

Year 10 Term 1 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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8 Year 10 Term 1 Week 8 Homework

8.1 Quadratic Equations

8.1.1 Solving quadratic equations using factors

Exercise 8.1.1 Factorise and solve the following quadratic equations:

1. $(x - 4)^2 = 0$

2. $(8 + 3x)^2 = 0$

3. $6x^2 + 6x = 0$

4. $y^2 - 16 = 0$

5. $x^2 - 7x + 12 = 0$

6. $x^2 + 6x + 9 = 0$

7. $2y^2 + 5y + 2 = 0$

8. $4x^2 + 4x - 35 = 0$

8.1.2 Completing the square

To solve a quadratic equation of the form $x^2 + bx + c = 0$ by completing the square:

- Take the constant term c to the other side of the equation.
- Add $(\frac{b}{2})^2$ to both sides of the equation to make the expression on the LHS a perfect square.
- Take the square root of the both sides of the equation ($\pm\sqrt{RHS}$).
- Solve the two resulting equations.

Exercise 8.1.2 Solve the following equations, leaving your answers in surd form.

1. $(x - 1)^2 = 1\frac{1}{2}$

2. $(y + 3)^2 = 3\frac{1}{2}$

3. $(x + 2\frac{1}{2})^2 = 12$

4. $(y - \frac{1}{3})^2 = \frac{5}{9}$

5. $x^2 + 3x = 2$

Exercise 8.1.3 Solve the following equations by completing the square.

1. $3y^2 + 2y - 6 = 0$

2. $2x^2 - 8x + 1 = 0$

3. $4y^2 - y - 2 = 0$

4. $3y^2 - 9y + 4 = 0$

5. $5y^2 + 6y - 9 = 0$

8.1.3 The quadratic formulae

The solution to the equation $ax^2 + bx + c = 0$ are given by:

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

Exercise 8.1.4 Use the quadratic formula to solve each of these equations. Give your answer in surd form

1. $x^2 + 8x - 4 = 0$

2. $3y^2 - 5y + 1 = 0$

3. $2x^2 + 8x + 5 = 0$

4. $5y^2 + 2y = 1$

Exercise 8.1.5 Solve for y , giving the solutions in simplest surd form, where necessary.

1. $y = \frac{7y-12}{y}$

2. $y - 8 = \frac{20}{y}$

Exercise 8.1.6 Solve the following equations using the substitution $u = x^2$

1. $x^4 - 10x^2 + 9 = 0$

2. $x^4 - 20x^2 + 64 = 0$

3. $2x^4 - 17x^2 - 9 = 0$

8.1.4 Miscellaneous exercises**Exercise 8.1.7 Factorise and solve the following quadratic equations:**

1. $9y^2 + 9y + 2 = 0$

2. $12y^2 - 7y + 1 = 0$

3. $4x^2 - 2x = 6$

4. $2x^2 = 11x - 5$

Exercise 8.1.8 Solve the following equations by completing the square.

1. $x^2 - 3x = 1$

2. $4x^2 - x = 2$

3. $y^2 - 5y - 1 = 0$

4. $x^2 - x - 4 = 0$

Exercise 8.1.9 Solve the following by using quadratic formula. Leaving your answer in surd form.

1. $x^2 + 3x + 1 = 0$

2. $x^2 - 7x + 2 = 0$

3. $9x^2 + 6x + 1 = 0$

4. $2x^2 + 11x + 5 = 0$

8.1.5 Maths challenge**Exercise 8.1.10**

1. Prove that the equation $x^2 + (k - 3)x - k = 0$ has real roots for all values of k .

2. For what value of k are the roots of the following equations real?

(a) $x^2 + 2x + k^2 = 1$

(b) $x^2 + 2kx + 2(k + 12) = 0$

3. For what values of k does the quadratic equation $(5k - 3)x^2 - 4kx + k + 1 = 0$ has one root?
