

Quadratic Formula Worksheet

For the Quadratic equation

$$ax^2 + bx + c = 0$$

Where a, b and c are real numbers and a $\neq 0$

Roots of the quadratic equation is given by Quadratic Formula

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

Question 1. State which all quadratic equations have real roots, no real roots

- a) $x^2 + x + 7 = 0$
- b) $3x^2 + 6x + 1 = 0$
- c) $9x^2 + x + 3 = 0$
- d) $11x^2 - 12x - 1 = 0$
- e) $-13x^2 + 3x + 7 = 0$
- f) $2x^2 - 6x + 3 = 0$
- g) $x - (1/x) - 3 = 0 \quad x \neq 0$
- h) $-x^2 - 2x - 2 = 0$

Solution

Nature of roots of Quadratic equation

S.no	Condition	Nature of roots
1	$b^2 - 4ac > 0$	Two distinct real roots
2	$b^2 - 4ac = 0$	One real root
3	$b^2 - 4ac < 0$	No real roots

Real roots: : (b), (d), (e), (f), (g)

No real roots : (a), (c), (h)

Question 2. Find the roots of the quadratic equation using Quadratic Formula

a) $x^2 - 3x - 10 = 0$

b) $x^2 - 11x + 30 = 0$

Solution

a)

$$x^2 - 3x - 10 = 0$$

Comparing this to $ax^2 + bx + c = 0$

We have $a = 1$, $b = -3$ and $c = -10$

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

So roots are $x = -2$ and 5

b) $x^2 - 11x + 30 = 0$

Comparing this to $ax^2 + bx + c = 0$

$a=1, b=-11$ and $c =30$

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

So

Roots are 5 and 6

Question 3. Find the roots of the quadratic equation using Quadratic formula

a) $x^2 + 4x - 5 = 0$

b) $2x^2 - 7x + 3 = 0$

Solution

a)

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

Comparing this to $ax^2 + bx + c = 0$

$a=1, b=4$ and $c = -5$

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

So

$$x = 1 \text{ or } -5$$

b)

$$2x^2 - 7x + 3 = 0$$

Comparing this to $ax^2 + bx + c = 0$

$a=2, b=-7$ and $c = 3$

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

So

$$x=1/2 \text{ or } 3$$

Question 4**Find the roots using Quadratic Formula**

a) $x^2 + (7 - x)^2 = 25$

b) $y^2 + (y+2)^2 = 580$

c) $11x^2 - 31x - 6 = 0$

d) $9 - y - 10y^2 = 0$

e) $14x + 4x^2 = 2x - 5$

g) $3y^2 + 4y = 2(y+4)$

h) $2x^2 - 5x + 3 = 0$

i) $\frac{x+1}{x-1} + \frac{x-2}{x+2} = 3, x \neq 1, x \neq -2$

j) $x^2 + 5x + 1$