

Questions

Q1.

(a) Factorise $2t^2 - 7t + 3$

.....
(2)

(b) Rearrange the formula $y = a - bx^2$ to make x the subject.

$x =$
(3)

(Total for Question is 5 marks)

Q2.

$$t^n = \frac{1}{t^3}$$

(a) Write down the value of n .

$n =$
(1)

(b) Simplify $\frac{6xy^5}{3xy^2}$

.....
(2)

(c) Expand and simplify $(3x - 2y)(x + 2y)$

.....
(2)

(d) Factorise $4x^2 - 7x - 2$

.....
(2)

(Total for question = 7 marks)

Q3.

The diagram shows a circular pond, of radius r metres, surrounded by a circular path. The circular path has a constant width of 1.5 metres.

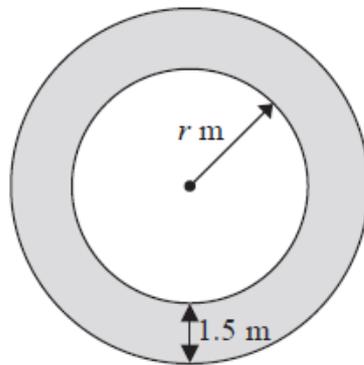


Diagram NOT accurately drawn

The area of the path is $\frac{1}{10}$ the area of the pond.

(a) Show that $2r^2 - 60r - 45 = 0$

(3)

(b) Calculate the area of the pond.
Show your working clearly.
Give your answer correct to 3 significant figures.

..... m²

(5)

(Total for question = 8 marks)

Q4.

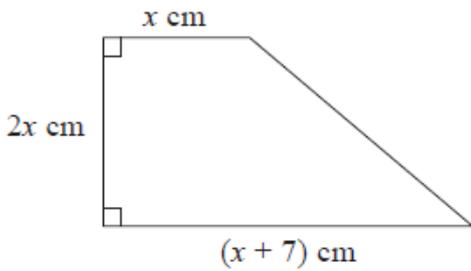


Diagram NOT accurately drawn

The diagram shows a trapezium.
The trapezium has an area of 17 cm^2

(a) Show that $2x^2 + 7x - 17 = 0$

(3)

(b) Work out the value of x .
Give your answer correct to 3 significant figures.
Show your working clearly.

$x = \dots\dots\dots$

(3)

(Total for question = 6 marks)

Q5.

Here is a hexagon.

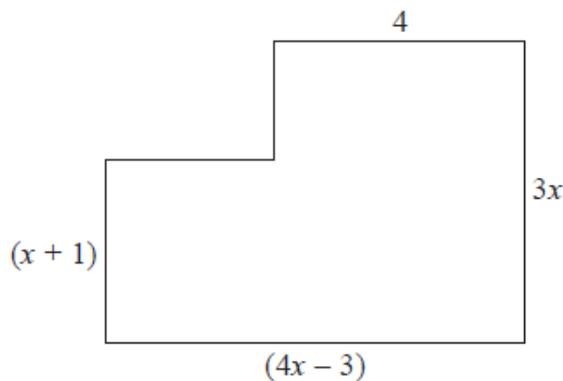


Diagram NOT accurately drawn

In the diagram, all the measurements are in centimetres.
All the corners are right angles.

The area of the hexagon is 40 cm^2

(a) Show that $4x^2 + 9x - 47 = 0$

(3)

(b) Solve $4x^2 + 9x - 47 = 0$

Show your working clearly.
Give your solutions correct to 3 significant figures.

.....
(3)

(c) Find the length of the longest side of the hexagon.
Give your answer correct to 3 significant figures.

..... cm
(2)

(Total for Question is 8 marks)

Q6.

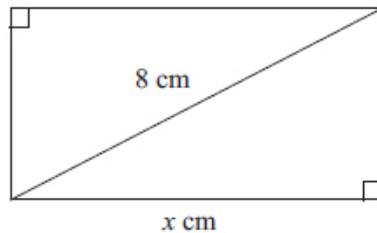


Diagram NOT
accurately drawn

The diagram shows a rectangle.
The length of the rectangle is x cm.
The length of a diagonal of the rectangle is 8 cm.
The perimeter of the rectangle is 20 cm.

(a) Show that $x^2 - 10x + 18 = 0$

(4)

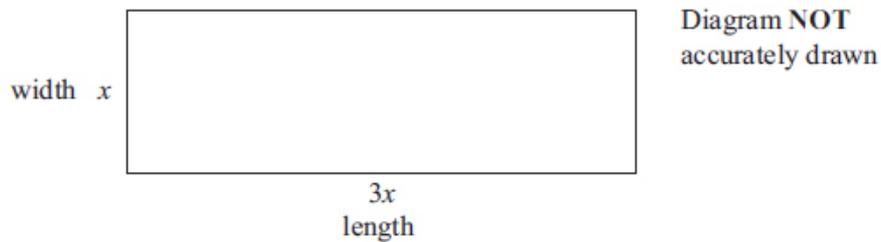
(b) Solve $x^2 - 10x + 18 = 0$
Give your solutions correct to 3 significant figures.
Show your working clearly.

.....
(3)

(Total for question = 7 marks)

Q7.

The diagram shows a rectangular playground of width x metres and length $3x$ metres.



The playground is extended, by adding 10 metres to its width and 20 metres to its length, to form a larger rectangular playground.

The area of the larger rectangular playground is double the area of the original playground.

(a) Show that $3x^2 - 50x - 200 = 0$

(3)

(b) Calculate the area of the original playground.

.....m²

(5)

(Total for question = 8 marks)

Q8.

Clare buys some shares for $\$50x$.
 Later, she sells the shares for $\$(600 + 5x)$.
 She makes a profit of $x\%$

(a) Show that $x^2 + 90x - 1200 = 0$

(3)

(b) Solve $x^2 + 90x - 1200 = 0$
 Find the value of x correct to 3 significant figures.

$x =$

(3)

(Total for question = 6 marks)

Q9.

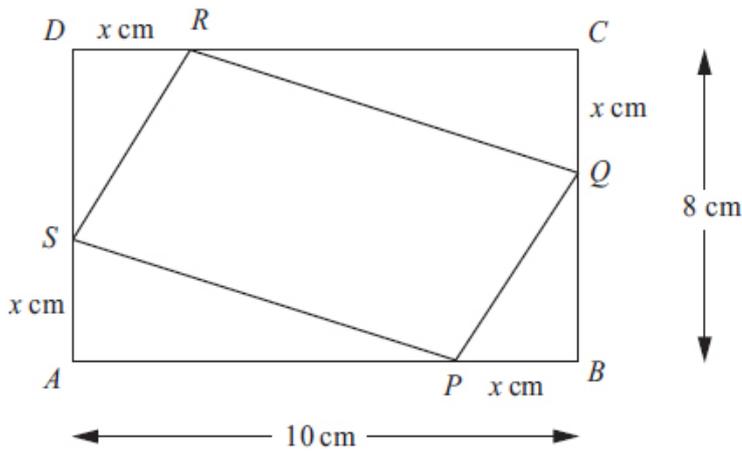


Diagram NOT accurately drawn

$ABCD$ is a rectangle.
 $AB = 10$ cm.
 $BC = 8$ cm.
 P, Q, R and S are points on the sides of the rectangle.
 $BP = CQ = DR = AS = x$ cm.

(a) Show that the area, A cm², of the quadrilateral $PQRS$ is given by the formula

$$A = 2x^2 - 18x + 80$$

(3)

(b) For $A = 2x^2 - 18x + 80$

(i) find $\frac{dA}{dx}$,

.....

(ii) find the value of x for which A is a minimum.

$x =$

(iii) Explain how you know that A is a minimum for this value of x .

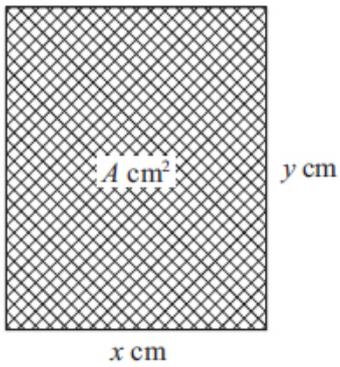
.....

.....

(5)

(Total for question = 8 marks)

Q10.



The diagram shows a rectangular photo frame of area $A \text{ cm}^2$.
 The width of the photo frame is $x \text{ cm}$.
 The height of the photo frame is $y \text{ cm}$.
 The perimeter of the photo frame is 72 cm .

(a) Show that $A = 36x - x^2$

(3)

(b) Find $\frac{dA}{dx}$

.....

(2)

(c) Find the maximum value of A .

$A = \dots\dots\dots$

(3)

(Total for question is 8 marks)