

Solve using the Quadratic Formula.

Find the discriminant, determine the nature of the roots, solve.

1. $3x^2 + x - 4 = 0$

a = 3, b = 1, c = -4

Discriminant's Value: $b^2 - 4ac = (1)^2 - 4(3)(-4)$
 $= 1 + 48$
 $= 49$

#/Nature of Roots: 2 real roots

Solution: $x = \frac{-1 \pm \sqrt{49}}{2(3)}$

$x = \frac{-1 \pm 7}{6}$

$x = \frac{-1+7}{6}$
 $x = \frac{6}{6} = 1$

$x = \frac{-1-7}{6}$
 $x = \frac{-8}{6} = -\frac{4}{3}$

Solns $x=1; x=-\frac{4}{3}$

2. $b^2 - 4b = -4$

a = 1, b = -4, c = 4

$b^2 - 4b + 4 = 0$

Discriminant's Value: $b^2 - 4ac = (-4)^2 - 4(1)(4)$
 $= 16 - 16$
 $= 0$

#/Nature of Roots: 1 real root

Solution: $x = \frac{4 \pm \sqrt{0}}{2(1)}$

$x = \frac{4 \pm 0}{2}$

$x = 2$

Soln: $x=2$

$$3. x^2 + 25 = 8x$$

$$a = \underline{1}, b = \underline{-8}, c = \underline{25}$$

$$x^2 - 8x + 25 = 0$$

$$\begin{aligned} \text{Discriminant's Value: } b^2 - 4ac &= (-8)^2 - 4(1)(25) \\ &= 64 - 100 \\ &= -36 \end{aligned}$$

#/Nature of Roots: 0 real roots

$$\text{Solution: } x = \frac{8 \pm \sqrt{-36}}{2(1)} \rightarrow \text{no real root for } \sqrt{-36}$$

No solution

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

$$a = \underline{6}, b = \underline{6}, c = \underline{-9}$$

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

$$\begin{aligned} \text{Discriminant's Value: } b^2 - 4ac &= (6)^2 - 4(6)(-9) \\ &= 36 + 216 \\ &= 252 \end{aligned}$$

#/Nature of Roots: 2 real roots

$$\text{Solution: } x = \frac{-6 \pm \sqrt{252}}{2(6)}$$

$$x = \frac{-6 \pm \sqrt{36 \cdot 7}}{12}$$

$$x = \frac{-6 \pm 6\sqrt{7}}{12}$$

$$x = \frac{-1 \pm \sqrt{7}}{2}$$