Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Quadratics using Formula

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

- Write your name in the space provided.
- Write your answers in the spaces provided in this question paper.
- Answer ALL questions.
- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
- You should have a ruler, compass and protractor where required.

Total Marks :

1) A man walks x km East and then $(x + 8)$ km North.
He is now 12 km from his starting point.

(a) Show that x satisfies the equation $x^2 + 8x - 40 = 0$

[3]

(b) Solve the equation to find x, giving your answer correct to 3 significant figures.

Answer $x =$ _____ [3]

2) Given that the product of $(2x + 5)$ and $(x + 3)$ is 10, find all the possible values of x. [5]

3) Use the quadratic formula to solve the following equation.
Give your answers correct to 2 decimal places. [3]

$$4x^2 + 7x - 5 = 0$$

4) *(a)* Factorise the expression $6x^2 - 5x - 21$ and hence solve the equation $6x^2 - 5x - 21 = 0$. [3]

(b) Solve the equation $5x^2 + 12x + 3 = 0$, giving your answers correct to 2 decimal places. [3]

5) The base of an open rectangular box is of length $(2x + 6)$ cm and width x cm.
The area of this base is $59\,\text{cm}^2$.
The height of the open box is $(x - 3)$ cm.

(a) Show that $2x^2 + 6x - 59 = 0$. [2]

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(b) (i) Solve the equation $2x^2 + 6x - 59 = 0$, giving your answers correct to 2 decimal places.
You must show all your working. [3]

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(ii) Hence calculate the volume of the box.
State clearly the units of your answer. [3]

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Volume of the box is .....

6) Solve the quadratic equation $5x^2 - 10x + 3 = 0$, giving your answers correct to 2 decimal places. [3]

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7) A large rectangular tile has width x cm, length $(x + 5)$ cm and area 2100 cm^2.
Use the quadratic formula to calculate the width of the tile, giving your answer correct to 1 decimal place.

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[4]

8) Use the quadratic formula to solve $(3x - 1)^2 = x(2x + 3) + 7$.
Give your answers correct to 2 decimal places. [6]

9) A rectangle of length $(x - 8)$ cm and width x cm and has an area of $\mathrm{y\ cm^2}$. It is known that

$$\mathrm{y} - x = 1284$$

Find the dimensions of the rectangle. Give your answers to 1 decimal place.

You must use an algebraic method.

[8]

10) *(a)* Ava runs a distance of 26 miles at an average speed of x mph.
Delyth runs the same distance at an average speed which is 2 mph slower than Ava.
The difference in their times is exactly 1 hour.

Show that x satisfies the equation $x^2 - 2x - 52 = 0$. [5]

(b) Use the quadratic formula to find Ava's speed.
Give your solution correct to 2 decimal places. [4]

11) The diagram shows a parallelogram and a rectangle joined along a common side.

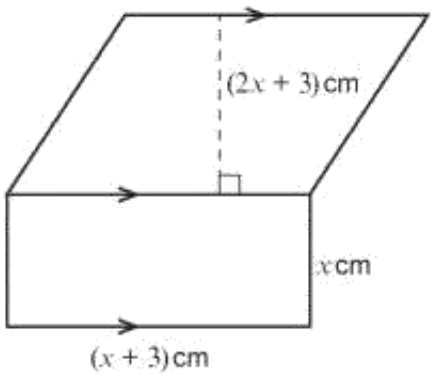

Diagram not drawn to scale

The width of the rectangle is x cm.
The length of the rectangle is $(x + 3)$ cm.
The height of the parallelogram is $(2x + 3)$ cm.
The total area of the parallelogram and the rectangle together is 70 cm^2.

(a) Show that $3x^2 + 12x - 61 = 0$. [3]

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(b) Use the quadratic formula to calculate the length of the rectangle.
Give your answer correct to 2 decimal places. [4]

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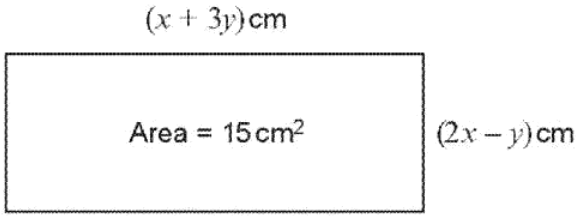
12) *(a)* Factorise $x^2 - 5x - 24$ and hence solve $x^2 - 5x - 24 = 0$. [3]

(b) Solve the following quadratic equation.
Give your answers correct to two decimal places.
You must show all your working. [3]

$$5x^2 + 2x - 9 = 0$$

13)



(a) Show that $2x^2 + 5xy - 3y^2 - 15 = 0$.
You must show your working. [3]

(b) It is known that

- $2x^2 + 5xy - 3y^2 - 15 = 0$
- $2x^2 - 3y^2 = -24{\cdot}1$
- $y - x = 1{\cdot}1$

Use an algebraic method to find the dimensions of the rectangle. [8]

14) *(a)* (i) Show that $(x + 2)^2 + 3(x + 1) - 11$ can be simplified to $x^2 + 7x - 4$. [2]

(ii) Solve the equation $x^2 + 7x - 4 = 0$, giving your answers correct to 2 decimal places. [3]

(b) Factorise the expression $5x^2 + 22x - 15$ and hence solve the equation $5x^2 + 22x - 15 = 0$. [3]