 \times 0.559$	M1	This mark is given for a method to find the value of x
	$x = 99.5$ (mm)	A1	This mark is given for the correct answer only (in the range 99.5 – 99.54)

Question 6 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$2 \times \begin{pmatrix} 3 \\ 4 \end{pmatrix} = \begin{pmatrix} 6 \\ 8 \end{pmatrix}$ $3 \times \begin{pmatrix} 5 \\ -2 \end{pmatrix} = \begin{pmatrix} 15 \\ -6 \end{pmatrix}$	M1	This mark is given for a method to find the vectors 2**a** and 3**b**
	$\begin{pmatrix} 6 \\ 8 \end{pmatrix} - \begin{pmatrix} 15 \\ -6 \end{pmatrix} = \begin{pmatrix} -9 \\ 14 \end{pmatrix}$	A1	This mark is given for the correct answer only

Question 7 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$CB = \sqrt{(9^2 - 6^2)} = \sqrt{45}$	P1	This mark is given for a process to find the length CB
	$= \sqrt{45}$	P1	This mark is given for correctly finding the length CB (accept 6.7)
	$\frac{1}{4} \times \pi \times (\sqrt{45})^2 = 11.25\pi$	P1	This mark is given for a process to find the area of the quarter circle
	35.3 (to 3 significant figures)	A1	This mark is given for the correct answer only (in the range 35.2 to 35.3)

WEEK 3 TASK 4

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

***1** Jonny wants to know how much coffee he will need for 800 people at a meeting.

Each person who drinks coffee will drink 2 cups of coffee.
10.6 g of coffee is needed for each cup of coffee.

Jonny assumes 68% of the people will drink coffee.

(*a*) Using this assumption, work out the amount of coffee Jonny needs.
Give your answer correct to the nearest gram.

800 people

68% drink coffee

1 mark 0·68 x 88 = 544 people

544 people → 2 cups of coffee

1 mark 544 x 2 = 1088 cups

1088 x 10·6 grams

Final mark

1 mark = 11532·8 grams

11533 ..... g

Range accepted 11532.5 to 11533 **(4)**

Jonny's assumption is wrong.
72% of the people will drink coffee.

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

1 mark

My answer would be greater as he'd need more coffee.

(1)

(Total for Question 1 is 5 marks)

***2** (*a*) Simplify $(m^2)^3$

$m^{2\times3}$

1 mark

m^6

.....

(1)

(*b*) Simplify $x^5 \times x^8$

x^{5+8}

1 mark

x^{13}

.....

(1)

(*c*) Expand $4p(p^2 + 3p)$

$4p \times p^2 \quad + \quad 4p \times 3p$

$4p^3 + 12p^2$

1 mark for either of these

Final mark

$4p^3 + 12p^2$

.....

(2)

(Total for Question 2 is 4 marks)

***3** (*a*) Write 468 000 in standard form.

1 mark

$4{\cdot}68 \times 10^5$

.....

(1)

(*b*) Write 5.037×10^{-4} as an ordinary number.

1 mark

0·0005037

.....

(1)

(Total for Question 3 is 2 marks)

***4** Ali buys packs of balloons and boxes of pencils.

There are 30 balloons in each pack.
There are 24 pencils in each box.

Ali buys exactly the same number of balloons and pencils.
Work out how many packs of balloons and how many boxes of pencils she could have bought.

You must show all your working.

Balloons: 30, 60, 90, 120 → 4 packs

Pencils: 24, 48, 72, 96, 120 → 5 packs

1 mark for at least three multiples of 30 and 24

1 mark

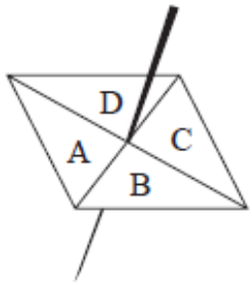
Final mark

4 ..... packs of balloons

5 ..... boxes of pencils

(Total for Question 4 is 3 marks)

***5** Here is a biased spinner.



The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.

Letter	A	B	C	D
Probability	0.4	0.21	0.32	0.07

Luka will spin the spinner 200 times.
Work out an estimate for the number of times the spinner will land on A. 0·4

0·4 × 200

1 mark

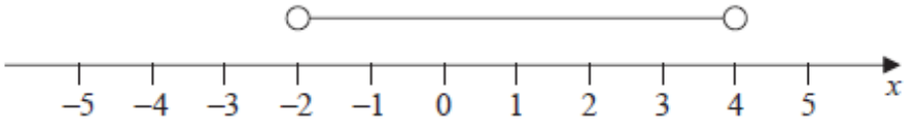
Final mark

80

.....

(Total for Question 5 is 2 marks)

***6** Jenna is asked to show the inequality $-3 < x \leq 4$ on a number line.
Here is her answer.



(*a*) Write down two mistakes Jenna has made.

1 The left hand circle should be above -3

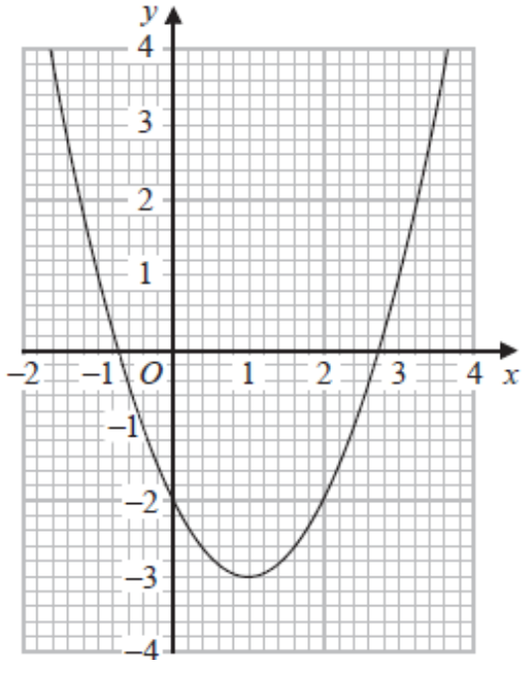
1 mark for acceptable explanation

2 The right hand circle should be solid.

1 mark for acceptable explanation

(Total for Question 6 is 2 marks)

***7** Here is the graph of $y = x^2 - 2x - 2$



Write down the coordinates of the turning point on the graph of $y = x^2 - 2x - 2$

1 mark (1 , -3)

(Total for Question 7 is 1 mark)

8 The table shows some information about the heights of a group of adults.

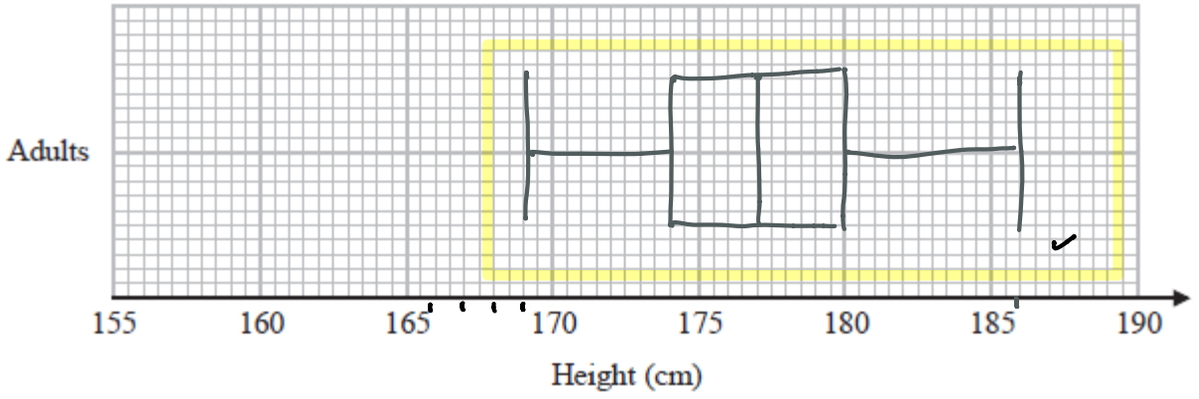
2 marks at least three correct points drawn

1 mark for at least two correct points drawn

least height	169 cm
greatest height	186 cm
median	177 cm
lower quartile	174 cm
upper quartile	180 cm

On the grid, draw a box plot for the information in the table.

3 marks for fully correct box plot



(Total for Question 8 is 3 marks)

***9** A solid cuboid is made of metal.

The metal has a density of 9 g/cm^3
The volume of the cuboid is 72 cm^3

Work out the mass of the cuboid.

mass = 9 × 72 1 mark

= 648

Final mark

648 ..... g

(Total for Question 9 is 2 marks)

***10** Riley travelled by car and by aeroplane.

He travelled 143 miles by car at an average speed of 55 miles per hour.
Riley then travelled for 5 hours and 20 minutes by aeroplane.

Work out, in hours and minutes, Riley's total travelling time.

1 mark

time = $\frac{143}{55}$

= 2·6 hours

Total time

= 5 hours 20 mins + 2·6 hours

0·6 of 1 hour = 36 mins

so 5 hours + 2 hours + 20 mins + 36 mins

= 7 hours + 56 mins

1 mark

Final mark

7 hours 56 minutes

(Total for Question 10 is 3 marks)

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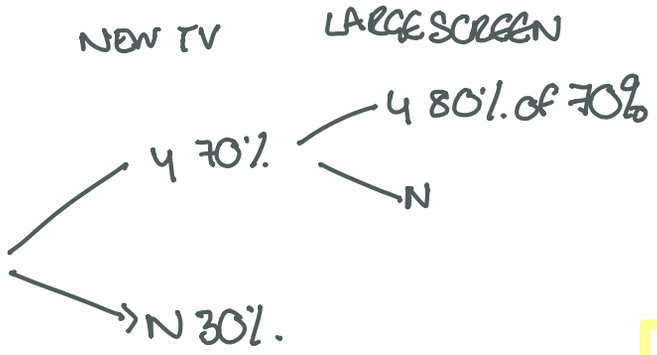
11 Some people were asked if they wanted a new television.

70% of the people said yes.
80% of the people who said yes wanted a television with a large screen.

What percentage of the people asked said they wanted a television with a large screen?



1 mark

0·8 × 70 = 56

Final mark

56 %

(Total for Question 11 is 2 marks)

***12** A company orders a large number of plates from a factory.
It would take 30 hours to make all the plates using 4 machines.
How many machines are needed to make all the plates in 6 hours?

Time 30hours Machines 4 so 120 hours in total

if 6 hours 120 ÷ 6 = 20 machines

1 mark

20 Final mark

.....

(Total for Question 12 is 2 marks)

TOTAL FOR PAPER IS 31 MARKS

WEEK 3 TASK 5

Question 1 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$n^{3+5} = n^8$	B1	This mark is given for the correct answer only
(b)	$c^{3-2} \times d^{4-1}$	M1	This mark is given for either c or d^3 seen
	cd^3	A1	This mark is given for the correct answer only
(c)	$5x > 14$	M1	This mark is given for a method to remove the fraction from the inequality
	$x > \frac{14}{5}$	A1	This mark is given for the correct answer only

Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{30}{24} = 1.25, \ \frac{12}{8} = 1.5$	P1	This mark is given for a process to find out how many hours Andy cycles and runs for
	1 hour 15 minutes + 1 hour 30 minutes	P1	This mark is given for a process to convert into hours and minutes
	2 hours and 45 minutes	A1	This mark is given for the correct answer only

Question 3 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$9.35 \leq m < 9.45$	B1	This mark is given for 9.35 in the correct position
		B1	This mark is given for 9.45 in the correct position

Question 4 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$5 \times 9 = 45$ 3 kg $10 \times 14 = 140$ 5 boxes = 10 kg	P1	This mark is given for a process to find the areas of the lawns and the amount of grass seed required
	$\frac{140}{45} = 3.111\ldots$	P1	This mark is given for a process to find the comparative sizes of the lawns
	$3 \times 3.111\ldots = 9.333\ldots$ kg	P1	This mark is given for a process to find the amount of grass seed needed for the larger lawn
	Yes, Maisie has enough grass seed	C1	This mark is given for a valid conclusion supported by correct working
(b)	Yes, there is an effect. 9 kg is not enough grass seed since 9.333… kg is required	C1	This mark is given for a valid conclusion supported by correct working

Question 5 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\frac{1}{3}, \frac{2}{3}; \frac{1}{3}, \frac{2}{3}, \frac{1}{3}, \frac{2}{3}$	B2	These marks are given for six fully correct probabilities (B1 is given for at least two correct probabilities)
(b)	$\frac{1}{3} \times \frac{2}{3}$	M1	This mark is given for a method to find the probability
	$\frac{2}{9}$	A1	This mark is given for the correct answer only

Question 6 (Total 2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$x = -2, y = 4$	B1	This mark is given for the correct answer only
(b)	0.6, 3.4	M1	This mark is given for correct answers shown on the graph or given as coordinates (for example (0.6, 0) and (3.4, 0)
		A1	This mark is given for the correct answer only (in the ranges 0.55 to 0.6 and 3.4 to 3.45