Complete the Square Practice **Monday Sept 21, 2015**

Steps for Solving by Completing the Square method

1. Arrange terms in standard form : $ax^2 + bx + c = 0$
2. "a" value MUST be equal to 1, so divide each term by the GCF to make a = 1
3. Move constant to the other side of the equation and add spaces to each side

$x^2 + bx + \_\_\_ = c + \_\_\_$

4. Find $\left(\frac{b}{2}\right)^2$ and enter this value into the blank spaces ___ on both sides of the equation
5. Rewrite left side in factored form and add the numbers on the right side
6. take the $\sqrt{\ }$ of both sides (don't forget $\pm$)
7. solve for x

Solve the quadratic equations below using complete the square method:

1. $x^2 - 8x - 16 = 3$

2. $4x^2 - 16x - 27 = 1$

3. $2x^2 - 8x = 32$

4. $5x^2 - 30x - 5$

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7. solve for x

5. $4x^2 - 24x - 3 = 1$

6. $6x^2 - 12x - 41 = 1$

7. $x^2 - 4x - 12 = 2$

8. $3x^2 - 36x - 7 = -1$

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Key

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Solve the quadratic equations below using complete the square method:

1. $x^2 - 8x - 16 = 3$
$-3 \quad -3$

$x^2 - 8x - 19 = 0$

$\left(\frac{8}{2}\right)^2 = 4^2 = 16$

$x^2 - 8x + 16 = 19 + 16$

$(x-4)^2 = 35$

$\sqrt{(x-4)^2} = \pm\sqrt{35}$

$x - 4 = \pm\sqrt{35}$

$x = 4 \pm \sqrt{35}$

2. $4x^2 - 16x - 27 = 1$

$\frac{4x^2}{4} - \frac{16x}{4} - \frac{28}{4} = \frac{0}{4}$

$x^2 - 4x - 7 = 0$

$\left(\frac{b}{2}\right)^2 = \left(\frac{-4}{2}\right)^2 = 4$

$x^2 - 4x + 4 = 7 + 4$

$\sqrt{(x-2)^2} = \pm\sqrt{11}$

$x - 2 = \pm\sqrt{11}$

$x = 2 \pm \sqrt{11}$

3. $2x^2 - 8x = 32$

$\frac{2x^2}{2} - \frac{8x}{2} - \frac{32}{2} = \frac{0}{2}$

$x^2 - 4x - 16 = 0$

$\left(\frac{-4}{2}\right)^2 = 4$

$x^2 - 4x + 4 = 16 + 4$

$\sqrt{(x-2)^2} = \pm\sqrt{20}$

$x - 2 = \pm\sqrt{20}$

$x = 2 \pm \sqrt{20}$

$2 \pm 2\sqrt{5}$

4. $5x^2 - 30x - 5 = 0$

$\frac{5x^2}{5} - \frac{30x}{5} - \frac{5}{5} = \frac{0}{5}$

$\left(\frac{b}{2}\right)^2 = \left(\frac{-6}{2}\right)^2 = 9$

$x^2 - 6x - 1 = 0$

$x^2 - 6x + 9 = 1 + 9$

$\sqrt{(x-3)^2} = \pm\sqrt{10}$

$x - 3 = \pm\sqrt{10}$

$x = 3 \pm \sqrt{10}$

1. Arrange terms in standard form : $ax^2 + bx + c = 0$
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$x^2 + bx + \_\_\_ = c + \_\_\_$

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7. solve for x

~~3.~~ $4x^2 - 24x - 3 = 1$

5)

$\frac{4x^2}{4} - \frac{24x}{4} - \frac{4}{4} = \frac{0}{4}$

$x^2 - 6x - 1 = 0$ $\quad \left(\frac{b}{2}\right)^2 = \left(\frac{6}{2}\right)^2 = 9$

$x^2 - 6x + \underline{9} = 1 + \underline{9}$

$\sqrt{(x-3)^2} = \pm\sqrt{10}$

$x - 3 = \pm\sqrt{10}$

$x = 3 \pm \sqrt{10}$

~~4.~~ $6x^2 - 12x - 41 = 1$

6)

$\frac{6x^2}{6} - \frac{12x}{6} - \frac{42}{6} = \frac{0}{6}$

$x^2 - 2x - 7 = 0$ $\quad \left(\frac{b}{2}\right)^2 = \left(\frac{-2}{2}\right)^2 = 1$

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

$\sqrt{(x-1)^2} = \pm\sqrt{8}$

$x - 1 = \pm\sqrt{8}$

$x = 1 \pm \sqrt{8}$ or $x = 1 \pm 2\sqrt{2}$

7)

~~5.~~ $x^2 - 4x - 12 = 2$ $\quad \left(\frac{4}{2}\right)^2 = 2^2 = 4$

$x^2 - 4x - 14 = 0$

$x^2 - 4x + \underline{4} = 14 + \underline{4}$

$\sqrt{(x-2)^2} = \pm\sqrt{18}$

$x - 2 = \pm\sqrt{18}$

$x = 2 \pm \sqrt{18}$

or

$x = 2 \pm 3\sqrt{2}$

8)

~~6.~~ $3x^2 - 36x - 7 = -1$ $\quad \left(\frac{12}{2}\right)^2 = 6^2 = 36$

$\frac{3x^2}{3} - \frac{36x}{3} - \frac{6}{3} = \frac{0}{3}$

$x^2 - 12x - 2 = 0$

$x^2 - 12x + \underline{36} = 2 + \underline{36}$

$\sqrt{(x-6)^2} = \pm\sqrt{38}$

$x - 6 = \pm\sqrt{38}$

$x = 6 \pm \sqrt{38}$