Solving Quadratic equations by completing the square 3.20.17

Welcome

Warm up: SOlve equations with x squared in it.

So we have used factoring to solve for the x-intercepts. There are other methods to solve for the x-intercept.

Given the equation:

$x^2 - 10x + 25 = 7$ Are we able to factor the left hand side of the equation? Yes it's a perfect square

So we can write $(x-5)^2 = 7$ So if we wanted to solve for x we could square root each side.

$x - 5 = \pm\sqrt{7}$ and then add 5 to both sides.

$x = 5 \pm \sqrt{7}$ Can we approximate the two solutions of this and approximate where they would be on the x-axis.

There is a necessity to make some equations into perfect squares. We can do this using algebra

$x^2 - 14x + 3 = -10$ First we need to move c the +3 to the other side

$x^2 - 14x + 0 = -10 - 3$ Then we need to replace the 0 with half of b squared $(\frac{b}{2})^2$ so $(\frac{14}{2})^2 = 49$

So we can add 49 to both sides

$x^2 - 14x + 49 = -10 - 3 + 49$ or $x^2 - 14x + 49 = 36$ Which we can then factor the left hand side

$(x-7)^2 = 36$ So solve for x we square root each side $x - 7 = \pm 6$ Then we add 7 to both sides

$x = 7 \pm 6 \; or \; x = 1, 13$

Example 2:

$x^2 + 14x - 9 = 6$

$x^2 + 14x = 6 + 9$ add 9 to each side

$x^2 + 14x + 49 = 15 + 49$ Add (half of b) squared to both sides $(\frac{b}{2})^2 \; so \; (\frac{14}{2})^2 = 49$

$(x+7)^2 = 64$ Factor the left hand side

$x + 7 = \pm 8$ Square root each side

$x = -7 \pm 8 \;\; so \; x = -15, \; 1$ Subtract 7 from each side

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