Completing the Square

1. Use algebra tiles to model each expression.
2. Add unit tiles to complete a perfect square trinomial.
3. Write the expression in factored form.

1) $x^2 + 4x +$ $\boxed{4}$

$(x+2)^2$
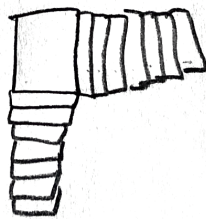
2) $x^2 + 2x +$ $\boxed{1}$

$(x+1)^2$

3) $x^2 + 10x +$ $\boxed{25}$
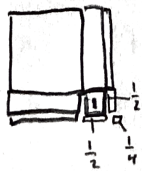
$(x+5)^2$

4) $x^2 + 8x +$ $\boxed{16}$

$(x+4)^2$

se

5) $x^2 - 6x +$ $\boxed{9}$

$(x-3)^2$

6) $x^2 + 14x +$ $\boxed{49}$

$(x+7)^2$

7) $x^2 + 3x +$ $\boxed{2.25}$

$(x+1.5)^2$

8) $x^2 - 9x +$ $\boxed{20.25}$

$(x-4.5)^2$

What is the rule for completing the square?

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

add $\left(\dfrac{b}{2}\right)^2$

Solve each equation by completing the square.

1) $x^2 + 10x = 24$

$x^2 + 10x + \boxed{25} = 24 + \boxed{25}$

$\sqrt{(x+5)^2} = \sqrt{49}$

$x + 5 = \pm 7$

$x = -5 \pm 7$

$\boxed{x = 2 \;\text{&}\; -12}$

2) $x^2 - 2x = 48$

$x^2 - 2x + \boxed{1} = 48 + \boxed{1}$

$\sqrt{(x-1)^2} = \sqrt{49}$

$x - 1 = \pm 7$

$x = 1 \pm 7$

$\boxed{x = 8 \; or \; -6}$

3) $x^2 + 6x = 16$

$x^2 + 6x + \boxed{9} = 16 + \boxed{9}$

$\sqrt{(x+3)^2} = \sqrt{25}$

$x + 3 = \pm 5$

$x = -3 \pm 5$

$\boxed{x = -8 \; or \; x = 2}$

4) $x^2 - 6x = -9$

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

$(x-3)^2 = 0$

$x - 3 = \pm 0$

$\boxed{x = 3}$

5) $x^2 - 10x + 9 = 0$

$x^2 - 10x \qquad = -9$

$x^2 - 10x + \boxed{25} = -9 + \boxed{25}$

$\sqrt{(x-5)^2} = \sqrt{16}$

$x - 5 = \pm 4$

$x = 5 \pm 4$

$\boxed{x = 1 \; or \; 9}$

6) $x^2 + 2x - 21 = 0$

$x^2 + 2x + \boxed{1} = 21 + \boxed{1}$

$(x+1)^2 = 22$

$x + 1 = \pm\sqrt{22}$

$\boxed{x = -1 \pm \sqrt{22}}$

7) $x^2 + 12x + 36 = 0$

$(x+6)^2 = 0$

$\boxed{x = -6}$ actually better by factoring!

8) $x^2 + 16x = 91$

$x^2 + 16x + \boxed{64} = 91 + \boxed{64}$

$(x+8)^2 = 155$

$x + 8 = \pm\sqrt{155}$

$\boxed{x = -8 \pm \sqrt{155}}$

Solve by Factoring (remember to take everything to one side first)

1. $x^2 = -12x - 35$

2. $6x^2 - 34x = -20$

Completing the Square

Complete the square to form a perfect square trinomial.

1. $x^2 + 4x + \boxed{}$

2. $x^2 - 16x + \boxed{}$

3. $x^2 + 7x + \boxed{}$

Solve each equation by completing the square.

4. $x^2 + 6x = -8$

5. $x^2 + 4x = 12$

6. $x^2 - 2x = 15$

7. $x^2 - 8x + 13 = 0$

8. $x^2 + 6x + 34 = 0$

9. $x^2 - 2x - 35 = 0$

10. A rectangular pool has an area of 880 ft². The length is 10 feet longer than the width. Write an equation and solve by completing the square. Then plug back in to find the dimensions of the pool. Round answers to the nearest tenth of a foot.