

MORE ON LINEAR-QUADRATIC EQUATIONS

Thu 4 APR 2019

Solve for x :

a) $3x + 7 = 2x^2 - 7x + 1$

Question: Is this a linear or a quadratic eq?

As the right-hand side is Quadratic, we say

That all is quadratic equation

1st Step: Bring the original equation to a standard

2nd Step: Apply formula quadratic equation form: $ax^2 + bx + c = 0$

$$3x+7 = 2x^2 - 7x + 1 \quad [ax^2 + bx + c = 0]$$

$$\cancel{3x+7} - \cancel{3x} = 2x^2 - 7x + 1 - \cancel{3x}$$

$$7 = 2x^2 - 10x + 1$$

$$\cancel{7} - \cancel{7} = 2x^2 - 10x + 1 - 7$$

Step 1: $\rightarrow 0 = 2x^2 - 10x - 6$

Step 2: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow x = \frac{10 \pm \sqrt{(-10)^2 - 4 \cdot 2 \cdot (-6)}}{2 \cdot 2} = \frac{10 \pm \sqrt{148}}{4} = \frac{10 \pm 12.1655}{4}$

$a=2 \quad b=-10 \quad c=-6$

$\left[\begin{array}{l} +5.54 \\ -5.41 \end{array} \right]$

Solve for x

$$b) -3(x-2)^2 + 10 = -x - 9$$

$$-3x^2 + 12x - 12 + 10 = -x - 9$$

$$-3x^2 + 12x - 2 = -x - 9$$

$$-3x^2 + 12x - 2 + x = \cancel{-x - 9 + x}$$

$$-3x^2 + 12x - 2 + x = -9$$

$$-3x^2 + 13x - 2 = -9$$

$$-3x^2 + 13x - 2 + 9 = \cancel{-9 + 9}$$

$$\boxed{-3x^2 + 13x + 7 = 0}$$

$$\begin{aligned} \bullet (x-2)^2 &= (x-2)(x-2) = \\ &= x^2 - 2x - 2x + 4 \\ &= x^2 - 4x + 4 \end{aligned}$$

$$\bullet -3(x-2)^2 = -3x^2 + 12x - 12$$

Step 1

$$-3x^2 + 13x + 7 = 0$$

$$x = \frac{-13 \pm \sqrt{13^2 - 4(-3) \cdot 7}}{2 \cdot (-3)} =$$

$$= \frac{-13 \pm \sqrt{169 + 84}}{-6} =$$

$$= \frac{-13 \pm \sqrt{253}}{-6} \approx \frac{-13 \pm 1.59}{6} =$$

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

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

$$a = -3 \quad b = 13 \quad c = 7$$

$$+ \frac{-11.41}{6} = -1.90$$

$$- \frac{-14.59}{6} = -2.43$$