

Year 10 Term 1 Homework

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

Table of contents

9 Year 10 Term 1 Week 9 Homework	1
9.1 Quadratic Equations	1
9.1.1 Solving quadratic equations using factors.	1
9.1.2 Solving the quadratic equations using quadratic formula.	2
9.2 Problem solving involving quadratic equations	3
9.3 Maths challenge	5
9.4 Miscellaneous equations	6

This edition was printed on March 25, 2011.

Camera ready copy was prepared with the **L^AT_EX₂ ϵ** typesetting system.

Copyright © 2000 - 2011 Yimin Math Centre (www.yiminmathcentre.com)

9 Year 10 Term 1 Week 9 Homework

9.1 Quadratic Equations

To solve a quadratic equation:

- write the equation in the form $ax^2 + bx + c = 0$
- factorise the expression on the left-hand side if it can be factorised easily, or
- completing the square if the co-efficient of x^2 is 1 and the co-efficient of x is even, or
- use the quadratic formula if $a \neq 1$ and the co-efficient of x is odd.

9.1.1 Solving quadratic equations using factors.

Exercise 9.1.1 Factorise and solve the following quadratic equations:

1. $x^2 + x = 10 - 2x$

2. $x^2 + 11x = 3x - 15$

3. $4x^2 - 13x + 11 = x^2 + 6x - 9$

4. $7x - 4x^2 = 8 - 11x + 3x^2$

9.1.2 Solving the quadratic equations using quadratic formula.**Exercise 9.1.2**

1. $3x^2 + 4x + 2 = x^2 - 3x - 2$

2. $3x^2 + 4x + 3 = x^2 - 5x + 7$

3. $x + \frac{1}{x} = 4$

4. $x = \frac{7x-3}{x}$

5. $x - 6 = \frac{2}{x}$

9.2 Problem solving involving quadratic equations

Exercise 9.2.1

1. The difference between a positive integer and its square is 42. Find the number.

2. The length of a rectangle is 5 cm greater than the breadth. If the area of the rectangle is 126 cm^2 , find its dimensions.

3. The base of a certain triangle is 6 cm longer than the altitude, and the area is 108 cm^2 . Find the length of the base.

4. In a right-angled triangle, the length of the hypotenuse is 15 cm. Of the two short sides, one side is 3 longer than the other side. What is the area of the triangle?

5. The difference of a number and its reciprocal is 4. What is the number?

Exercise 9.2.2

1. The sum of the term in the series $3 + 7 + 11 + 15 + \dots$ can be found by using formula

$$S = \frac{n}{2}[2a + (n - 1)d], \text{ where :}$$

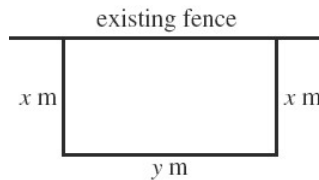
- S is the sum of the terms,
- a is the first term,
- n is the number of the terms
- d is the common difference between the terms.

(a) What is the value of a ? _____

(b) By how much are the terms increasing each time? _____

(c) How many terms of this series would need to be added for the sum of 595?

2. A farmer used 100 metres of fencing to build a new enclosure as shown, by suing an existing fence as on side.



(a) Find an expression for the area of the enclosure in terms of x

(b) Find all possible dimensions of the enclosure if it has an area of 1200 m^2 .

9.3 Maths challenge

Exercise 9.3.1

1. $\frac{3}{x} - \frac{3x}{2} = 4$

2. Solve the following equations simultaneously:

(a) $y = x^2$ and $y - 9x - 10 = 0$

(b) $y = 2x^2 - x$ and $y = x + 4$

3. The perimeter of a rectangle is 22 cm and the area is 28 cm^2 .

(a) Show that $y = 11 - x$ and $x^2 - 11x + 28 = 0$.

(b) Hence, find the dimensions of the rectangle.

4. Find the dimensions of a rectangle that a perimeter of 46 cm and an area of 102 cm^2 .

9.4 Miscellaneous equations**Exercise 9.4.1** Solve the following equations using the substitution $u = x^2$

1. $x^4 - 50x^2 + 49 = 0$

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

Exercise 9.4.2 Solve the following equations by using a suitable substitution.

1. $(2^x)^2 - 5 \times 2^x + 4 = 0$

2. $(3^x)^2 - 28 \times 3^x + 27 = 0$

Exercise 9.4.3 Evaluate or simplify the following expressions:

1. $(\frac{a}{4} + 3a)b - 2ab + c.$

2. $1 + \frac{1}{x} - \frac{x+1}{x}$

3. $3 - \frac{1}{2x+1} - \frac{5x}{2x+1}$

Exercise 9.4.4 Simplify the following radicals and express each answer with rational exponents:

1. $\sqrt{\frac{8x^3}{9y^6}}$

2. $\sqrt{3x^2} \times \sqrt{12x^3}$

3. $\sqrt{1-x^2} - \frac{1}{\sqrt{1-x^2}}$

Exercise 9.4.5 Solve the following equations:

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

2. $x(x + 2) = 3x^2 + 1$

3. $\frac{x+1}{3} + \frac{x+2}{7} = 2$

4. $x^4 - 6x^2 + 9 = 0$

5. $x^4 - x^3 + x - 1 = 0$

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