Easter Intervention

Foundation / Higher Crossover Questions

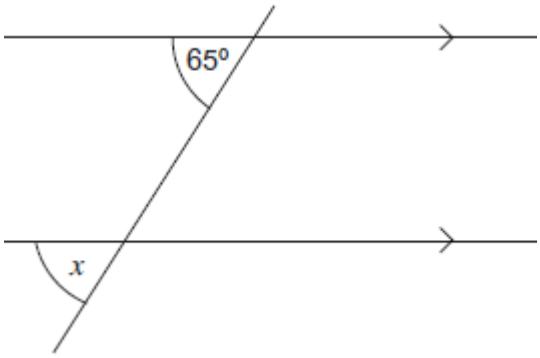
Topic			
Angles			
Linear Equations			
Averages			
Area			
Circles			
Standard Form			
Upper and Lower Bounds			
Expanding and Factorising			
Percentages / Compound Interest			
Probability			
Solving Quadratics			
Transformations			
Volume			
Pythagoras			
Trigonometry			
Drawing Graphs			

Questions only on the HIGHER paper will be marked with a (H)

If you have any questions, feel free to email: bonea@ianramsey.org.uk

Angles

Q1. Write down the size of angle x. Give a reason for your answer.



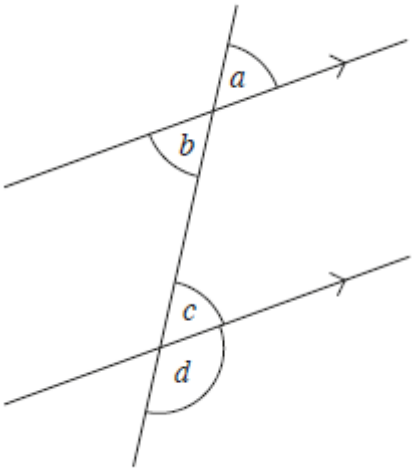
Answer _____ degrees

Reason _____

_____

(Total 2 marks)

Q2.



(a) Which angles are vertically opposite? Circle your answer

a and b a and c b and c b and d c and d

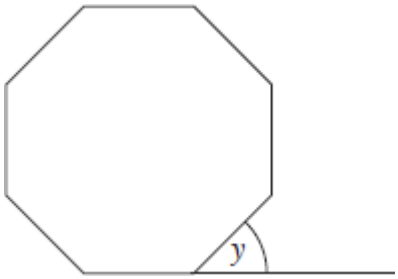
(b) Which angles are alternate? Circle your answer

a and b a and c b and c b and d c and d

(c) Which angles are corresponding? Circle your answer

a and b a and c b and c b and d c and d

Q3. (a) The diagram shows a regular octagon.



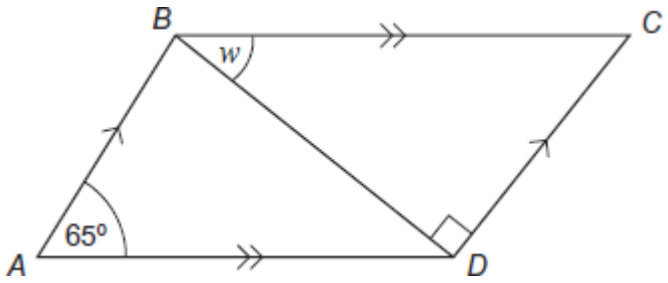
The base line of the octagon is extended. Work out the size of angle y.

_____

Answer _____ degrees

(2)

(b) $ABCD$ is a parallelogram. BD is a diagonal.



Work out the size of angle w.

_____

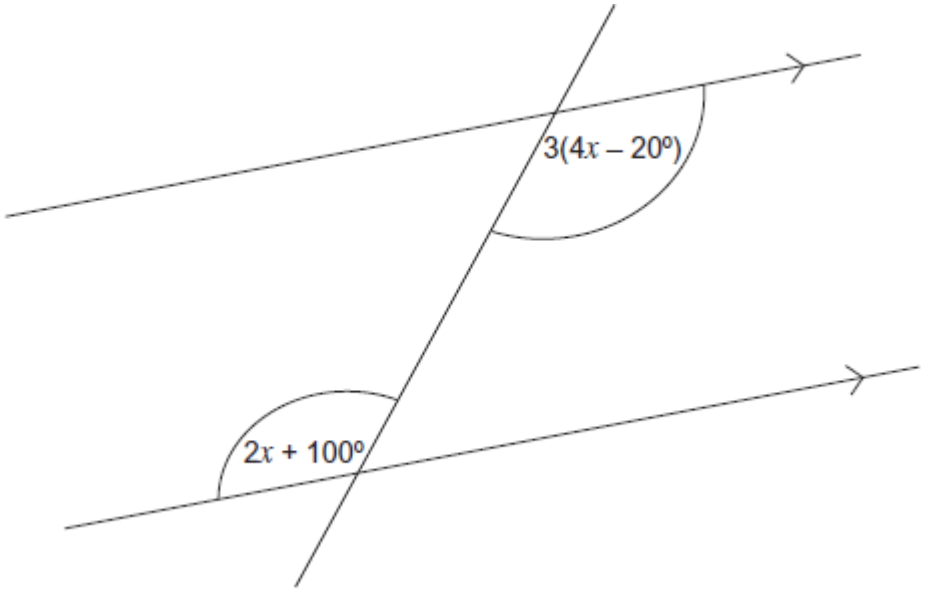
_____

Answer _____ degrees

(3)

(Total 5 marks)

Q4. The diagram shows three straight lines.



(a) Which of the following describes the pair of angles marked? Circle your answer.

Alternate Corresponding Interior Vertically opposite

(1)

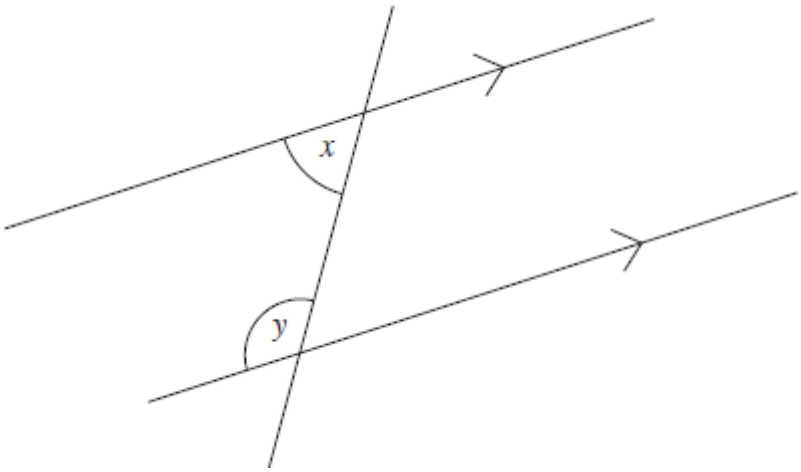
(b) Work out the value of x.

x = _____ degrees

(4)

(Total 5 marks)

Q5.



(a) Use the diagram to write an equation connecting x and y.

Answer _____

(1)

(b) The ratio $x : y = 2 : 3$

Use this information to write another equation connecting x and y.

_____

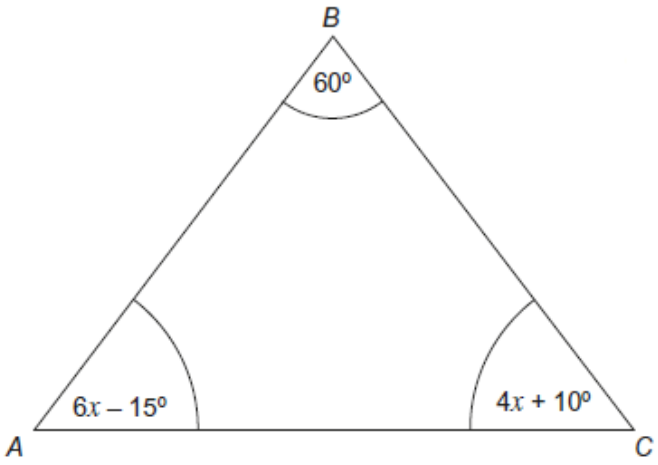
_____

Answer _____

(1)

(Total 2 marks)

Q6. Show that *ABC* is an equilateral triangle.



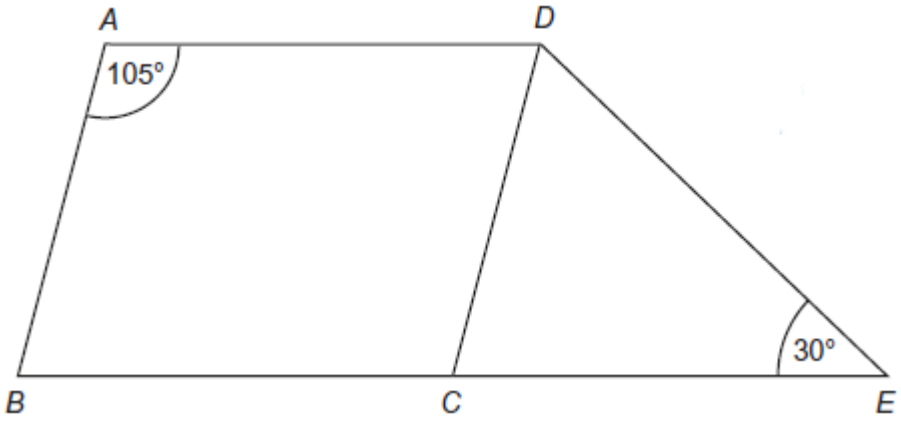
_____

_____

_____

(Total 5 marks)

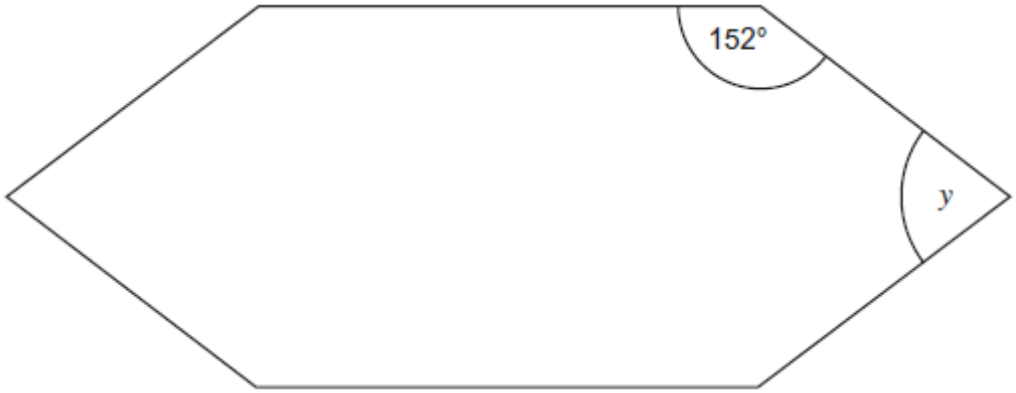
Q7. A parallelogram *ABCD* and a triangle *DCE* are joined as shown. *BCE* is a straight line.



Show that *DCE* is an isosceles triangle. You **must** show your working.

(Total 4 marks)

Q8. This hexagon has two lines of symmetry.



Work out the size of angle y.

Answer _____ degrees

(Total 3 marks)

Linear Equations

Q1. Solve $4x - 5 = 17$

$x =$ _____

(Total 2 marks)

Q2. Solve $12x = 3$

Circle your answer.

$x = -9$ $\quad x = \frac{1}{4}$ $\quad x = 4$ $\quad x = 36$

(Total 1 mark)

Q3. Solve $4(x + 5) = 15$

$x =$ _____

(Total 3 marks)

Q4. Solve $7x - 9 = 3x + 23$

$x =$ _____

(Total 3 marks)

Q5.

Solve $4(x - 5) = x + 7$

$x =$ _____

(Total 3 marks)

Q6.

Solve $2x + 3 + \frac{4x - 1}{2} = 10$

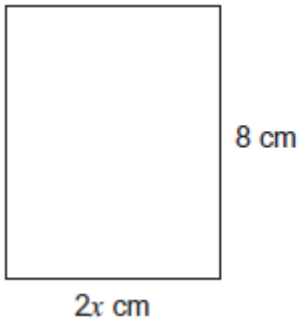
Do **not** use trial and improvement.

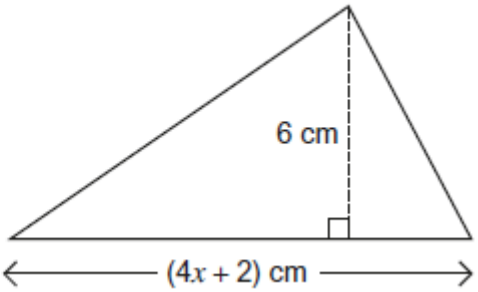
$x =$ _____

(Total 4 marks)

Q7.

The area of the rectangle and the area of the triangle are equal.





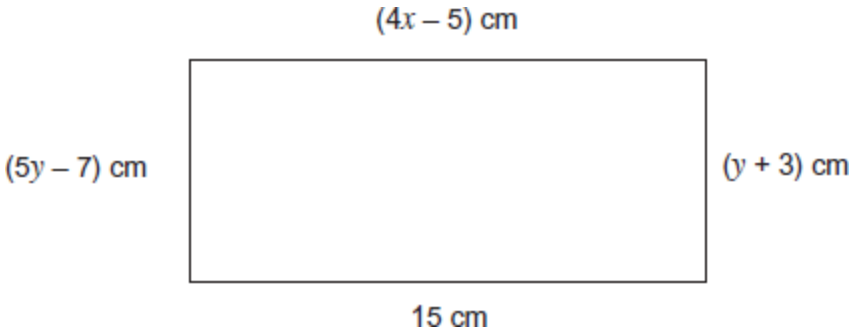
Work out the value of x.

x = _____

(Total 4 marks)

Q8.

The diagram shows a rectangle.



(a) Set up and solve an equation to work out the value of x.

x = _____

(3)

(b) Work out the area of the rectangle.

Answer _____ cm^2

(5)

(Total 8 marks)

Averages

Q1.

Here is a list of numbers.

0 3 5 7 12 29

(a) Write down **three** numbers from the list with a median of 7.

Answer _____ , _____ and _____

(1)

(b) Write down **three** numbers from the list with a range of 7.

_____

_____

Answer _____ , _____ and _____

(1)

(c) Find **three** numbers from the list with a mean that is a whole number.

_____

_____

Answer _____ , _____ and _____

(2)

(d) Find **three** numbers from the list with the range double the median.
Write down the values of the range and median.

_____

_____

_____

_____

_____

Answer _____ , _____ and _____

Range = _____ Median = _____

(3)

(Total 7 marks)

Q2. Five integers have

a mode of 6
a median of 8
a mean of 10

What is the **greatest** possible range of the five integers?

You **must** show your working.

Answer _____

(Total 3 marks)

Q3. Adam and six other men ran a race.
The times, in seconds, of the six other men are shown.

9.75 9.79 9.80 9.88 9.94 9.98

The mean time for **all** seven men was 9.83 seconds. Did Adam win the race?

You **must** show your working.

(Total 3 marks)

Q4.

The table shows information about the marks of 30 students in a test.

Mark	Frequency
14	2
15	10
16	2
17	3
18	13
	Total = 30

Students who scored less than the mean mark have to retake the test.

How many students have to retake the test?

You **must** show your working.

Answer _____

(Total 3 marks)

Q5. The table shows information about the pay per hour of 40 people.

Pay per hour, x (£)	Frequency		
$5 < x \leq 15$	14		
$15 < x \leq 25$	12		
$25 < x \leq 35$	11		
$35 < x \leq 45$	2		
$45 < x \leq 55$	1		
	Total = 40		

(a) Which group contains the median pay per hour? Circle your answer.

$5 < x \leq 15$ $15 < x \leq 25$ $25 < x \leq 35$ $35 < x \leq 45$ $45 < x \leq 55$

(1)

(b) Work out an estimate of the mean pay per hour.

Answer £ _____

(4)

(Total 5 marks)

Q6. Paula records the times she takes to run 30 marathons.

Time , t (minutes)	Frequency	Midpoint	
$200 < t \leq 240$	16		
$240 < t \leq 280$	4		
$280 < t \leq 320$	4		
$320 < t \leq 360$	0		
$360 < t \leq 400$	2		
$400 < t \leq 440$	0		
$440 < t \leq 480$	2		
$480 < t \leq 520$	2		

(a) Write down the modal class.

Answer _____ < t ≤ _____

(1)

(b) Use midpoints to calculate an estimate of the mean time Paula takes.

_____

_____

_____

_____

_____

Answer _____ minutes

(3)

Q7.

The table shows information about water used in a household.
The value for April is missing.

Month	**Water used (m^3)**
January	16.2
February	18.1
March	15.9
April	
May	17.8
June	21.0

The mean monthly water used for the six months is 18 m^3

Work out the value for April.

_____

_____

_____

_____

Answer _____ m^3

(Total 3 marks)

Q8. These expressions represent four numbers.

$2x + 2$	$3x - 1$	$4x - 6$	$5x + 2$

The sum of the first two expressions is 36. Work out the median of the four numbers.

Answer _____

(Total 5 marks)

Q9. Here is information about the scores, t, of class A in a test.

Score	Frequency		
$0 < t \leq 10$	4		
$10 < t \leq 20$	8		
$20 < t \leq 30$	9		
$30 < t \leq 40$	3		
$40 < t \leq 50$	1		

The mean score for class B in the same test is 22

Dan says, "On average, class A did better than class B."

Is he correct? You **must** show your working.

Answer _____

Area

Q1. A shape is made from a rectangle R and a square S.

The shape has a perimeter of 44 cm. The area of the square is 36 cm^2

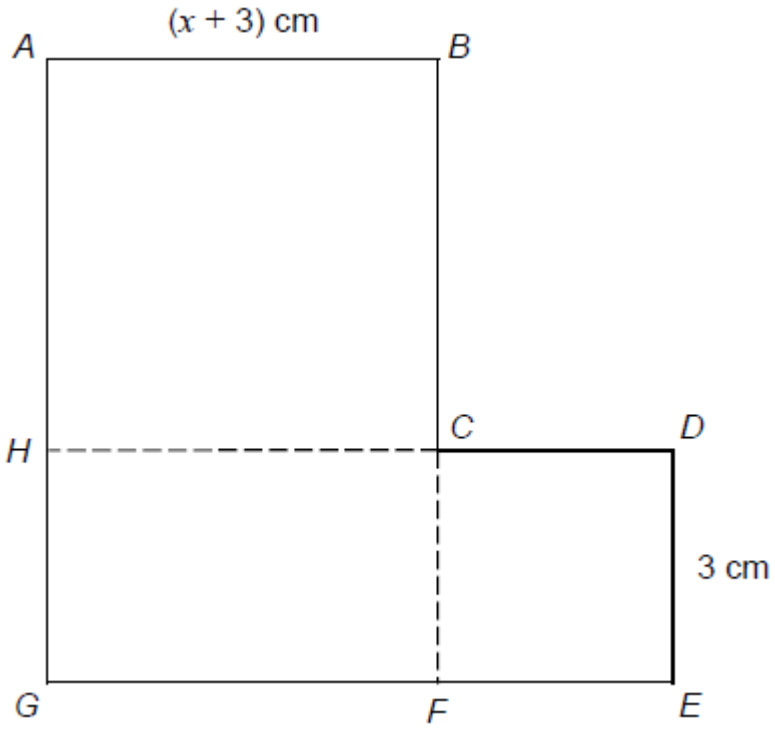
Work out the area of the shape.

Answer _____ cm^2

(Total 4 marks)

Q2(H). *ABCH* is a square. *HCFG* is a rectangle. *CDEF* is a square.

They are joined to make an L-shape.

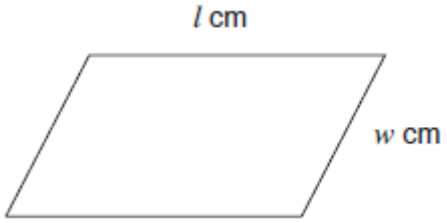


Show that the total area of the L-shape, in cm², is $x^2 + 9x + 27$

(Total 4 marks)

Q3.

(a)

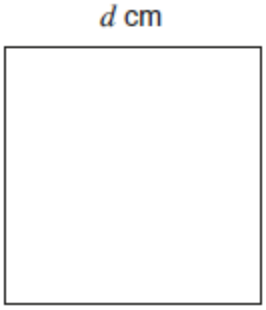


The perimeter of the parallelogram is P cm. Circle the correct formula.

$P = l + w$ $\quad$ $P = lw$ $\quad$ $P = 2(l + w)$ $\quad$ $P = 2lw$

(1)

(b)

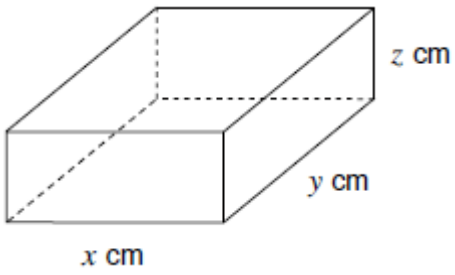


The area of the square is A cm^2 Circle the correct formula.

$A = 2d$ $\quad$ $A = 4d$ $\quad$ $A = \sqrt{d}$ $\quad$ $A = d^2$

(1)

(c)



The surface area of the cuboid is S cm^2

Circle the correct formula.

$S = xyz$ $\quad$ $S = (xyz)^2$ $\quad$ $S = 6xyz$ $\quad$ $S = 2(xy + xz + yz)$

(1)

(d) The surface area of a **cube** is 150 cm^2

Work out the volume of the cube.

Answer _____ cm^2

(4)

(Total 7 marks)

Q4.

Field A is a rectangle with sides of 30 m and 70 m

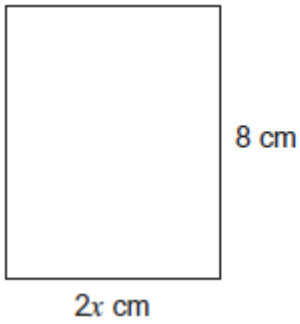
Field B is a square with the same **perimeter** as Field A.

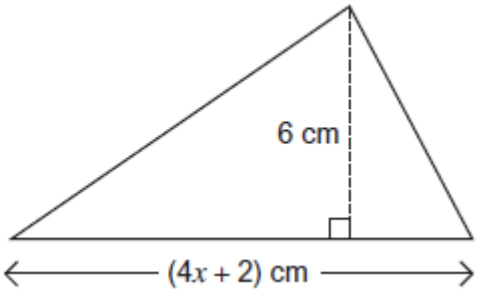
How much bigger in area is Field B than Field A?
You **must** show your working.

Answer _____ m^2

(Total 4 marks)

Q5. The area of the rectangle and the area of the triangle are equal.



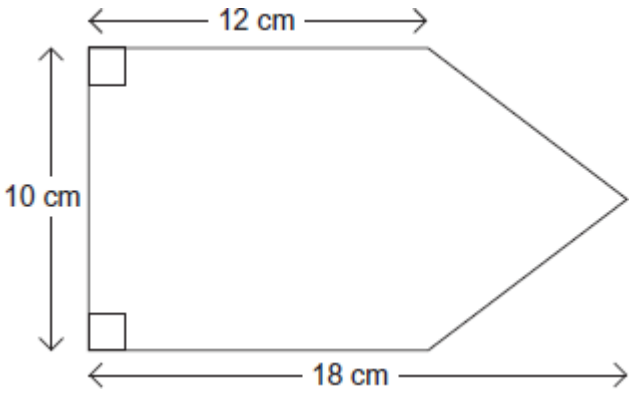


Work out the value of x.

x = _____

(Total 4 marks)

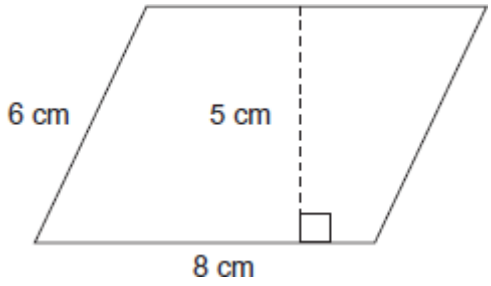
Q6. Work out the area of this pentagon.



Answer _____ cm^2

(Total 3 marks)

Q7.(a) Work out the area of this parallelogram.



State the units of your answer.

_____

_____

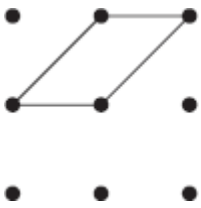
_____

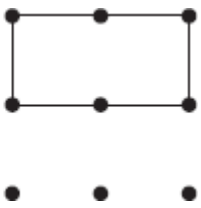
Answer _____

(3)

(b) Phoebe is drawing quadrilaterals on a nine-point square grid by joining points.

For example





She says,

"If you draw a quadrilateral it will **always** have line or rotational symmetry."

Draw a quadrilateral on the grid below to show that Phoebe is wrong.
Use the first two grids for practice and the bottom grid for your answer.

Practice grids

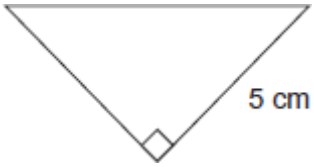
Answer grid

(1)

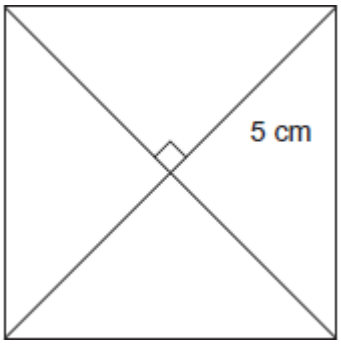
(Total 4 marks)

Q8.

Here is a right-angled triangle.



Four of these triangles are joined to make a square as shown.



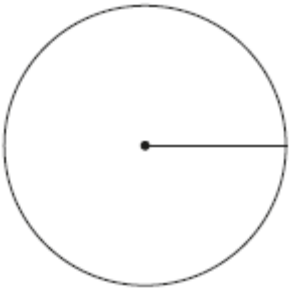
Work out the area of the square.

Answer _____ cm^2

(Total 3 marks)

Circles

Q1.(a) The radius of this circle is 2.5 cm



Work out the area. Give your answer to 1 significant figure..

_____

_____

Answer _____ cm^3

(3)

(b) The diameter of this semicircle is 16 cm

Work out the perimeter of the semicircle.

_____

_____

_____

_____

_____

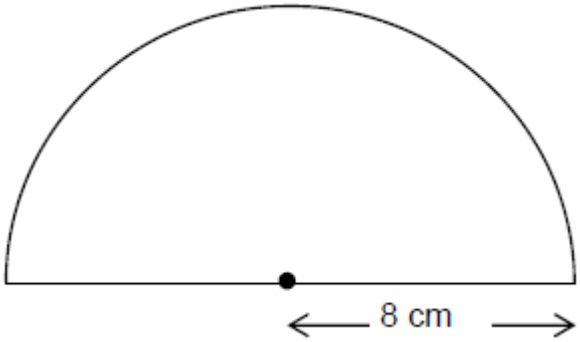
Answer _____

(3)

(Total 6 marks)

Q2.

The diagram shows a semicircle of radius 8 cm

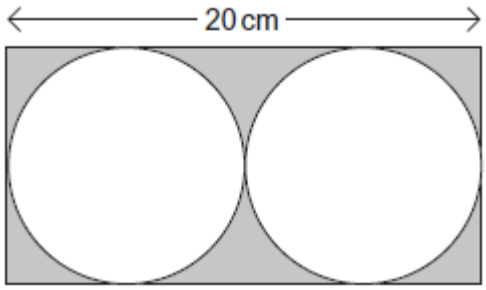


Work out the area of the semicircle. Give your answer in terms of π.

Answer _____ cm^2

(Total 2 marks)

Q3. Two identical circles fit inside a rectangle as shown.



The length of the rectangle is 20 cm. Work out the area of the shaded section.

Answer _____ cm^2

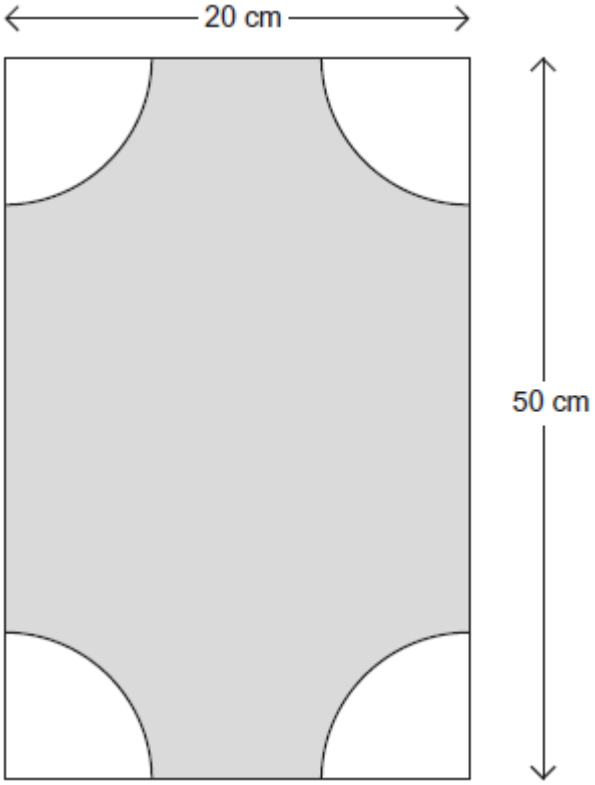
(Total 6 marks)

Q4.(a) Work out the area of a circle of radius 6 cm

Answer _____ cm^2

(2)

(b) Quarter circles of radius 6 cm are cut from the corners of a rectangle as shown.



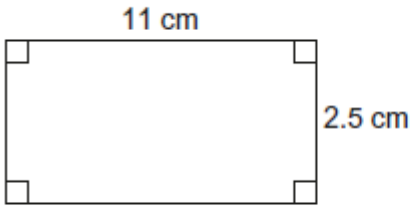
Work out the shaded area.

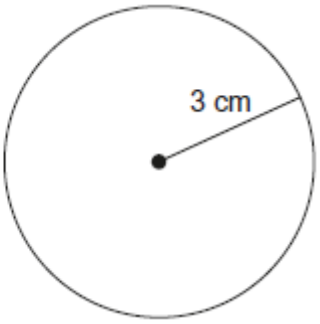
Answer _____ cm^2

(3)

(Total 5 marks)

Q5. Which has the **greater** area?



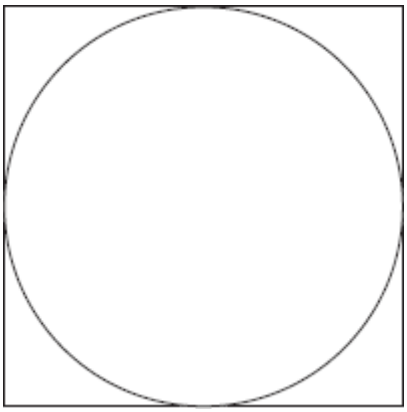


You **must** show your working.

Answer _____

(Total 3 marks)

Q6. The area of this square is 36 cm^2

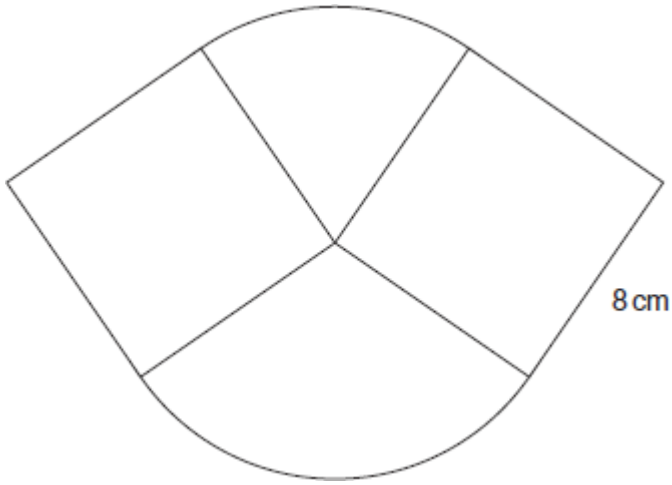


Work out the circumference of the circle.

Answer _____ cm

(Total 3 marks)

Q7(H). This shape is made from two sectors and two squares of side 8 cm.
The radius of each sector is also 8 cm.

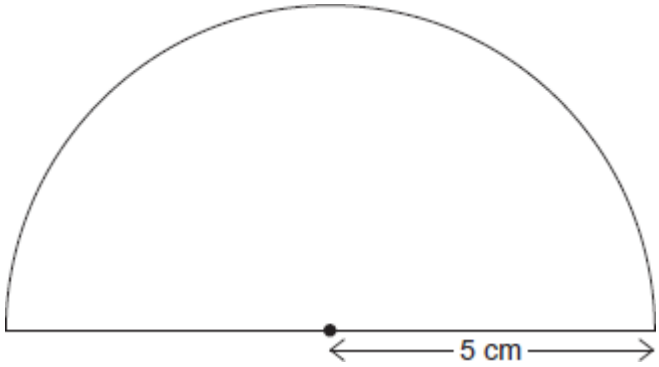


Work out the total area of the shape.

Answer _____ cm^2

(Total 4 marks)

Q8. This semi-circle has a radius of 5 cm



Work out the **perimeter** of the semi-circle. Remember to include the base.

Answer _____ cm

(Total 3 marks)

Standard Form (non-calculator)

Q1.

(a) Work out 2.4×0.002

Answer _____

(1)

(b) Write 1.2×10^{-5} as an ordinary number.

Answer _____

(1)

(c) Write 2 500 000 in standard form.

Answer _____

(1)

(Total 3 marks)

Q2.

(a) Write 0.000 583 in standard form.

Answer _____

(1)

(b) Write 9.416×10^5 as an ordinary number.

Answer _____

(1)

(c) Divide 7200 million by 300. Give your answer in standard form.

Answer _____

(3)

(Total 5 marks)

Q3.(a) Write 0.000 72 in standard form.

Answer _____

(1)

(b) Divide 80 million by 20 000. Write your answer in standard form.

Answer _____

(3)

(Total 4 marks)

Q4.(a) Work out $2 \times 10^6 \times 8 \times 10^4$ Give your answer in standard form.

Answer _____

(2)

(b) Work out $\frac{2 \times 10^6}{8 \times 10^4}$

Give your answer as an ordinary number.

Answer _____

(2)

(Total 4 marks)

Q5. Work out the value of $5.4 \times 10^5 \times 2 \times 10^{-2}$

Give your answer in standard form.

Answer _____

(Total 2 marks)

Q6. (a) Write the number 0.000 000 7 in standard form.

Answer _____

(1)

(b) Write 3×10^5 as an ordinary number.

Answer _____

(1)

(c) Work out $4 \times 10^3 \times 8 \times 10^5$

Give your answer in standard form.

Answer _____

(2)

(Total 4 marks)

Q7. Here is a list of numbers.

1 000 000 4.6×10^4 63 000 5×10^3 1.7×10^5

Work out the range. Write your answer in standard form.

Answer _____

(Total 4 marks)

Q8.

Write the number 4540 million in standard form.

Answer _____

(Total 2 marks)

Upper and Lower Bounds

Q1. x = 2500 to the nearest 100

Circle the smallest possible value of x.

2449 2450 2495 2499

(Total 1 mark)

Q2. The maximum safe load of a bridge is 1500 kg to the nearest 10 kg.
An average soldier is 75 kg to the nearest kilogram.

Work out an estimate for the maximum number of soldiers that can **safely** cross the bridge at the same time.

Answer _____

(Total 5 marks)

Q3.

A shelf supports 80 kg, to the nearest kilogram.
Bottles weigh 1.4 kg each, to the nearest tenth of a kilogram.

Work out the greatest number of bottles that can definitely be supported by the shelf.

Answer _____

(Total 4 marks)

Q4. A home gym can take a maximum load of 145 kg of weight plates.
Each weight plate is 10 kg to the nearest kilogram.

Work out the **greatest** number of weight plates that can be safely loaded on the gym.
You **must** show your working.

Answer _____

(Total 4 marks)

Q5.

Amy and Kate each catch three fish.
The weight of each fish, to the nearest tenth of a kilogram, is shown.

Amy	6.8 kg	4.3 kg	5.2 kg
Kate	8.2 kg	3.4 kg	4.5 kg

Kate says that the total weight of her fish is more than the total weight of Amy's fish.

Show that this could be true.

(Total 4 marks)

Q6.

Bags of nails weigh 200 grams each.

Boxes of screws weigh 140 grams each.

Both measurements are given to the nearest 10 grams.

Show that 4 bags of nails **could** weigh the same as 6 boxes of screws.

(Total 3 marks)

Q7(H).

x = 400 to 1 significant figure.
y = 25 to 2 significant figures.

Work out the maximum **integer** value of $\frac{x}{y}$

Answer _____

(Total 3 marks)

Expanding and Factorising

Q1.(a) Multiply out $3(2x - 7)$

Answer _____

(1)

(b) Factorise $x^2 + 8x$

Answer _____

(1)

(Total 2 marks)

Q2. Expand and simplify $6(x - 3) - 4(x - 5)$

Answer _____

(Total 3 marks)

Q3(H). Expand and simplify $(2x + 5)(2x - 5)(3x + 7)$

Answer _____

(Total 3 mark)

Q4. Expand and simplify $(2x + 5y)(3x - 8y)$

Answer _____

(Total 3 marks)

Q5. (a) Expand and simplify $(x + 5)(x + 9)$

Answer _____

(2)

(b) Factorise fully $5x^2 - 10xy$

Answer _____

(2)

(Total 4 marks)

Q6. (a) Multiply out $5(3x + 7)$

Answer _____

(1)

(b) Make w the subject of the formula $z = w + 3$

Answer _____

(1)

(c) Factorise fully $4y^2 + 6y$

Answer _____

(2)

(Total 4 marks)

Q7.

(a) Expand and simplify $4(x - 2) - 2(3 - 5x)$

Answer _____

(3)

(b) Simplify fully $\dfrac{8a^2 + 10ab}{12a + 15b}$

Answer _____

(3)

(Total 6 marks)

Q8. Expand and simplify $3(2x + 5) - 2(x - 4)$

Answer _____

(Total 3 marks)

Percentages / Compound Interest

Q1. Circle the calculation that increases 400 by 7%

400 × 0.07 400 × 0.7 400 × 1.07 400 × 1.7

(Total 1 mark)

Q2. In 1999 the minimum wage for adults was £3.60 per hour.

In 2013 it was £6.31 per hour.

Work out the percentage increase in the minimum wage.

Answer _____ %

(Total 3 marks)

Q3. Sophie sells birthday cards.

She adds 30% profit to the cost price.
She sells the cards for £2.34 each.
She wants to increase her profit to 40% of the cost price.

How much should she sell each card for?

Answer £ _____

(Total 3 marks)

Q4. Increase 4200 by 38%

Answer _____

(Total 2 marks)

Q5. Work out 258% of 6300

Answer _____

(Total 2 marks)

Q6. Work out 51% of 400

Answer _____

(Total 2 marks)

Q7. Nick went to a football training camp.

(a) He weighed 80 kg before the training camp.
He weighed 74 kg after the training camp.

Work out his percentage weight loss.

Answer _____ %

(3)

(b) Nick's backpack weighs 12 kg to the nearest kilogram.

What is the least the backpack could weigh? Circle the correct answer.

11.4 kg 11.5 kg 11.6 kg 11.9 kg 12 kg

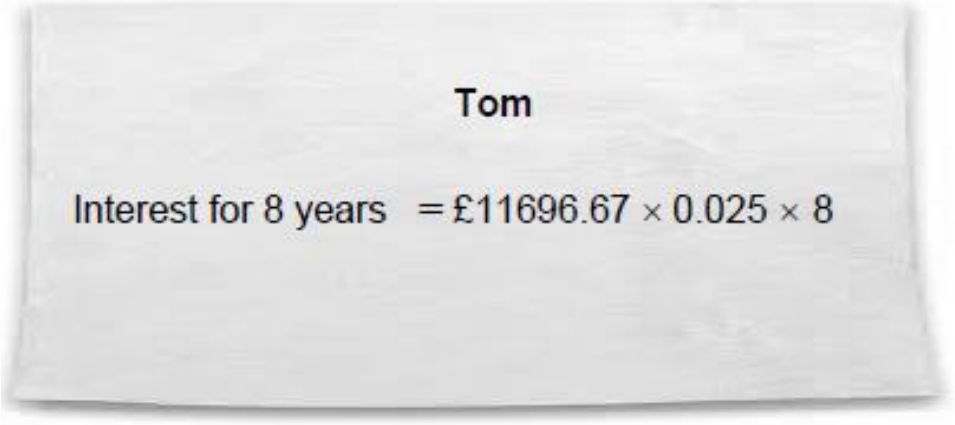
(1)

(Total 4 marks)

Q8.

An amount of money was invested for 8 years.
It earned **compound** interest at 2.5% per year.
After 8 years the total value of the investment was £11 696.67

(a) Tom is trying to work out the total interest earned.



State what is wrong with Tom's method.

_____

_____

(1)

(b) Work out the total interest earned.

_____

_____

_____

_____

_____

Answer £ _____

(3)

(Total 4 marks)

Q9. £1800 is invested at 4% compound interest per year.

How many years will it take for the investment to be worth £2000?

Answer _____ years

(Total 4 marks)

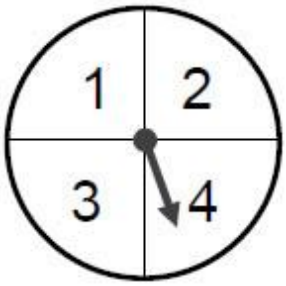
Q10. David invests £5000 in a savings account.
The account pays 3.2% compound interest per year.

Work out the value of his investment after 3 years.
Give your answer to the nearest penny.

Answer £ _____

(Total 4 marks)

Probability



Q1. A game is played with a fair spinner.

The player spins the spinner twice. The score is the **difference** between the two numbers.

(a) Complete the table to show the scores.

		First spin			
		1	**2**	**3**	**4**
Second spin	**1**			2	
	2				
	3	2			
	4				

(2)

(b) The player **loses** if the score is 0 or 1
The player **wins** if the score is 2 or 3

Amy says,

"Two scores win and two scores lose, so the chance of winning is evens."

Is Amy correct?

Yes ☐ No ☐

Tick a box. Give a reason for your answer.

_____

_____

_____

_____

(2)

(Total 4 marks)

Q2.

50 cars arrive at a car park. The table shows the number of people in each car.

Number of people	Number of cars
1	9
2	12
3	18
4	7
5	4

(a) One of the cars is chosen at random.

Work out the probability that there are **more than 3** people in the car.

Answer _____

(2)

(b) Work out the total number of people in the 50 cars.

Answer _____

(2)

(Total 4 marks)

Q3. John goes to work by car or by train.

(a) The probability that John goes by car is 0.4

Work out the probability he goes by train.

Answer _____

(1)

(b) John works for 200 days each year.

How many days would you expect him to go to work by car?

_____

_____

Answer _____

(2)

(c) Ben also goes to work by car or by train.
Out of 200 days, he went by car on 150 days.

Work out the relative frequency that Ben goes to work by car.

_____

_____

Answer _____

(1)

(Total 4 marks)

Q4. Ali has an ordinary, fair dice.

(a) Ali is going to throw the dice six times.

He says,

"I will get one of each number."

Give a reason why he could be wrong.

_____

_____

(1)

(b) Lucy throws the dice 50 times. Her results are shown.

Number thrown	1	2	3	4	5	6
Frequency	7	4	12	5	9	13

Work out the relative frequency of throwing an odd number.

_____

_____

Answer _____

(2)

(Total 3 marks)

Q5. A spinner has four sections A, B, C and D.

The table shows the probabilities of the spinner landing on A, B or C.

Outcome	A	B	C	D
Probability	0.2	0.3	0.15	

Work out the probability of landing on D.

Answer _____

(Total 2 marks)

Q6. Ann picks a 4-digit number.

The first digit is **not** zero. The 4-digit number is a multiple of 5

How many different 4-digit numbers could she pick?

Answer _____

(Total 3 marks)

Q7(H). A bag contains 10 counters. 4 of the counters are black and 6 are white.

A counter is picked out of the bag and then replaced. A second counter is picked out.

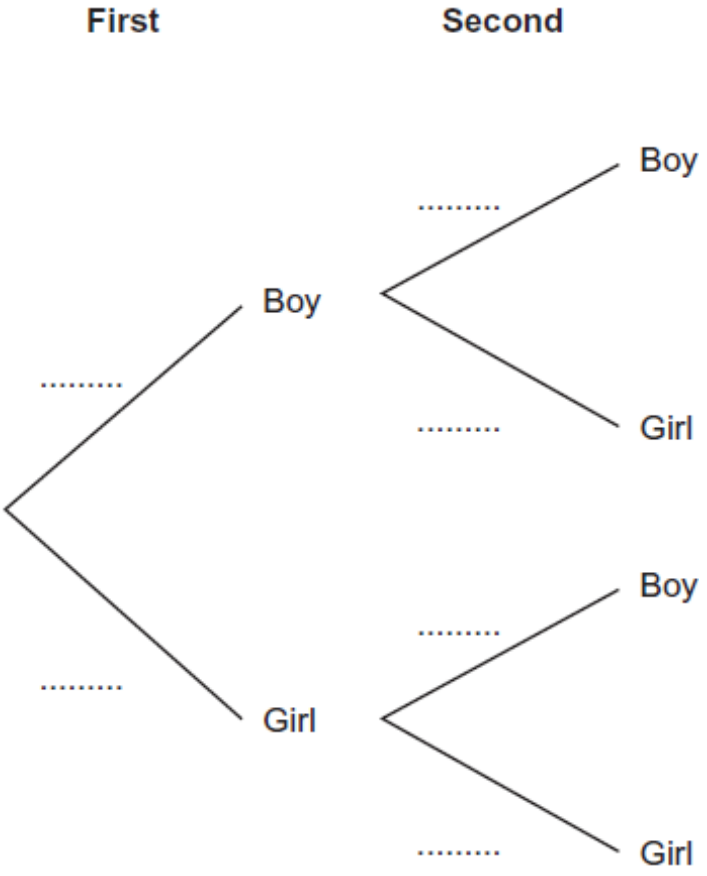
Work out the probability that they are both black.

Answer _____

(Total 3 marks)

Q8. A team has 7 boys and 3 girls. Stevie chooses two of the team at random.

(a) Complete the probability tree diagram.



(3)

(b) Work out the probability that he chooses one boy and one girl.

Answer _____

(3)

(Total 6 marks)

Solving Quadratics

Q1. Circle the equation with roots 4 and –8

$4x(x - 8) = 0$ $(x - 4)(x + 8) = 0$

$x^2 - 32 = 0$ $(x + 4)(x - 8) = 0$

(Total 1 mark)

Q2.

(a) Factorise $x^2 + 10x + 24$

Answer _____

(2)

(b) Hence or otherwise, solve $x^2 + 10x + 24 = 0$

Answer _____

(1)

(Total 3 marks)

Q3(H). (a) Expand and simplify $(6x - 1)(2x + 3)$

Answer _____

(2)

(b) Solve $4x^2 + x - 3 = 0$

Answer _____

(3)

(Total 5 marks)

Q4(H)

Solve the quadratic equation $5x^2 + 8x + 2 = 0$

Give your answers to 1 decimal place.

Answer _____

(Total 3 marks)

Q5(H).

Solve $5x^2 + 3x - 4 = 0$

Give your answers to 2 decimal places.

Answer _____ and _____

(Total 3 marks)

Q6(H).

Solve the quadratic equation $3x^2 - 12x - 5 = 0$

Give your answers to 2 decimal places.

Answer _____

(Total 3 marks)

Q7.

(a) Factorise $x^2 + 5x - 24$

Answer _____

(2)

(b) Solve $x^2 + 5x - 24 = 0$

Answer _____

(1)

(Total 3 marks)

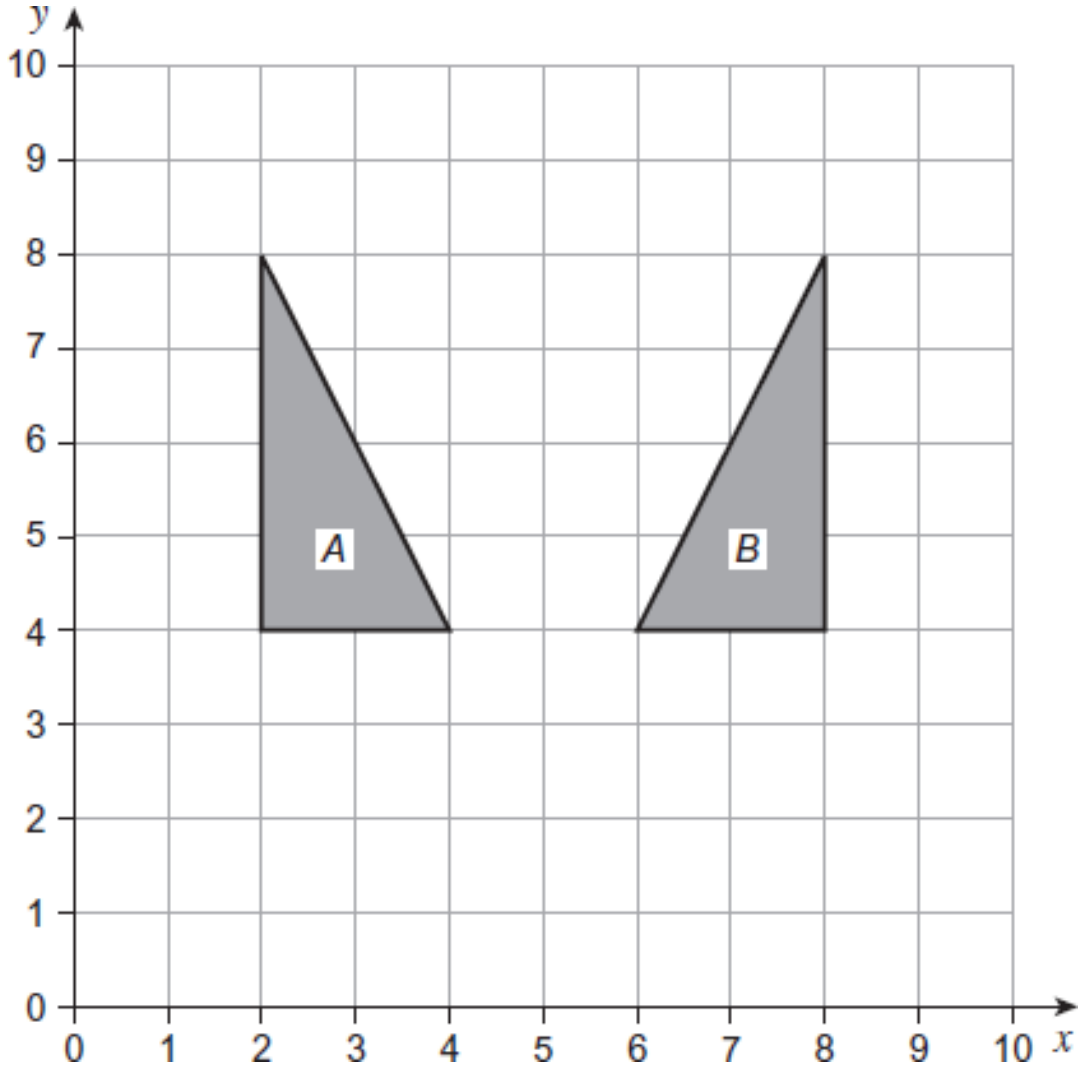
Q8. Solve $x^2 - 7x - 18 = 0$

Answer _____

(Total 3 marks)

Transformations

Q1.



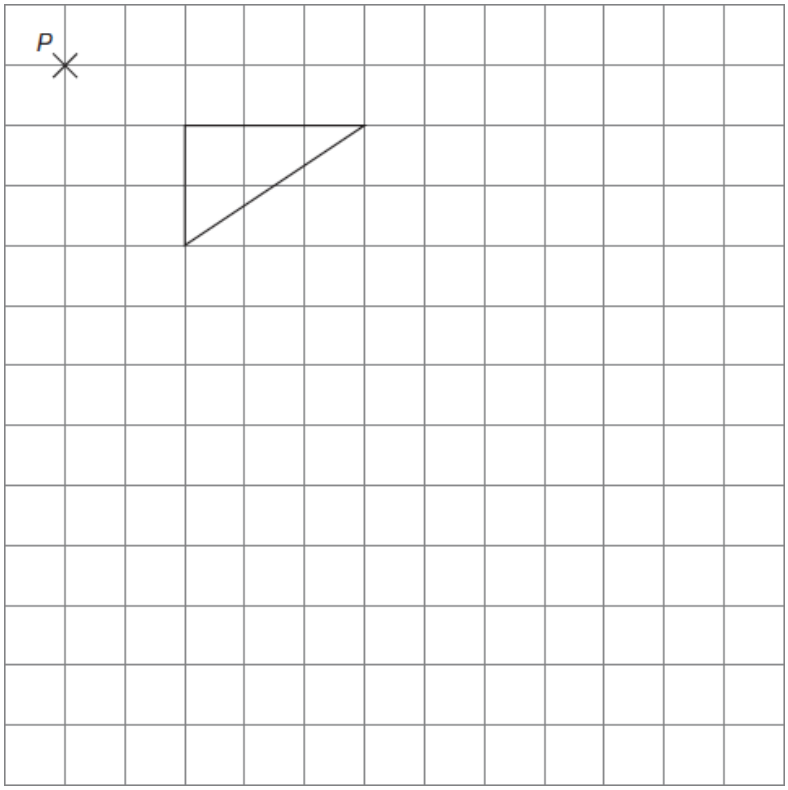
Describe fully the **single** transformation that maps shape *A* to shape *B*.

_____

_____

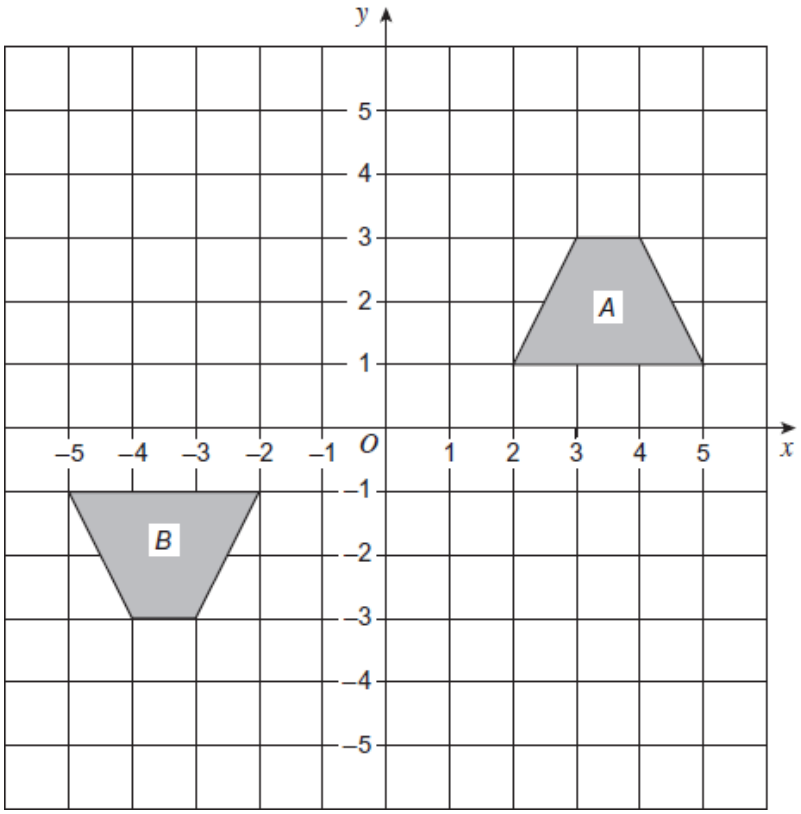
(Total 2 marks)

Q2. (a) Enlarge this shape by scale factor 2 with centre of enlargement point *P*.



(3)

(b) Describe fully the **single** transformation that maps shape *A* to shape *B*.

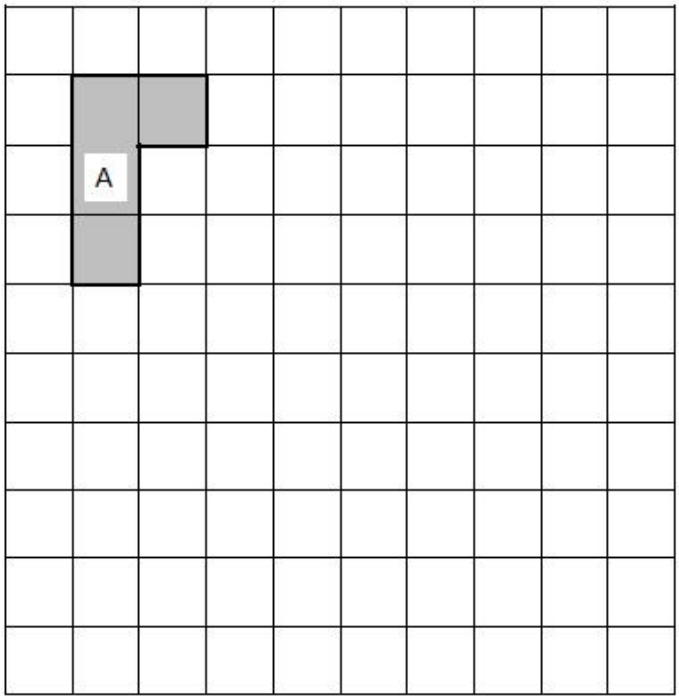


_____

_____

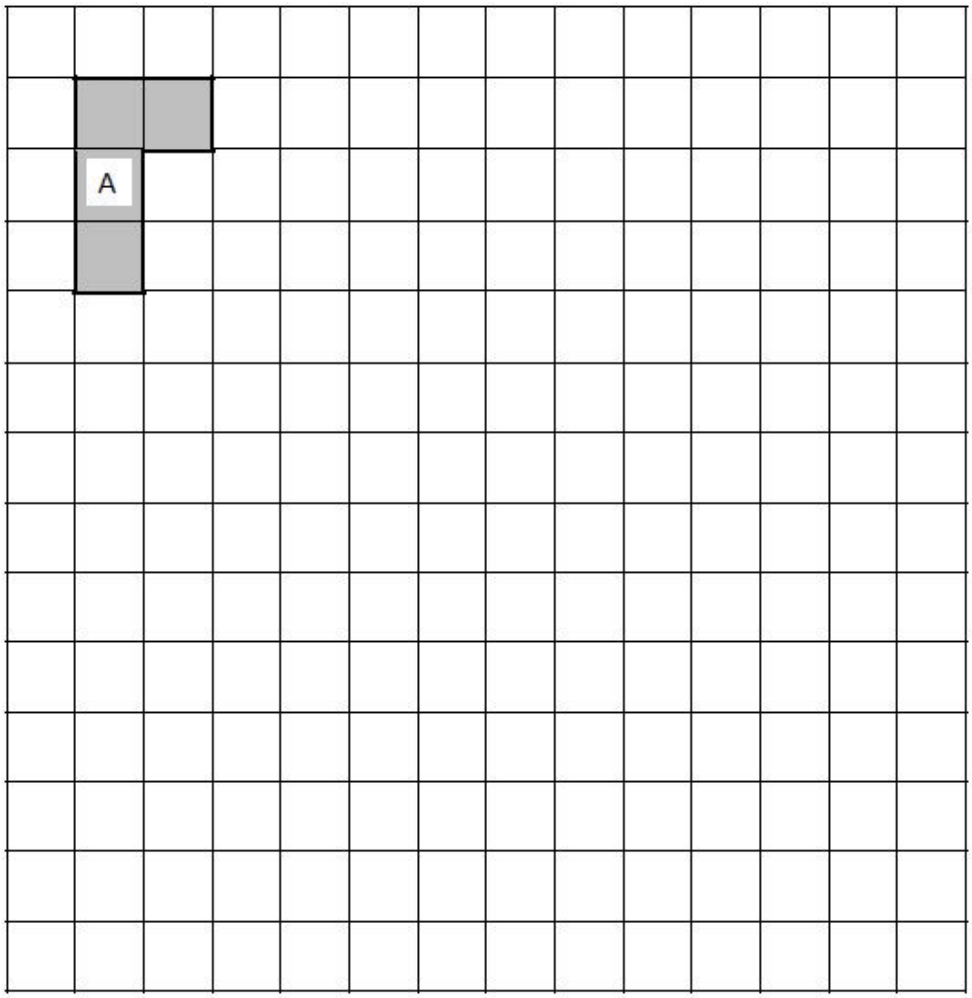
(3)

Q3.(a) On the grid draw a shape that is a reflection of shape A. Show your mirror line.



(1)

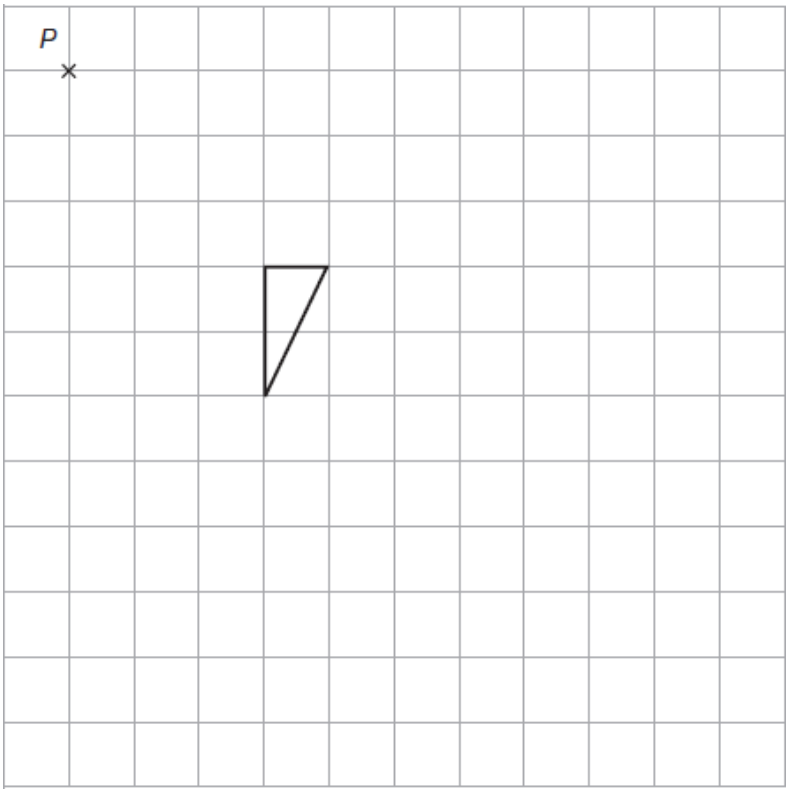
(b) On this grid draw a shape that is an enlargement of shape A.



(1)

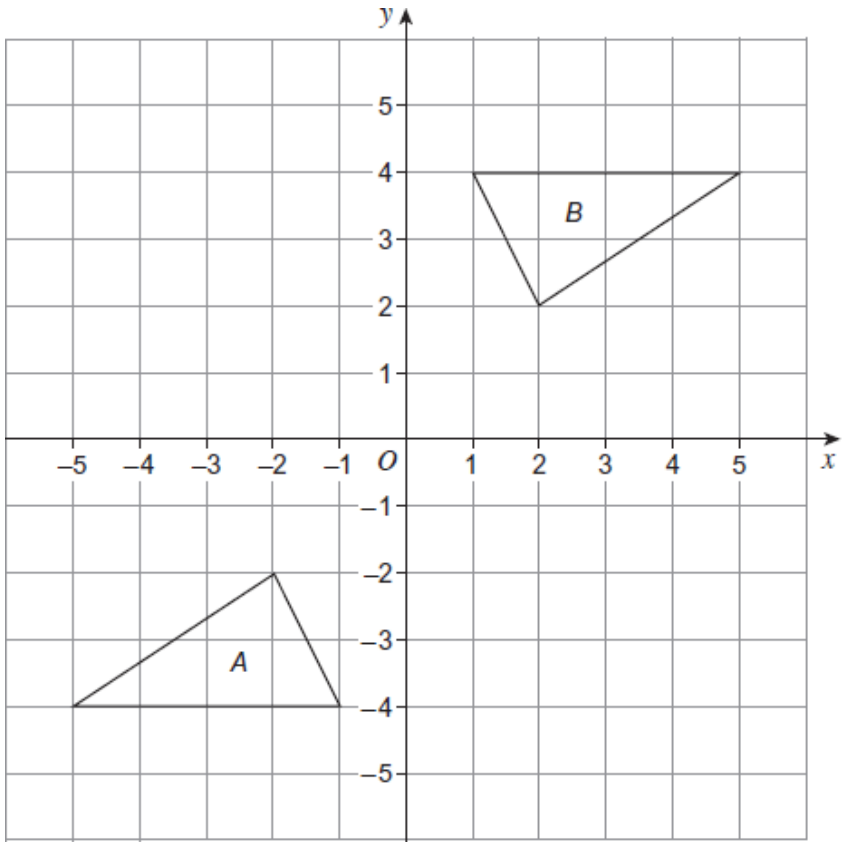
(Total 2 marks)

Q4. (a) Enlarge the triangle by scale factor 2, using point *P* as the centre of enlargement.



(3)

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

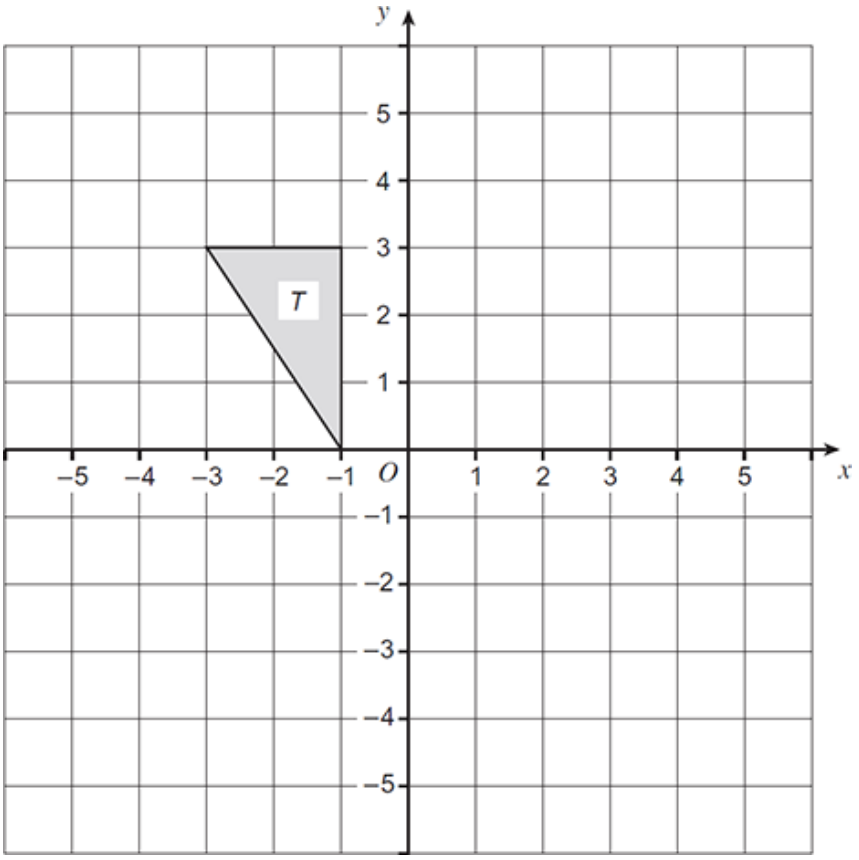


_____

_____

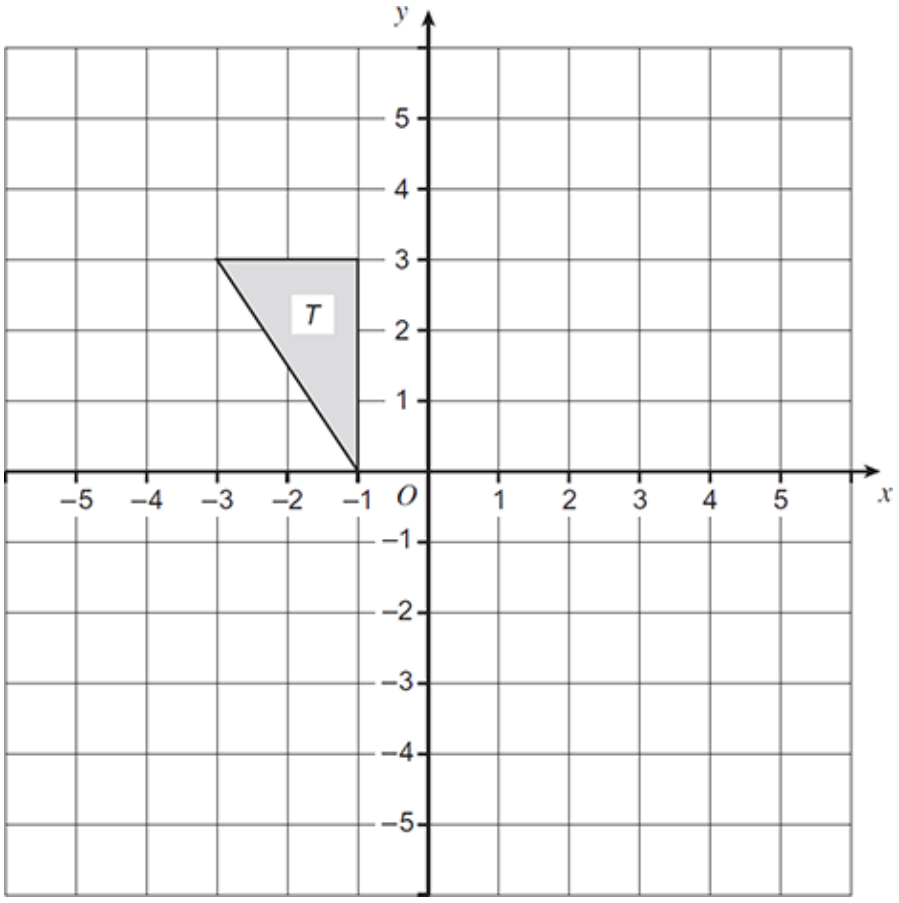
(3)

Q5. (a) Translate triangle T by the vector $\begin{pmatrix} 4 \\ -5 \end{pmatrix}$



(2)

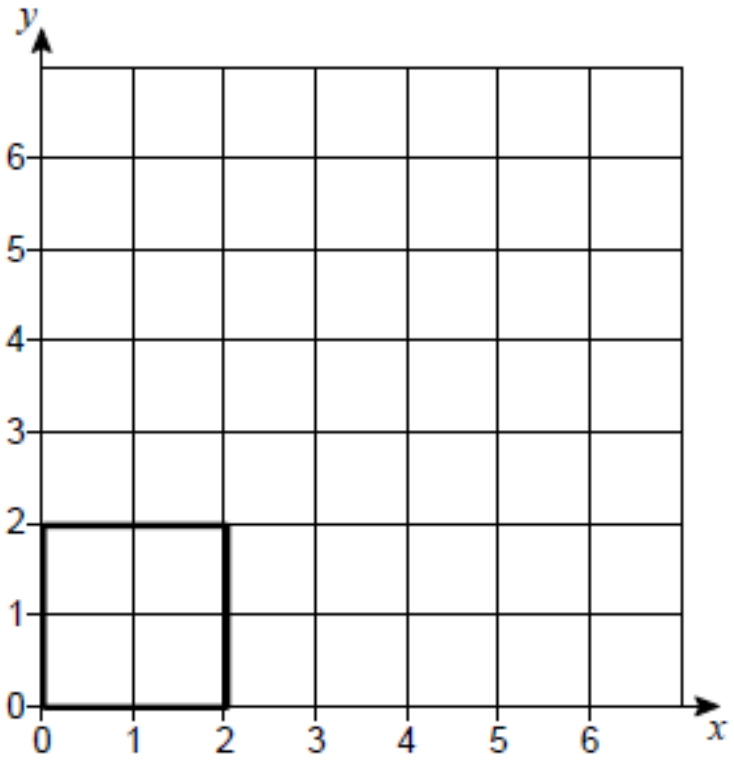
(b) Reflect triangle T in the line $y = -1$



(2)

Q6. Square *OABC* is drawn on a centimetre grid.

O is (0, 0) *A* is (2, 0) *B* is (2, 2) *C* is (0, 2)



(a) *OABC* is translated by the vector $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$

Circle the number of invariant points on the perimeter of the square.

0 1 2 4

(1)

(b) *OABC* is enlarged, scale factor 2, centre (0, 0)

Circle the number of invariant points on the perimeter of the square.

0 1 2 4

(1)

(c) *OABC* is reflected in the line $y = x$

Circle the number of invariant points on the perimeter of the square.

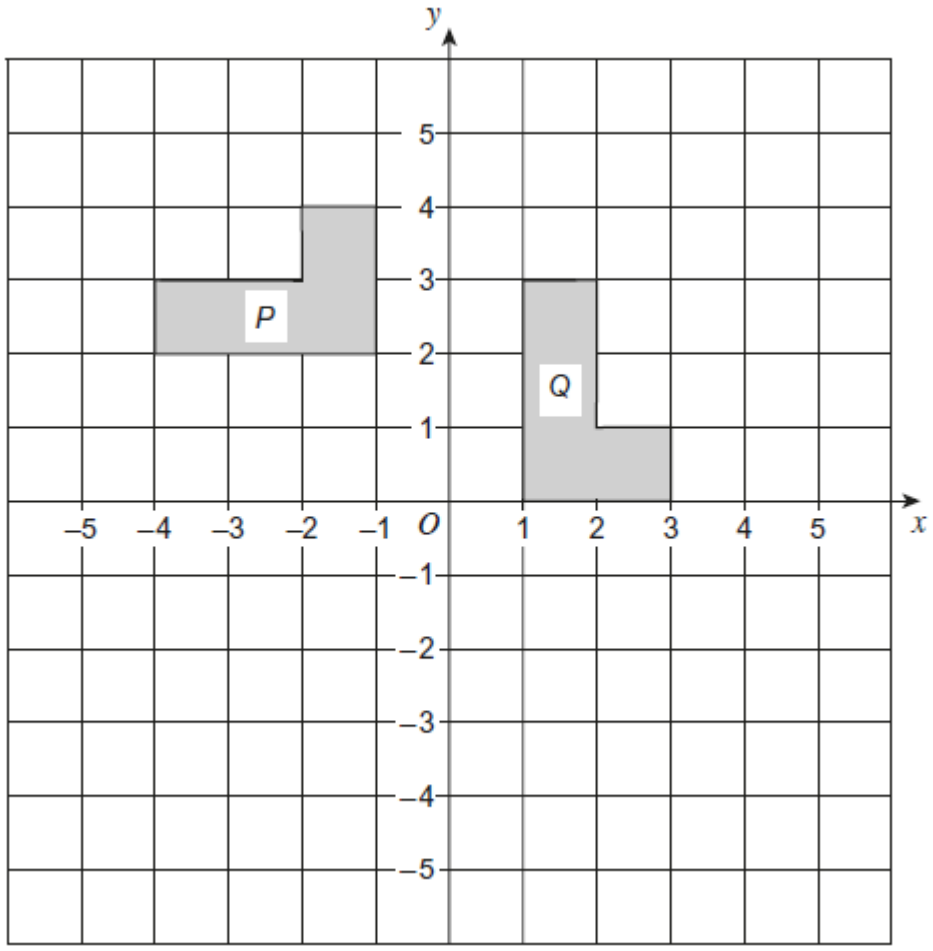
0 1 2 4

(1)

(Total 3 marks)

Q7.

(a) Describe fully the **single** transformation that maps shape *P* to shape *Q*.



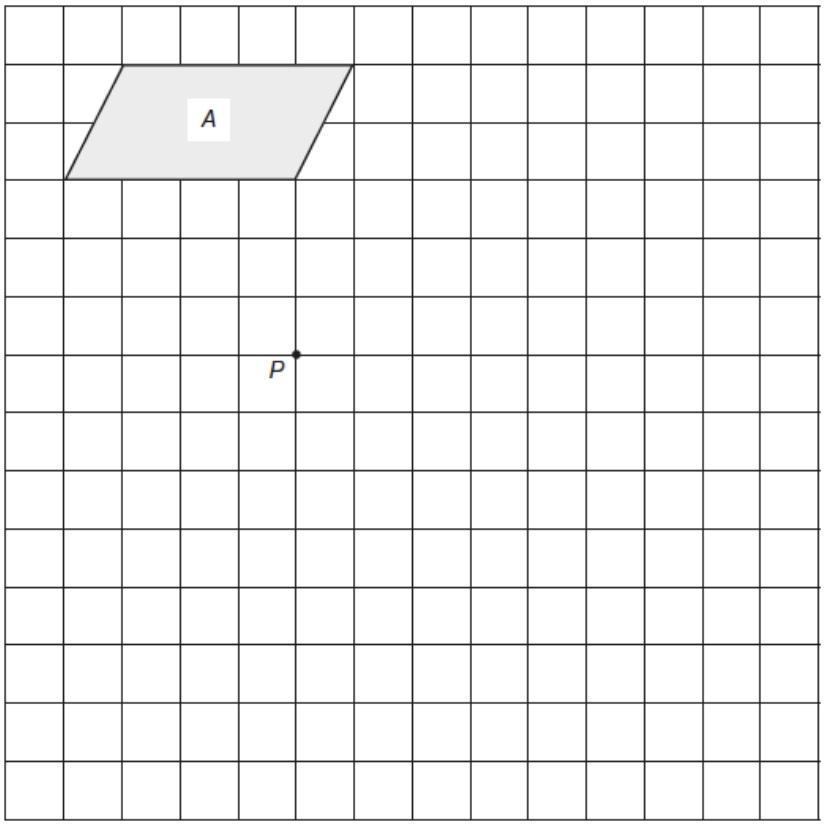
(3)

(b) On the grid, translate shape *Q* by vector $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$

(2)

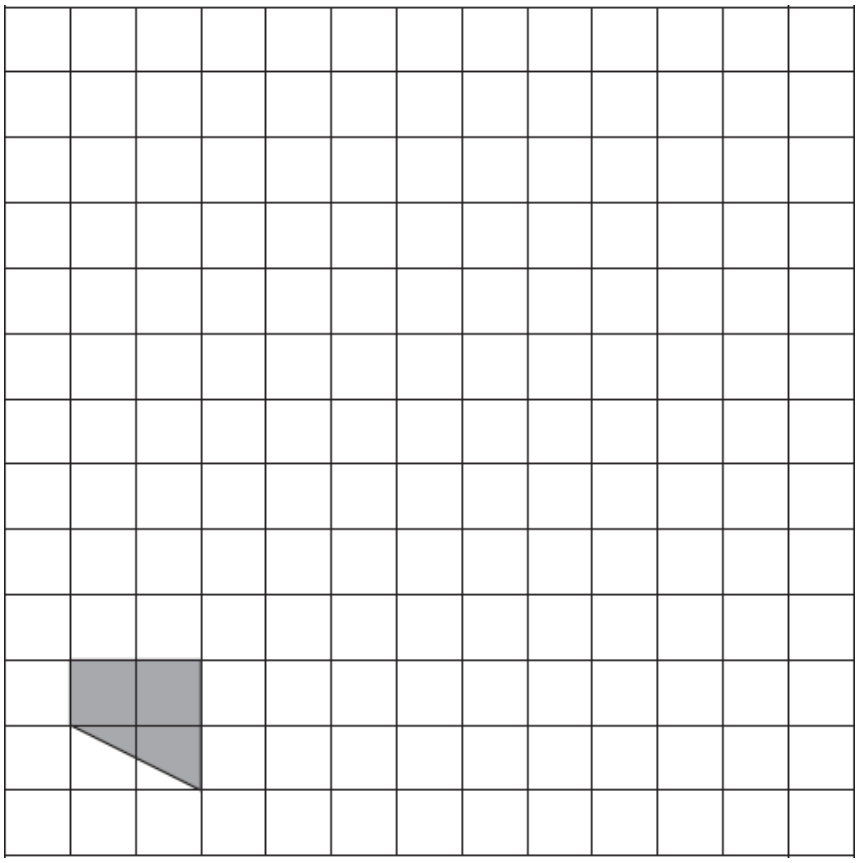
(Total 5 marks)

Q8. On this grid, rotate shape *A* by 90° clockwise about point *P*.



(Total 3 marks)

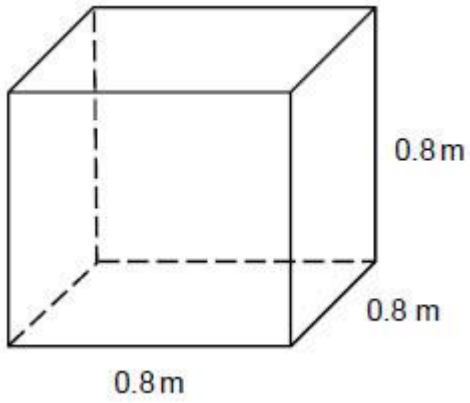
Q9. Enlarge the shape by scale factor 3



(Total 2 marks)

Volume

Q1. A cube has edges of length 0.8 metres.

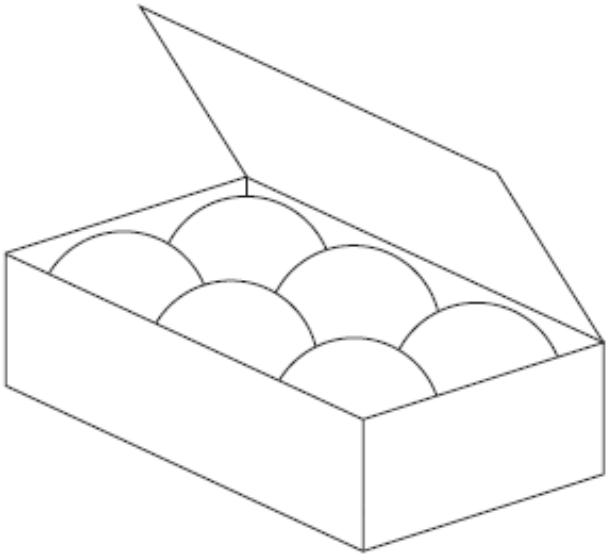


Work out its volume in **cubic centimetres**.

Answer _____ cm^3

(Total 2 marks)

Q2. Six balls just fit inside a box as shown. The balls each have a diameter of 5 cm.

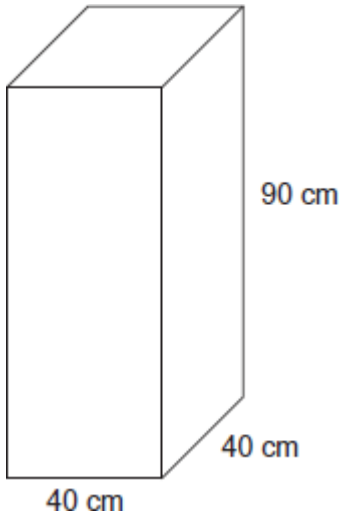


Work out the volume of the box.

Answer _____ cm^3

(Total 3 marks)

Q3. The diagram shows a water tank in the shape of a cuboid.



The tank is full of water. 1 litre = 1000 cm^3

How many gallons of water are in the tank?

_____

_____

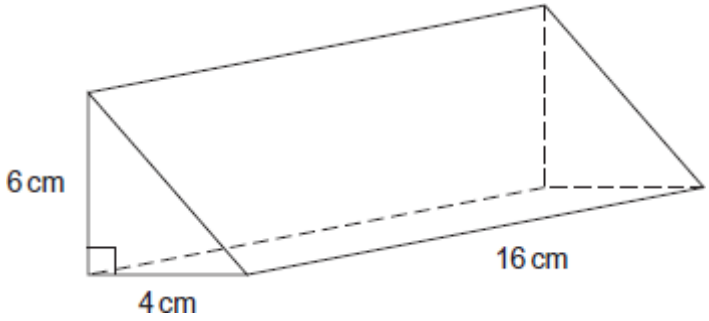
_____

_____

Answer _____ gallons

(Total 4 marks)

Q4.



Calculate the volume of the prism. State the units of your answer.

_____

_____

_____

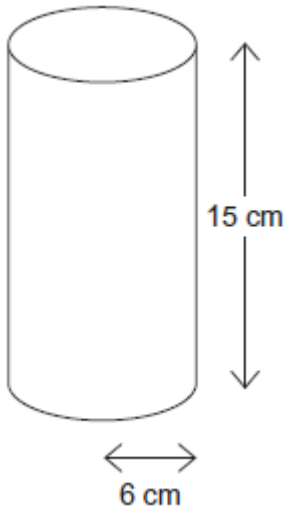
_____

Answer _____

(Total 4 marks)

Q5.

(a) The diagram shows a cylinder.



The radius of the base is 6 cm
The height is 15 cm

Work out the volume.

_____

_____

_____

Answer _____ cm^3

(3)

(b) 1000 cm^3 = 1 litre

A tank contains 45 000 cm^3 of water.
The tank leaks at 0.75 litres/minute.

How long does the tank take to empty?

_____

_____

_____

_____

_____

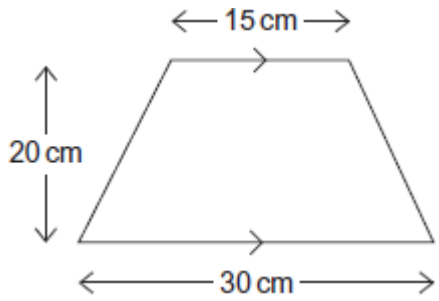
_____

Answer _____

(4)

(Total 7 marks)

Q6. The diagram shows a trapezium.

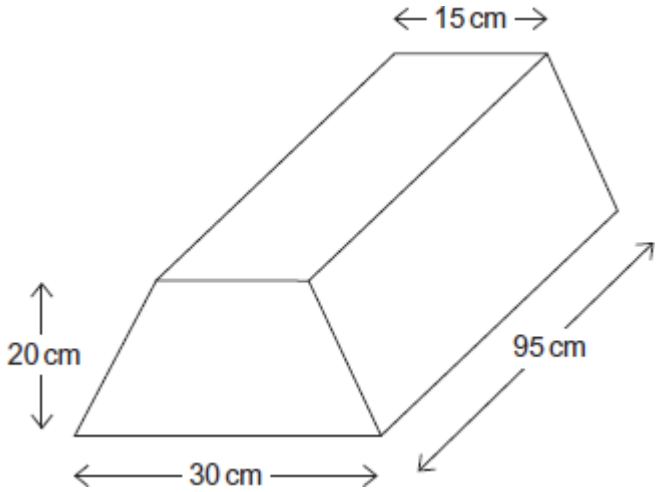


(a) Work out the area of the trapezium.

Answer _____ cm^2

(2)

(b) The trapezium is the cross-section of this prism.



Work out the volume of the prism.

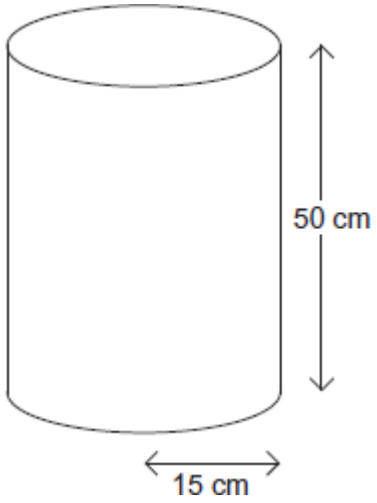
Answer _____ cm^3

(2)

(Total 4 marks)

Q7.

A tank is in the shape of a cylinder of radius 15 cm and height 50 cm



(a) Work out the volume of the tank.

_____

_____

Answer _____ cm^3

(3)

(b) The volume of another tank is 33 000 cm^3

The tank is empty.
The tank is filled at the rate of 0.22 litres a second.

How many **minutes** will it take to fill the tank?

_____

_____

_____

_____

_____

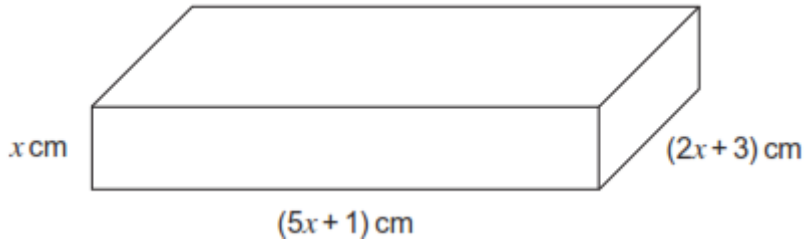
Answer _____ minutes

(4)

(Total 7 marks)

Q8(H).

The diagram shows a cuboid.
The length is $(5x + 1)$ cm.
The width is $(2x + 3)$ cm.
The height is x cm.



The length is 7 cm longer than the width.

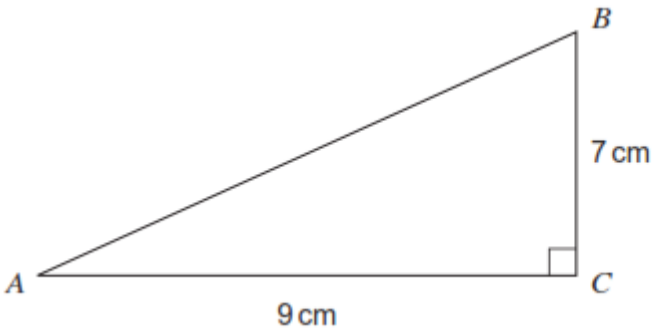
Work out the volume of the cuboid.

Answer _____ cm^3

(Total 5 marks)

Pythagoras Theorem

Q1. Work out length AB as a decimal.



Not drawn accurately

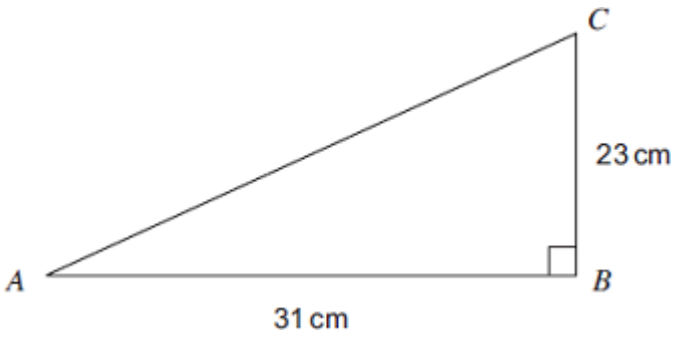
Answer _____ cm

(Total 3 marks)

Q2.

Work out the length AC.

Not drawn accurately

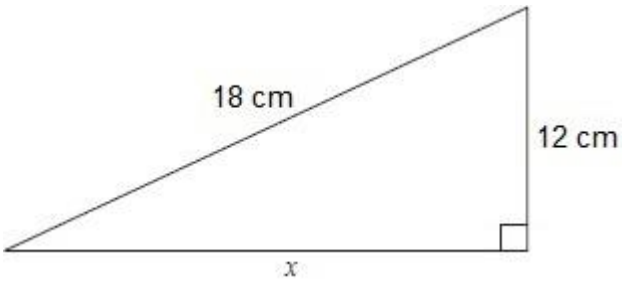


Answer _____ cm

(Total 3 marks)

Q3.

Work out the length x.



Not drawn accurately

Give your answer to 1 decimal place.

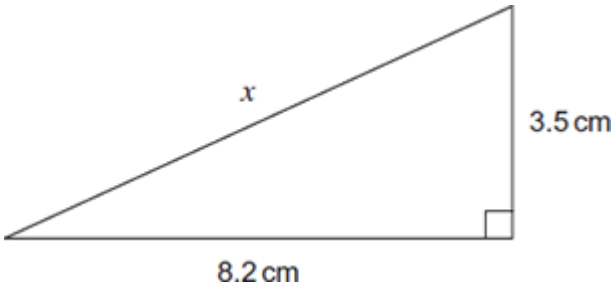
Answer _____ cm

(Total 4 marks)

Q4.

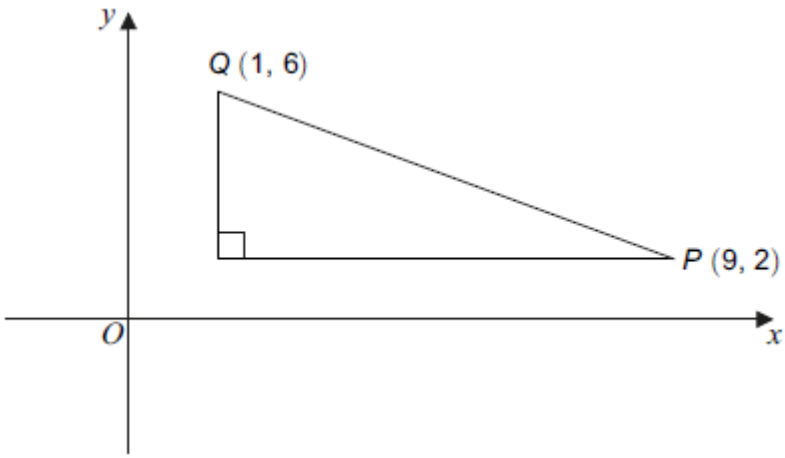
Work out the length x.

Not drawn accurately



Answer _____ cm

(Total 3 marks)



Q5.

Work out the length of *PQ*. Give your answer to 3 significant figures.

_____

_____

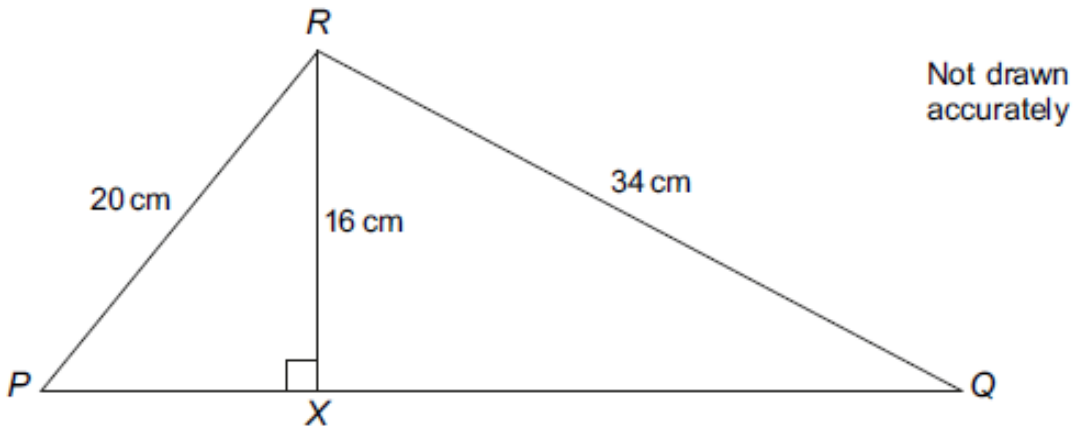
_____

_____

PQ = _____

(Total 4 marks)

Q6(H). In triangle *PQR*, *X* is a point on *PQ*. *RX* is perpendicular to *PQ*.



Work out the ratio *PX* : *XQ*. Give your answer in its simplest form.

_____

_____

_____

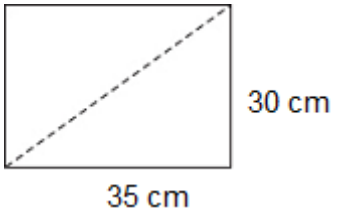
_____

_____

_____

Answer _____ : _____

Q7. (a) The diagram shows a rectangle.

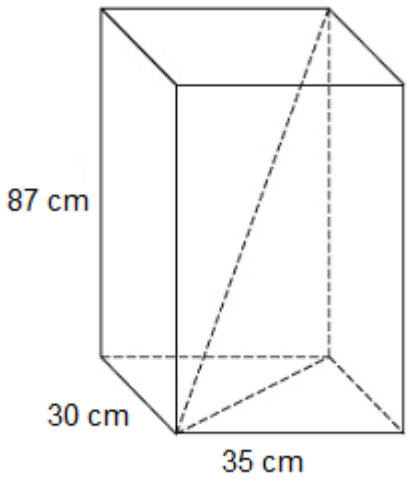


Work out the length of the diagonal.

Answer _____ cm

(3)

(b) The rectangle in part (a) is the base of this box. The box is a cuboid.



Will a straight rod of length 1 metre fit in the box?
You **must** show your working.

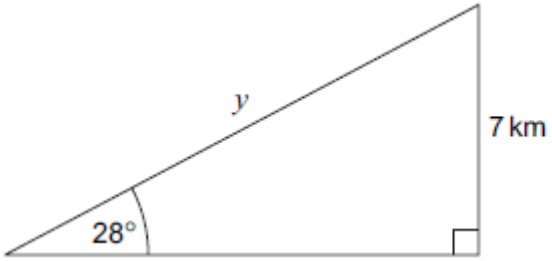
(3)

(Total 6 marks)

Trigonometry

Q1.

An aircraft flies y kilometres in a straight line at an angle of elevation of 28°.
The gain in height is 7 kilometres.



Not drawn accurately

Work out the value of y.

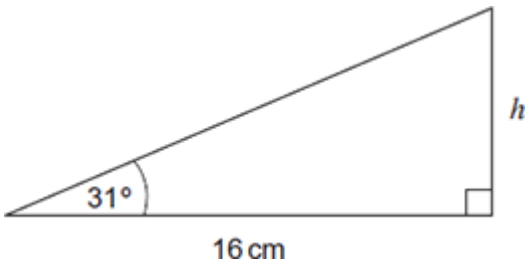
y = _____ km

(Total 3 marks)

Q2.

Work out the height h.

Not drawn accurately

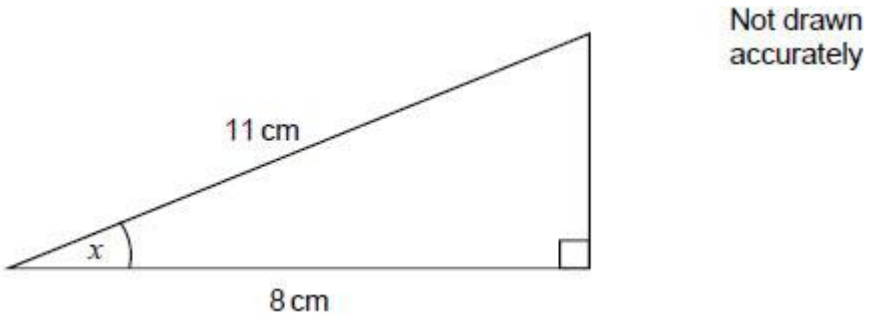


Answer _____ cm

(Total 3 marks)

Q3.

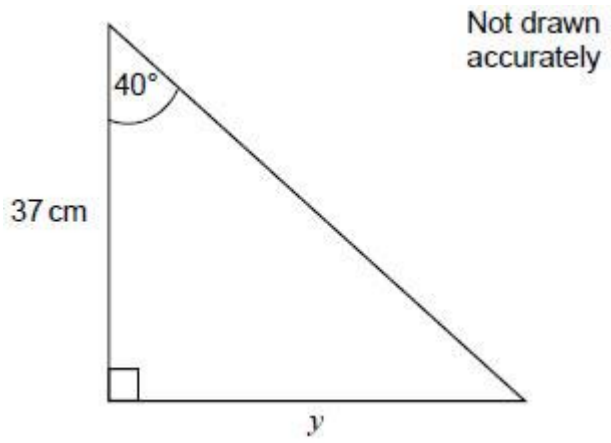
(a) Work out the size of angle x.



Answer _____ degrees

(2)

(b) Work out length y.



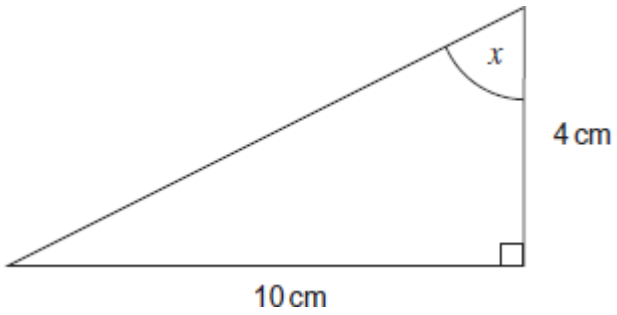
Answer _____ cm

(2)

(Total 4 marks)

Q4.

Not drawn accurately



Work out the size of angle x.

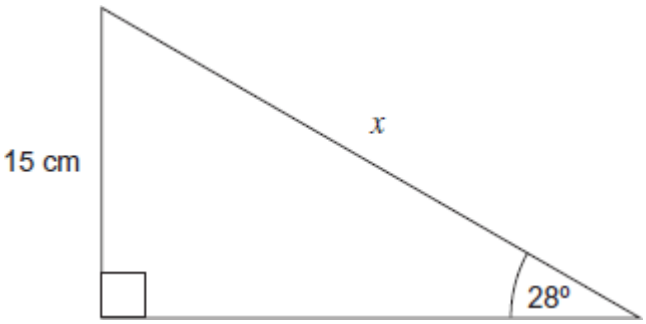
Answer _____ degrees

(Total 3 marks)

Q5.

Work out the length x.

Not drawn accurately

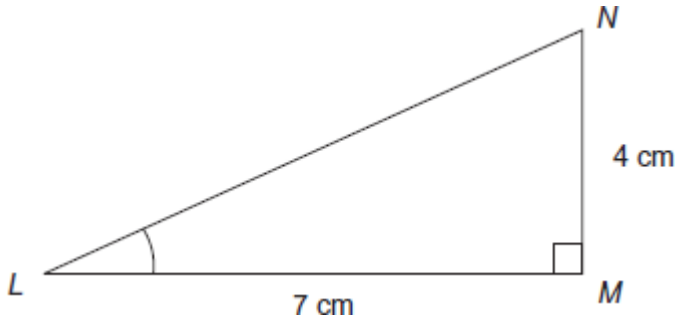


Answer _____ cm

(Total 3 marks)

Q6.

Not drawn accurately



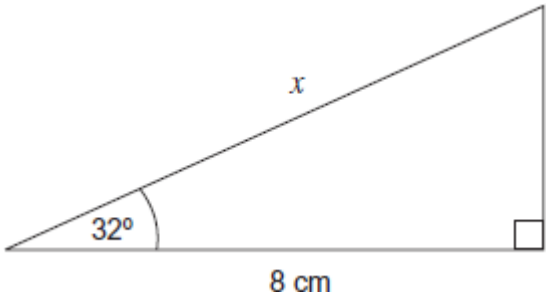
(a) Work out the size of angle *L*.

Answer _____ degrees

(3)

(b)

Not drawn accurately



Work out x.

Answer _____ cm

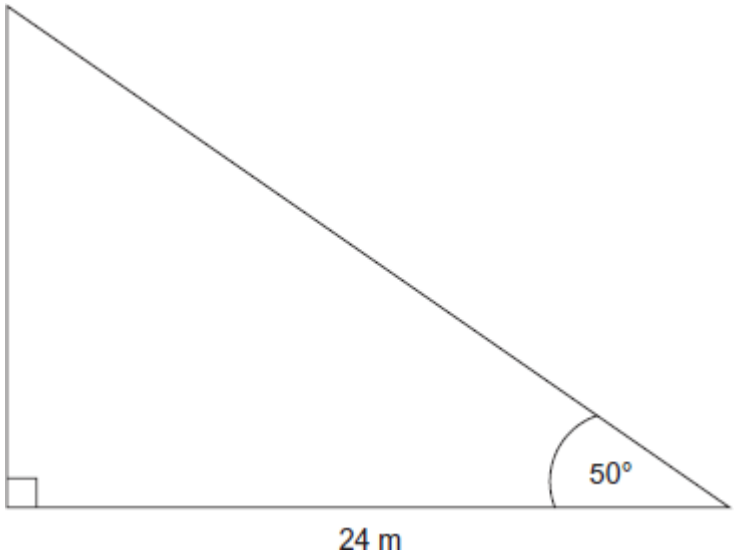
(3)

(Total 6 marks)

Q7.

Work out the area of this right-angled triangle.

Not drawn accurately



Give your answer to 2 significant figures.

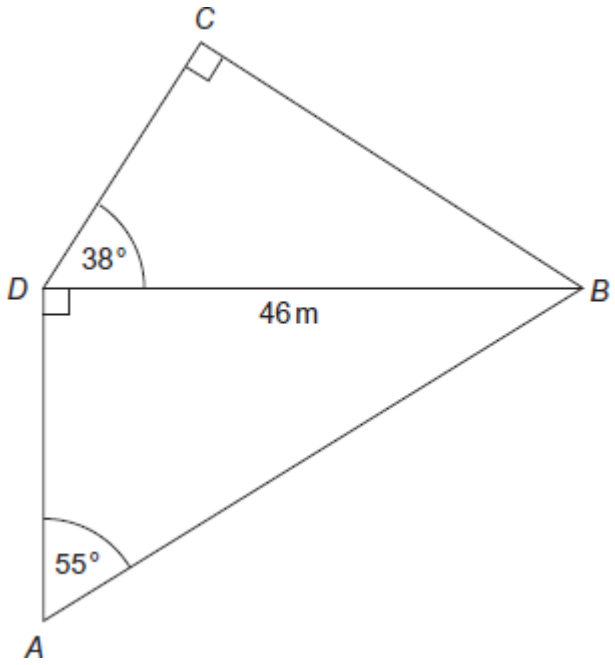
Answer _____ m^2

(Total 5 marks)

Q8.

The diagram shows five straight paths.

Not drawn accurately



Harry walks along paths *AD* and *DC*.

Work out the total distance he walks.

Answer _____ m

(Total 6 marks)

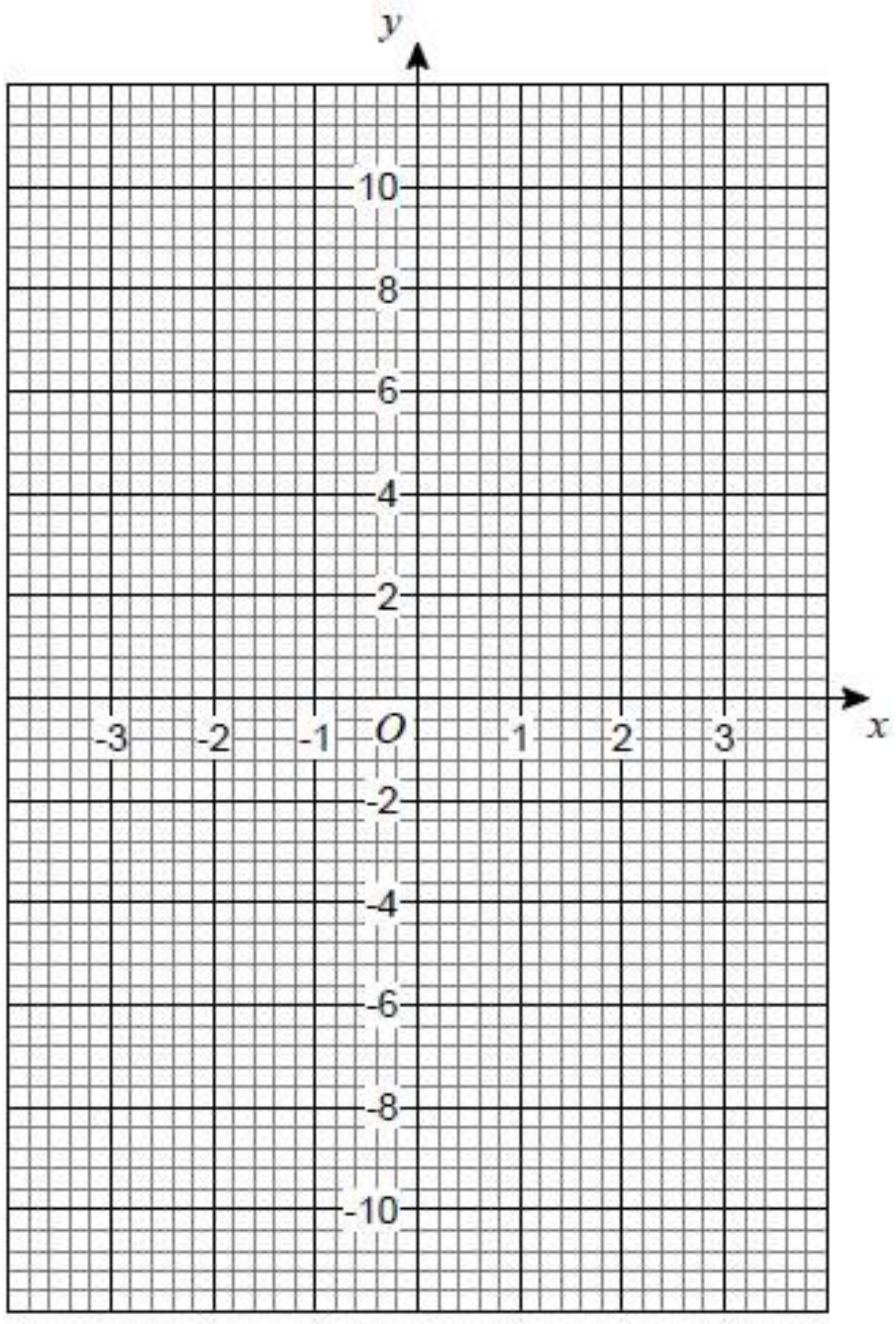
Graphs

Q1. (a) Complete the table for $y = 3x + 1$

x	−3	−2	−1	0	1	2	3
y	−8		−2		4		

(2)

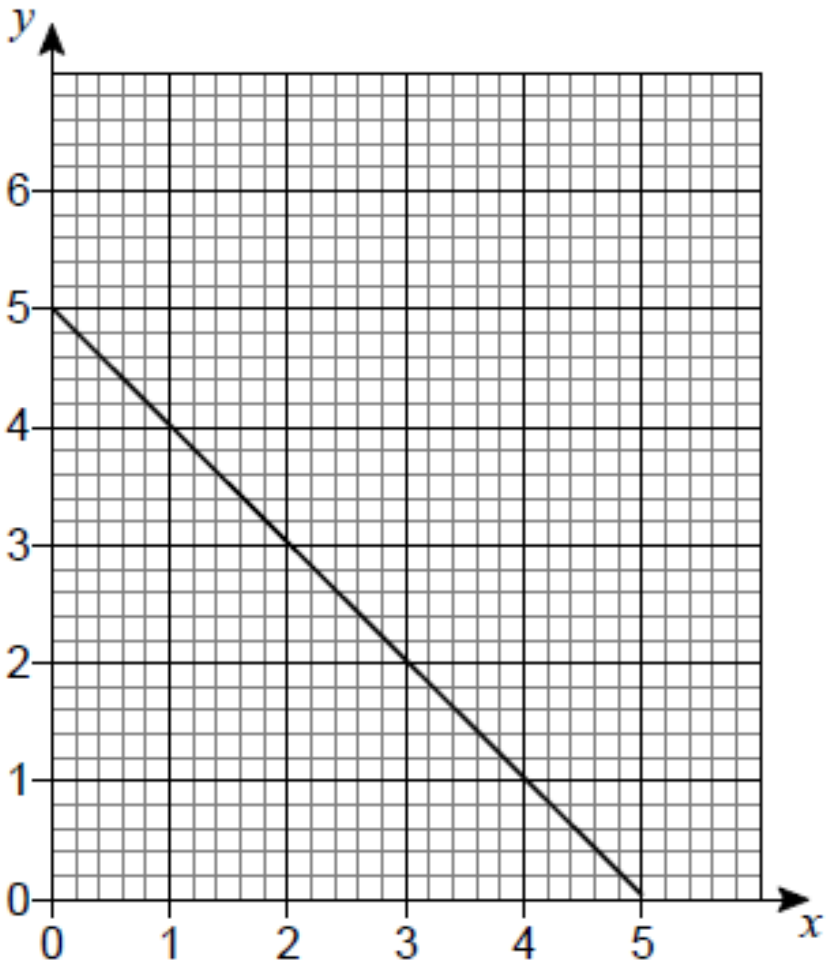
(b) On the grid draw the graph of $y = 3x + 1$ for values of x from −3 to 3



(2)

Q2.

Here is the graph of $y = 5 - x$ for values of x from 0 to 5



(a) On the same grid, draw the graph of $y = x + 1$ for values of x from 0 to 5

(2)

(b) Use the graphs to solve the simultaneous equations

$y = 5 - x$ and $y = x + 1$

$x =$ _____

$y =$ _____

(1)

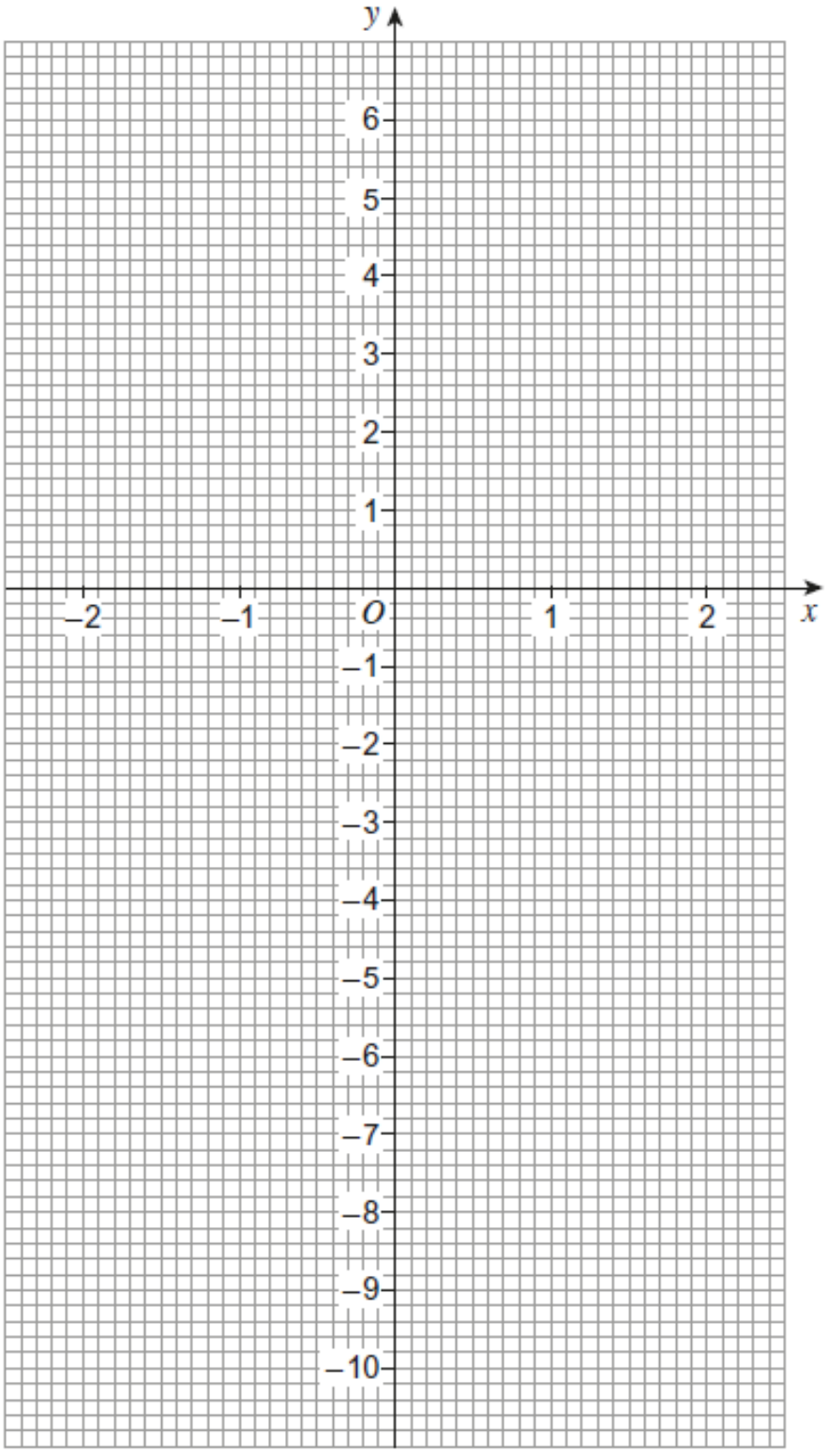
(Total 3 marks)

Q3.

Here is a table of values for $y = x^3 - 2$ for $x = -2$ to 2

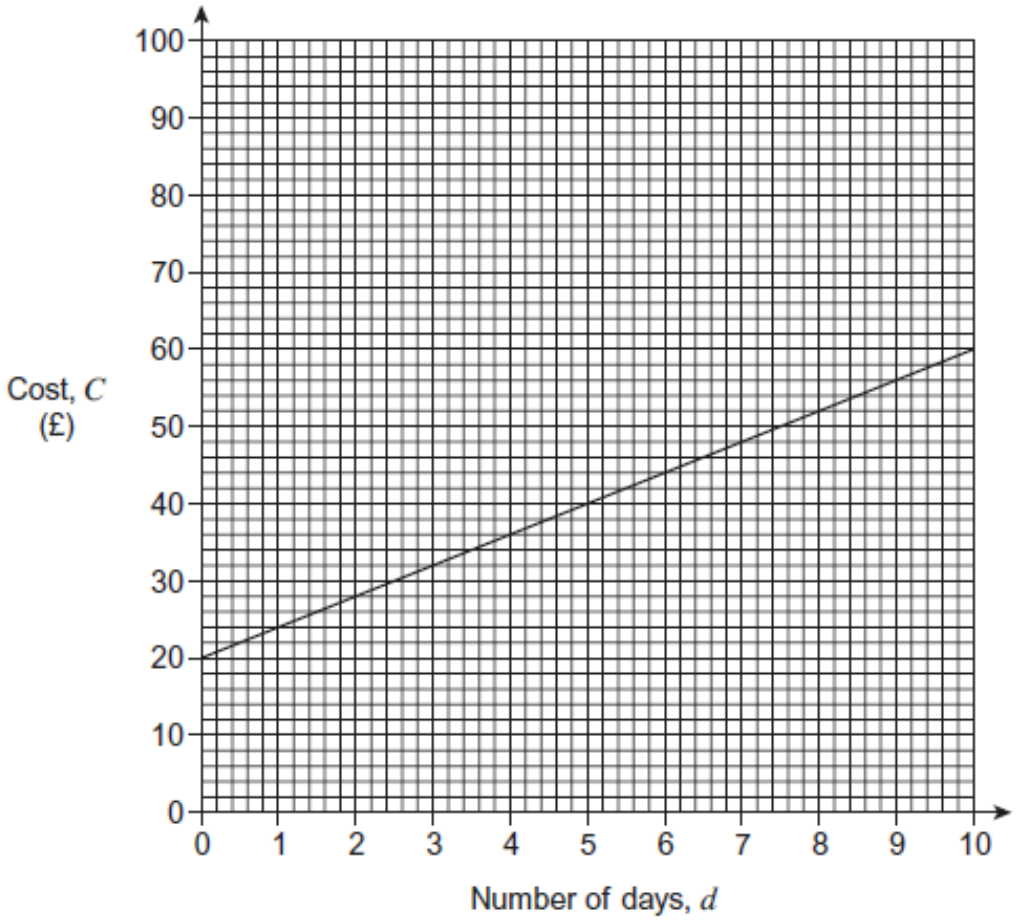
x	–2	–2	0	1	2
y	–10	–3	–2	–1	6

Draw the graph of $y = x^3 - 2$ for values of x from –2 to 2



(Total 2 marks)

Q4. This graph is used to work out the cost, C (£), to hire a drill for a number of days, d.



(a) Circle the correct formula for the cost, C, to hire a drill.

$C = 20d + 4$ $C = 4d + 24$ $C = 4d + 20$ $C = 24d - 4$

(b) The cost of hiring a sander is given by the formula

$C = 6d + 10$

Dev hires a drill and a sander for the **same** number of days. The **total** cost is £90

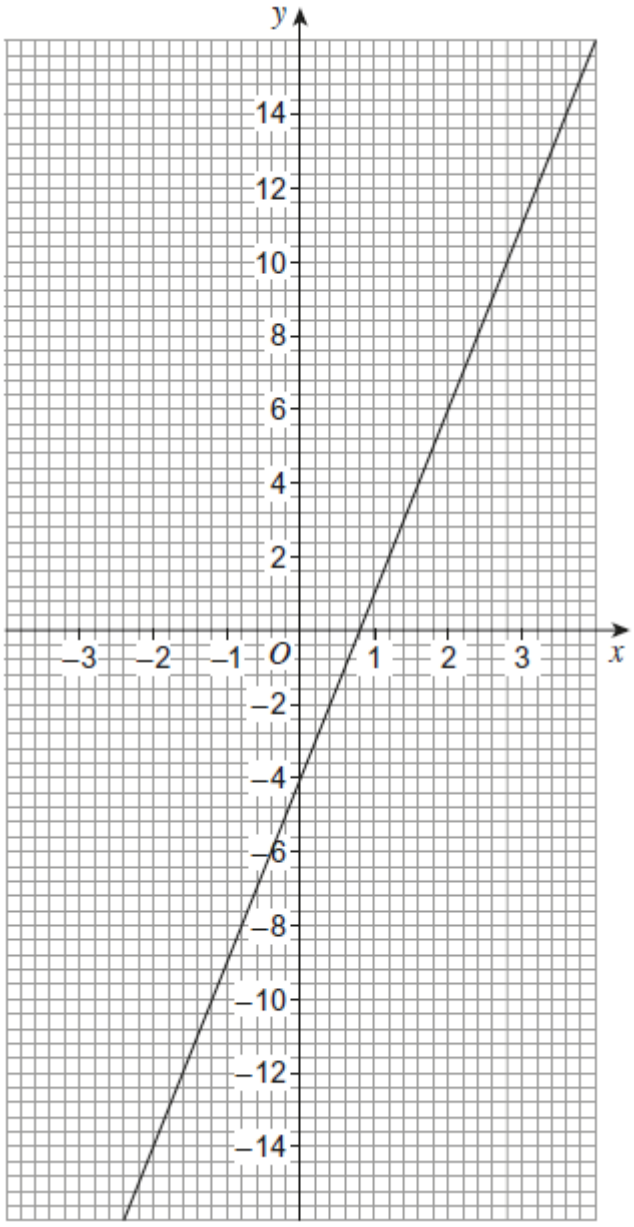
Work out the number of days that he hires the drill and sander.

Answer _____ days

(Total 4 marks)

Q5.

Here is a straight-line graph.



(a) Use the graph to work out the value of x when y = 8

Answer _____

(1)

(b) Work out the gradient of the line.

Answer _____

(3)

(Total 4 marks)

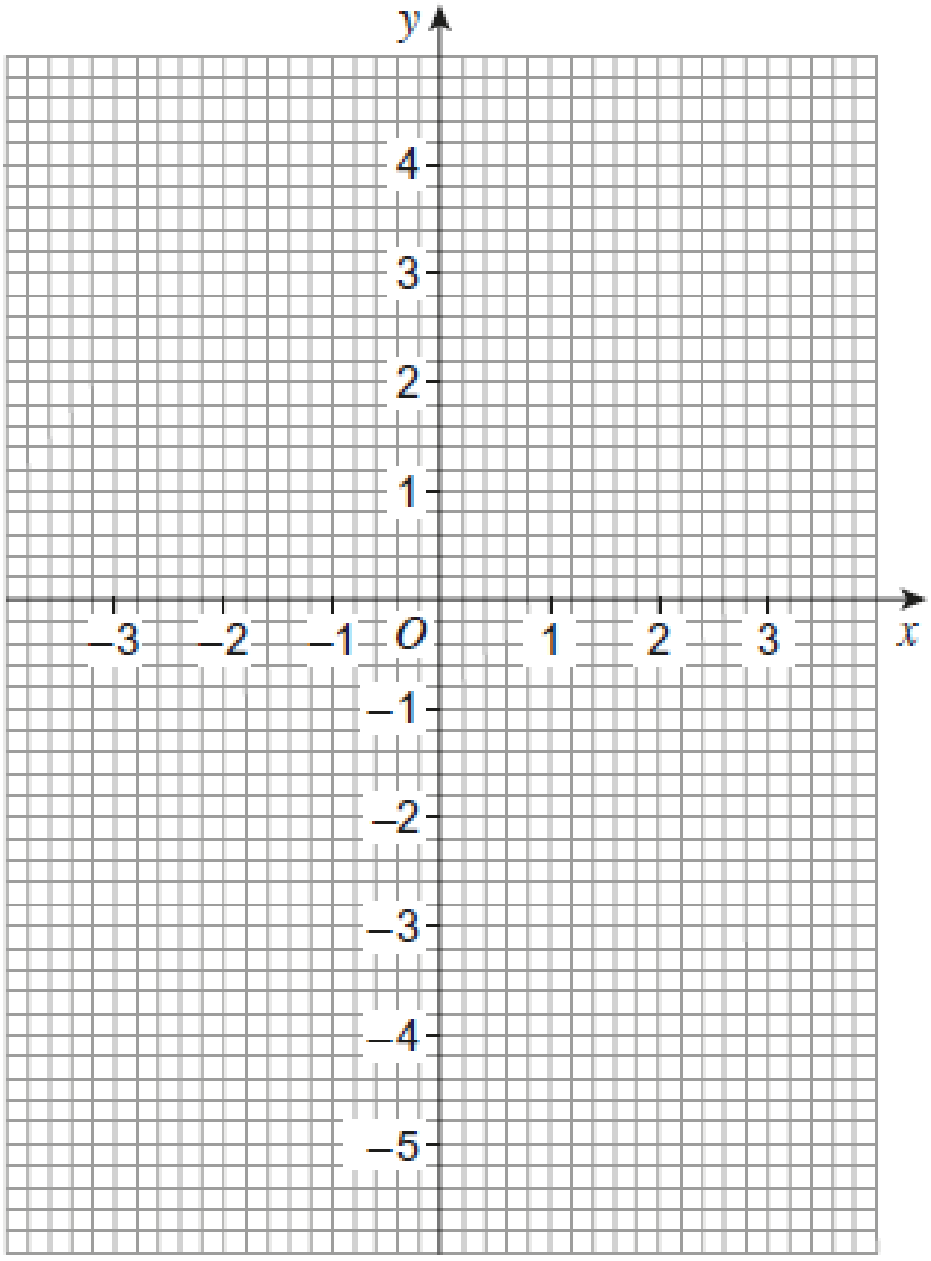
Q6.

(a) Complete the table of values for $y = x^2 - 5$ for values of x from –3 to 3

x	–3	–2	–1	0	1	2	3
y	4		–4			–1	4

(2)

(b) Draw the graph of $y = x^2 - 5$ for values of x from –3 to 3



(2)

(c) Use the graph of $y = x^2 - 5$ to write down the values of x when $y = 0$

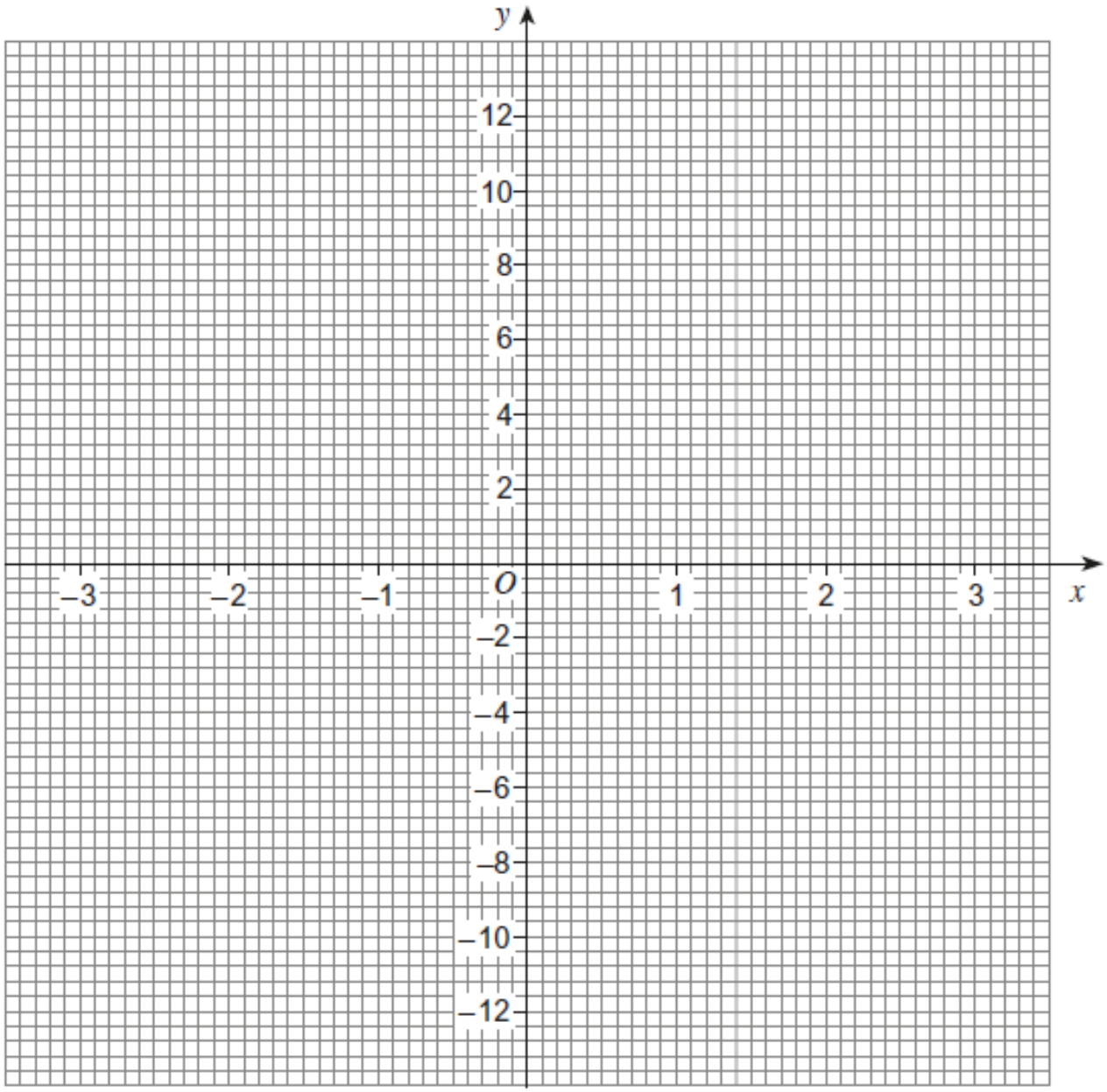
Answer _____ and _____

(1)

(Total 5 marks)

Q7.

Draw the graph of $y = 3x - 2$ for values of x from -3 to 3



(Total 3 marks)

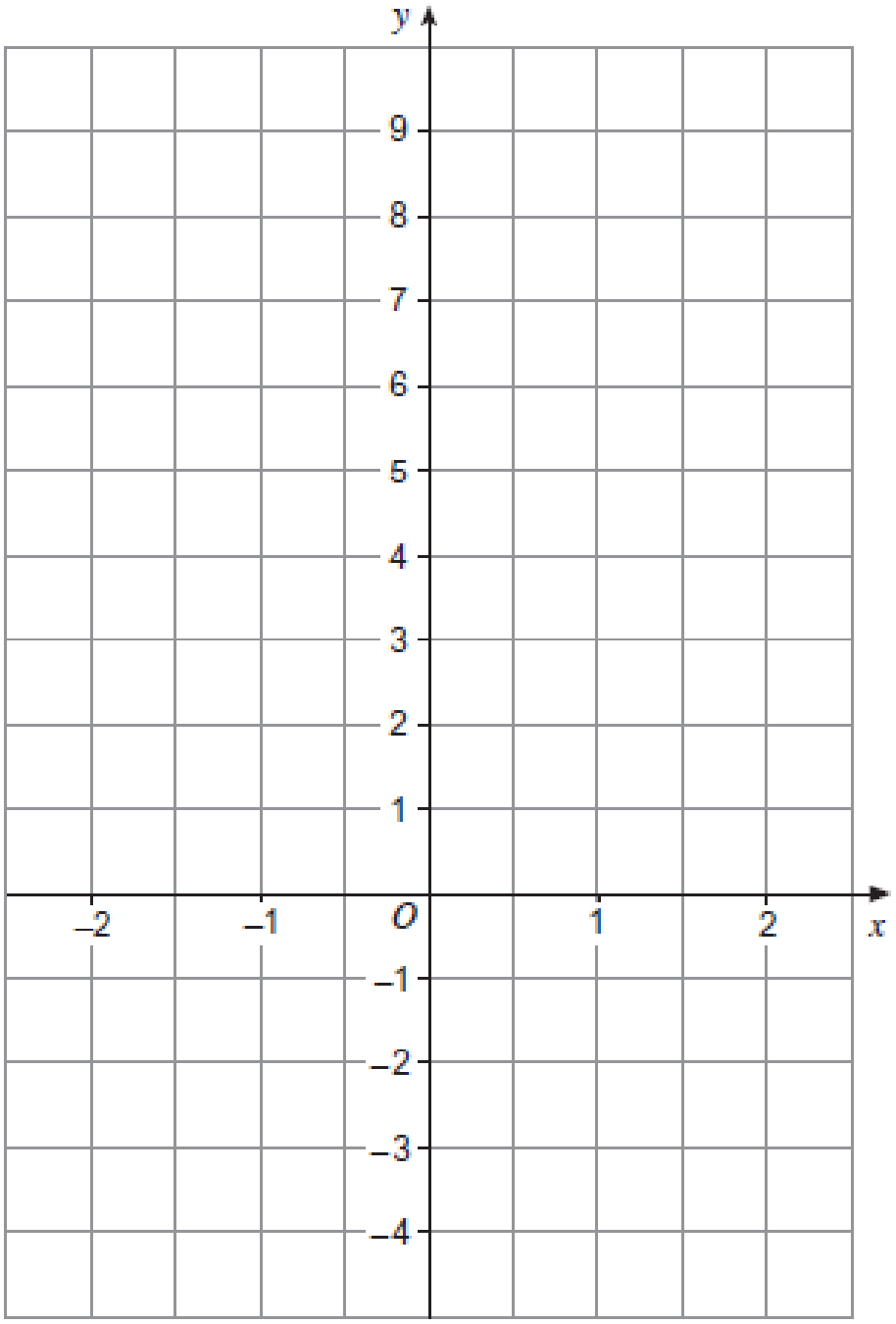
Q8.

(a) Complete the table of values for $y = 3x + 2$

x	−2	−1	0	1	2
y		−1		5	

(2)

(b) On the grid draw the graph of $y = 3x + 2$ for values of x from −2 to 2



(2)

(c) Work out the gradient of the line $y = 3x + 2$

Answer _____

(1)

(Total 5 marks)