Unit 7 · Quadratic Equation

WORKSHEET

Full marks 36.5

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 36.5

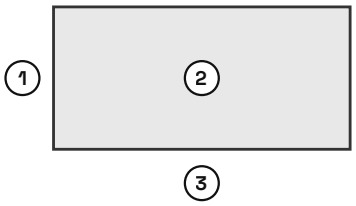
1 Key words [3]

Match each word or expression in Column A with its meaning in Column B. Write the letter in the box. One meaning in Column B is not needed. Each match carries 0.5 mark.

Column A		Column B
1. quadratic equation	☐	**a.** adding the square of half the coefficient of x to both sides
2. standard form	☐	**b.** writing one side as a product of two factors, with 0 on the other side
3. roots	☐	**c.** the number of terms in the equation
4. factorization method	☐	**d.** an equation in one variable whose highest power is 2
5. completing the square	☐	**e.** the number under the square root that decides how many real roots there are
6. $b^2 - 4ac$	☐	**f.** the values of the variable that make the equation true
		g. $ax^2 + bx + c = 0$, with $a \neq 0$

2 Fill the diagram [1.5]

A playground is x m wide. Its length is 1 m more than twice its breadth, and its area is 300 m^2. Write the expression or number that belongs in each numbered box. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which of these is **not** a quadratic equation? [1]

a. $3x^2 - x = 0$ **b.** $(x + 1)(x - 1) = x^2 + 2x$

c. $x(x + 5) = 6$ **d.** $x^2 = 9$

ii. What are the roots of $(x - 4)(2x + 3) = 0$? [1]

a. 4 and $-\frac{3}{2}$ **b.** -4 and $\frac{3}{2}$

c. 4 and -3 **d.** 4 and $\frac{3}{2}$

iii. What must be added to $x^2 - 10x$ to make it a perfect square? **[1]**

a. 100 **b.** 10

c. 25 **d.** -25

iv. How many real roots does $4x^2 - 12x + 9 = 0$ have? **[1]**

a. two different roots **b.** one (both roots equal)

c. none **d.** it can't be told without solving

v. A rectangle's length is 3 m more than its breadth x m, and its area is 40 m^2. Which equation gives x? **[1]**

a. $x^2 + 3x - 40 = 0$ **b.** $x^2 + 3x + 40 = 0$

c. $x^2 - 3x - 40 = 0$ **d.** $2x + 3 = 40$

4 Very short answers **[3]**

Write very short answers to the following questions.

a. Write the formula for the roots of $ax^2 + bx + c = 0$. **[1]**

b. Write $x(x - 3) = 10$ in standard form, and write the values of a, b and c. **[1]**

c. Solve $3x^2 = 48$. **[1]**

5 Short answers **[6]**

Write short answers to the following questions.

a. From $(x - 5)(x + 2) = 0$ we may write "$x = 5$ or $x = -2$", but from $(x - 5)(x + 2) = 8$ we may not write "$x - 5 = 8$ or $x + 2 = 8$". Explain why, and solve the second equation. **[2]**

b. Bina solved $x^2 = 5x$ by dividing both sides by x, and wrote "$x = 5$". Find her mistake and write the correct roots. **[2]**

c. Write a quadratic equation in standard form whose roots are 3 and -5. **[2]**

6 Problems [16]

Solve the following problems. Show your working.

a. Solve $2x^2 + 8x - 10 = 0$ by completing the square. **[3]**

Answer:

b. Solve $3x^2 - 4x - 2 = 0$ by using the formula. Give the roots to 2 decimal places. **[3]**

Answer:

c. A rectangular plot has area 150 m^2 and perimeter 50 m. Find its length and breadth. **[3]**

Answer:

d. A mother is 34 and her daughter 4. In how many years will the product of their ages be 400? **[3]**

Answer:

e. An institute planned to share 180 pencils equally among the students enrolled in Grade 1. On the day, 5 students were absent, so each student present got 3 more pencils. **[4]**

a. How many students were enrolled in Grade 1?

b. How many pencils did each student present get?

Answer: _____

7 Think **[2]**

Think, then answer.

A ball is thrown straight up. Its height after t seconds is about $h = 20t - 5t^2$ meters. At what times is it 15 m high? Why does the equation give two answers, and do both make sense?

8 Activity: One string, many rectangles (not marked)

Tie a string into a loop 24 cm long. Hold it with four fingers to make rectangles of different breadths, and fill in the table.

breadth x	**3 cm**	**5 cm**	**6 cm**
length			
area			

Now solve an equation to find the breadth that gives an area of 32 cm^2, and check it with the loop. Can the loop make a rectangle of area 40 cm^2?