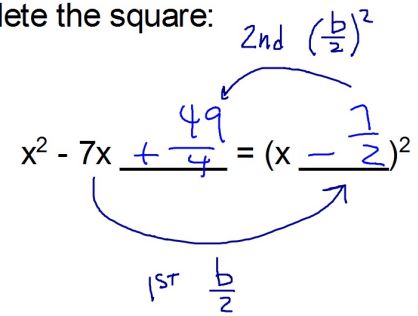
Complete the square:



Solve by completing the square.

$x^2 + 22x = 5$ $(\frac{b}{2})^2$

$x^2 + 22x + \boxed{121} = 5 + \boxed{121}$

$\frac{b}{2}$

$(x + \boxed{11})^2 = 126$

Now solve using Square Roots

Solve by Completing the Square:

1. Get the equation into the following form: $x^2 + bx = c$
2. Complete the square so the equation becomes: $(x - h)^2 = k$
3. Solve for x using Square Roots.

$ax^2 + bx = c$

Solving by completing the square works best if:

1. a = 1
2. b is even

Solve by Completing the Square.

$x^2 - 8x - 11 = 0$

$+11 \quad +11$

$x^2 - 8x + 16 = 11 + 16$

$\sqrt{(x-4)^2} = \sqrt{27}$

$x - 4 = \pm\sqrt{27} = \pm 3\sqrt{3}$

$+4 \qquad\qquad +4$

$x = 4 \pm 3\sqrt{3}$

Solve by Completing the Square.

$x^2 - 6x - 29 = 11$

$+29 \quad +29$

$x^2 - 6x + 9 = 40 + 9$

$\sqrt{(x-3)^2} = \sqrt{49}$

$x - 3 = \pm 7$

$+3 \quad +3$

$x = 10, -4$

Solve by Completing the Square.

$-x^2 - 4x + 1 = -13$

$-1 \quad -1$

$\frac{-x^2 - 4x}{-1} = \frac{-14}{-1}$

$x^2 + 4x + 4 = 14 + 4$

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

$x + 2 = \pm\sqrt{18} = \pm 3\sqrt{2}$

$-2 \qquad\qquad -2$

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

Solve by Completing the Square.

$x^2 + 10x = -21$

$x^2 + 10x + 25 = -21 + 25$

$\sqrt{(x+5)^2} = \sqrt{4}$

$x + 5 = \pm 2 - 5$

-5

$x = -3, -7$

Solve by Completing the Square.

$x^2 - 6x + 23 = 0$

$-23 \quad -23$

$x^2 - 6x + 9 = -23 + 9$

$\sqrt{(x-3)^2} = \sqrt{-14}$

$x - 3 = \pm i\sqrt{14}$

$+3 \quad +3$

$x = 3 \pm i\sqrt{14}$

Solve by Completing the Square.

$3x - x^2 = 11$

$\frac{-x^2 + 3x}{-1} = \frac{11}{-1}$

$x^2 - 3x + \frac{9}{4} = -11 + \frac{9}{4}$ → $-\frac{11}{1}\cdot\frac{4}{4} + \frac{9}{4} = -\frac{44}{4} + \frac{9}{4} = -\frac{35}{4}$

$\sqrt{(x - \frac{3}{2})^2} = \sqrt{\frac{-35}{4}}$

$x - \frac{3}{2} = \frac{\pm i\sqrt{35}}{2}$

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

$x = \frac{3}{2} \pm \frac{i\sqrt{35}}{2}$ or $\frac{3 \pm i\sqrt{35}}{2}$

Solve by Completing the Square.

$2x^2 - 36x + 10 = 0$

$-10 \quad -10$

$\frac{2x^2 - 36x}{2} = \frac{-10}{2}$

$x^2 - 18x + 81 = -5 + 81$

$\sqrt{(x-9)^2} = \sqrt{76}$ → 4.19

$x - 9 = \pm 2\sqrt{19}$

$+9 \quad +9$

$x = 9 \pm 2\sqrt{19}$

Solve by Completing the Square.

$2x^2 + 7x - 5 = 0$

$+5 \quad +5$

$\frac{2x^2 + 7x}{2} = \frac{5}{2}$

$x^2 + \frac{7}{2}x + \frac{49}{16} = \frac{5}{2} + \frac{49}{16}$ → $\frac{5}{2}\cdot\frac{8}{8} + \frac{49}{16} = \frac{40}{16} + \frac{49}{16} = \frac{89}{16}$

$\sqrt{(x + \frac{7}{4})^2} = \sqrt{\frac{89}{16}}$

$x + \frac{7}{4} = \pm\frac{\sqrt{89}}{4}$

$-7/4 \quad -7/4$

$x = \frac{-7}{4} \pm \frac{\sqrt{89}}{4}$ or $\frac{-7 \pm \sqrt{89}}{4}$

Find the coordinates of the Vertex then rewrite the equation into Vertex Form.

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

$a = 1$

LOS $x = \frac{-10}{2} = -5$

Vertex $(-5, -32)$

$(-5)^2 + 10(-5) - 7$

$y = 1(x+5)^2 - 32$

Rewrite the equation into Vertex Form by Completing the Square.

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

$+7 \qquad +7$

1st: Move the 7 to the left side of the equation

$y + 7 + 25 = x^2 + 10x + 25$

2nd: Complete the square by adding 25 to both sides of the equation

$y + 32 = (x+5)^2$

$-32 \qquad -32$

3rd: Move the 32 back to the right side of the equation

$y = (x+5)^2 - 32$

You can now finish Hwk #20 Sec 5-7

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