9.5 Completing The Square

To complete the square for $x^2 + bx$ is to add c where $c = (b/2)^2$

Ex. **Find the value of c that makes the expression a perfect square trinomial. Then write the perfect square trinomial.**

$x^2 + 8x + c$

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

$x^2 + 8x + 16$

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Find the value of c that makes the expression a perfect square trinomial. Then write the perfect square trinomial.

$x^2 - 12x + c$

$c = \left(\frac{-12}{2}\right)^2 = 36$

$x^2 - 12x + 36$

$x^2 + 5x + c$

$c = \left(\frac{5}{2}\right)^2 = \frac{25}{4}$

$x^2 + 5x + \frac{25}{4}$

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Solve by completing the square.

$x^2 - 16x = -15$

$c = \left(\frac{-16}{2}\right)^2 = 64$

$x^2 - 16x + 64 = -15 + 64$

$\sqrt{(x-8)^2} = \sqrt{49}$

$x - 8 = \pm 7$

$+8 \quad +8$

$7 + 8$

$-7 + 8$

$x = 15$ or 1

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Solve by completing the square.

$x^2 - 2x = 3$

$c = \left(\frac{-2}{2}\right)^2 = 1$

$x^2 - 2x + 1 = 3 + 1$

$\sqrt{(x-1)^2} = \sqrt{4}$

$x - 1 = \pm 2$

$+1$

$2 + 1$

$-2 + 1$

$x = 3$ or -1

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Solve by completing the square. Round to the nearest hundredth.

$x^2 - 10x = -8$

$c = \left(\frac{-10}{2}\right)^2 = 25$

$x^2 - 10x + 25 = -8 + 25$

$\sqrt{(x-5)^2} = \sqrt{17}$

$x - 5 = \pm\sqrt{17}$

$+5 \quad +5$

$x = 5 \pm \sqrt{17}$

$= 9.12$ or $.88$

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Solve by completing the square. Round to the nearest hundredth.

$x^2 + 3x = 8$

$c = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

$x^2 + 3x + \frac{9}{4} = 8 + \frac{9}{4}$

$\sqrt{\left(x + \frac{3}{2}\right)^2} = \sqrt{\frac{41}{4}}$

$x + \frac{3}{2} = \pm\frac{\sqrt{41}}{2}$

$-\frac{3}{2} \quad -\frac{3}{2}$

$x = \frac{-3 \pm \sqrt{41}}{2}$

$x = 1.70$ or -4.70

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Solve by completing the square. Round to the nearest hundredth.

$x^2 - 10x - 4 = 0$

$+4 \quad +4$

$c = \left(\frac{-10}{2}\right)^2 = 25$

$x^2 - 10x + 25 = 4 + 25$

$\sqrt{(x-5)^2} = \sqrt{29}$

$x - 5 = \pm\sqrt{29}$

$+5 \quad +5$

$x = 5 \pm \sqrt{29}$

$= 10.39 \text{ or } -.39$

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Solve by completing the square. Round to the nearest hundredth.

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

$+5 \quad +5$

$\left(\frac{3}{2}\right)^2 = \frac{9}{4}$

$x^2 + 3x + \frac{9}{4} = 5 + \frac{9}{4}$

$\sqrt{\left(x + \frac{3}{2}\right)^2} = \sqrt{\frac{29}{4}}$

$x + \frac{3}{2} = \frac{\pm\sqrt{29}}{2}$

$-\frac{3}{2} \quad -\frac{3}{2}$

$x = \frac{-3 \pm \sqrt{29}}{2}$

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Classwork: **p.608 #4 - 22 even, 26**

Final Five

What are the solutions to $x^2 + 12x = -10$?

a) $-6 \pm \sqrt{46}$ b) $-6 \pm \sqrt{26}$

c) $6 \pm \sqrt{26}$ d) $6 \pm \sqrt{46}$

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