

Surname	
Other Names	
Candidate Signature	

Centre Number						Candidate Number				
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Examiner Comments	

Total Marks

Quadratics

GCSE MATHEMATICS

CM

End of Topic Test

Non-calculator

Time allowed: 1 hour

Instructions to candidates:

- In the boxes above, write your centre number, candidate number, your surname, other names and signature.
- Answer ALL of the questions.
- You must write your answer for each question in the spaces provided.
- You must **not** use a calculator.

Information to candidates:

- Full marks may only be obtained for answers to ALL of the questions.
- The marks for individual questions and parts of the questions are shown in round brackets.
- There are 10 questions in this question paper. The total mark for this paper is 60.

Advice to candidates:

- You should ensure your answers to parts of the question are clearly labelled.
- You should show sufficient working to make your workings clear to the Examiner.
- Answers without working may not gain full credit.

GCSE/EQU

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quadratics topic test



1 (a) Factorise fully the following expressions

(i) $4xy - 2y$

.....

(1)

(ii) $x^2 + 4x + 3$

.....

(2)

(iii) $2x^2 - 18x + 28$

.....

(2)

(Total for Question 1 is 5 marks)

2 Solve the equation $x^2 + 6x - 40 = 0$.

.....

(Total for Question 2 is 3 marks)



3 (a) Verify that $y = -2$ is a solution to the equation $y^2 - 4y - 12 = 0$.

(2)

(b) Find the other solution to the equation $y^2 - 4y - 12 = 0$.

.....
(2)

(Total for Question 3 is 4 marks)

4 Solve the equation $2x^2 - 6x + 1 = 0$, giving your answers to two decimal places.

.....
(3)

(Total for Question 4 is 3 marks)



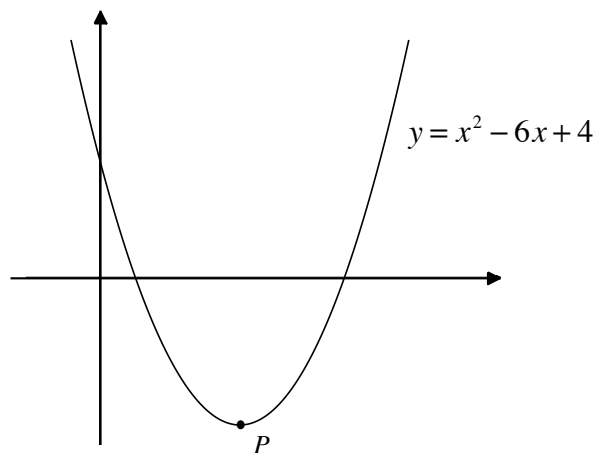
5 (a) Express $x^2 - 6x + 4 = 0$ in the form $(x+a)^2 + b$, where a and b are constants to be found.

$a = \dots\dots\dots$

$b = \dots\dots\dots$

(3)

The diagram below shows a sketch of the curve with equation $y = x^2 - 6x + 4$.



The point P lies on the curve and is a minimum point.

(b) Write down the coordinates of P .

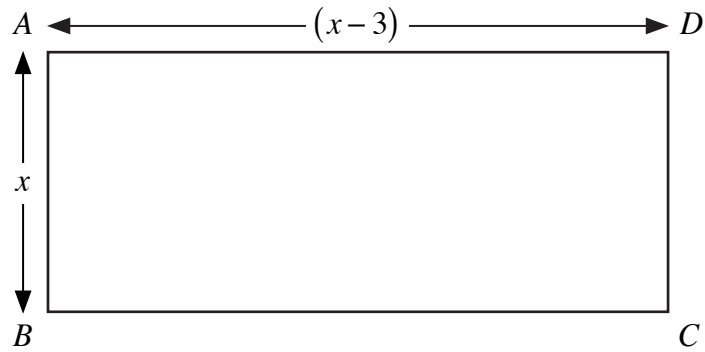
.....

(1)

(Total for Question 5 is 4 marks)



6



The rectangle $ABCD$ is shown in the diagram above.

All dimensions are in centimetres.

The rectangle has area 28 cm^2 .

(a) Find the value of x .

.....

(5)

(b) Find the length of the line segment AC .

.....

(2)

(c) Write down the length of the line segment BD .

.....

(1)

(Total for Question 6 is 8 marks)



7 The curve C has the equation $y = f(x)$, where

$$f(x) = 3x^2 + (2x - 1)(2 - x) + 10$$

(a) Express $f(x)$ in the form $ax^2 + bx + c$, where a, b and c are constants to be found.

$f(x) = \dots\dots\dots$

(3)

(b) Find the coordinates of the minimum point on C .

$\dots\dots\dots$

(4)

(c) **Using your answer to part (b)**, explain why the curve C does not intersect the x axis.

$\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$

(1)

(Total for Question 7 is 8 marks)



8 The quadratic equation $ax^2 + bx + c = 0$ has solutions

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(a) State the name given to this formula.

.....
(1)

(b) Use the formula above to solve the equation $(2x - 1)(3x + 3) = 1$.

.....
(5)

Adam has the equation $2x^2 + px + q = 0$.

He uses the above formula to solve it and obtains the following expression

$$x = \frac{9 \pm \sqrt{57}}{4}$$

(c) Find the values of the constants p and q .

$p = \dots\dots\dots$, $q = \dots\dots\dots$
(3)

(Total for Question 8 is 9 marks)



9 (a) By completing the square, or otherwise, prove that the equation $a^2 + 2a + 10 = 0$ has no real solutions.

(4)

(b) Find the range of values of k such that the equation $a^2 + 2a + k = 0$ has real solutions.

.....
(3)

(Total for Question 9 is 7 marks)

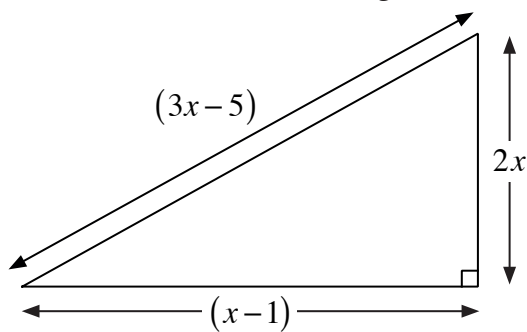


10 (a) State Pythagoras' Theorem and explain it using a suitable diagram.

.....

(2)

The triangle T is shown below and all measurements are given in centimetres.



(b) Show that $x^2 - 7x + 6 = 0$.

(4)

(c) Find the length of the longest side of the triangle T .

.....cm

(3)

(Total for Question 10 is 9 marks)

