Warmup

Factor the following:

① $7x^2 - 31x - 20$

-140: $4 \cdot -35$

	$7x$	4
x	$7x^2$	$4x$
-5	$-35x$	-20

$(7x+4)(x-5)$

② $4x^2 - 169$

$2x \cdot 2x$, -13, 13

$(2x+13)(2x-13)$

③ $\frac{3x^2}{3} - \frac{15x}{3} - \frac{42}{3}$

$3(x^2 - 5x - 14)$

-14: $-7 \cdot 2$

$3(x-7)(x+2)$

Find the roots (set = 0 and solve)

④ $3x^2 + 2 = 5x$

$-5x \quad -5x$

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

6: $-2 \cdot -3$

	$3x$	-2
x	$3x^2$	$-2x$
-1	$-3x$	2

$(3x-2)(x-1)=0$

⑤ $x^2 - 81 = 0$

$x \cdot x$, -9, 9

$(x-9)(x+9)=0$

$x-9=0 \quad x+9=0$

$+9 \quad +9 \quad -9 \quad -9$

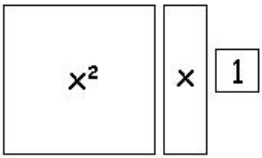
$x=9 \quad x=-9$

GSE Algebra 1

8.4 - Complete the Square

Name: _____

We are going to use the following "tiles" below to help us understand complete the square. Use your imagination.



1.) Review factoring with the following problems.

A.) x^2+2x+1

$(x+1)(x+1)$

B.) x^2+4x+4

$(x+2)(x+2)$

C.) x^2+6x+9

$(x+3)(x+3)$

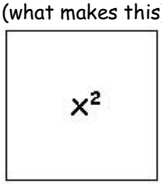
$(x+3)^2$

D.) $x^2+8x+16$

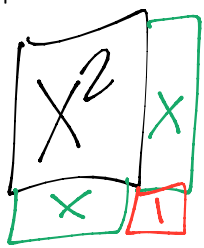
$(x+4)(x+4)$

* Perfect Square trinomials

2.) x^2 is already a complete square. You can see that represented with algebra tiles. (what makes this)

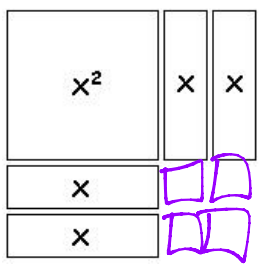


3.) $x^2 + 2x$ isn't a complete square. How much do we need to add to it to "complete" it?



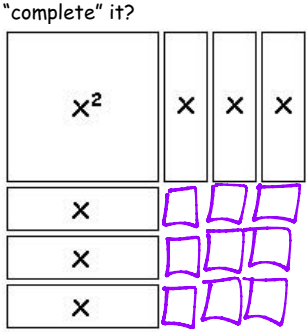
x^2+2x+1

4.) $x^2 + 4x$ isn't a complete square. How much do we need to add to it to "complete" it?



x^2+4x+4

5.) $x^2 + 6x$ isn't a complete square. How much do we need to add to it to "complete" it?



x^2+6x+9

6.) $x^2 + 8x$ isn't a complete square. How much do we need to add to it to "complete" it?

$x^2+8x+16$

7.) Have you found a pattern yet?

$\frac{1}{2}b$ term

Square # to get C

8.) Complete the squares:

x^2+10x $\frac{10}{2}$ $+25$ $\quad (5)^2=25$

x^2+14x $\frac{14}{2}$ $+49$ $\quad (7)^2=49$

x^2+3x $\frac{3}{2}$ $+2.25$ $\quad (1.5)^2=2.25$

x^2+bx $\frac{b}{2}$ $+\frac{b^2}{4}$ $\quad \left(\frac{b}{2}\right)^2=\frac{b^2}{4}$

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

x^2+4x+4

Practice completing the square.

$x^2 - 14x + \_\_\_\_$ → $\frac{-14}{2} = -7$, $(-7)^2 = 49$

$x^2 - 12x + 36$ → $\frac{-12}{2} = -6$, $(-6)^2 = 36$

$x^2 + 4x + 4$ → $\frac{4}{2} = 2$, $(2)^2 = 4$

$x^2 - 9x + 20.25$ → $(-4.5)^2 = 20.25$

$x^2 + 20x + 100$ → $(10)^2 = 100$

$x^2 - 30x + 225$ → $(-15)^2 = 225$

$x^2 - 11x + 30.25$ → $(-5.5)^2 = 30.25$

$x^2 - 15x + 56.25$ → $(-7.5)^2 = 56.25$

$x^2 + x + 0.25$ → $(\frac{1}{2})^2 = 0.25$

*Cannot complete the square until $A = 1$

Before you divide the middle term by 2, you need to take out the GCF. For these, it is ONLY going to be a NUMBER.
Let's do the first one to show you how to complete the rest.

$2x^2 - 4x + \_\_\_\_$ → $\frac{2x^2}{2} - \frac{4x}{2}$

* $2(x^2 - 2x + \_\_\_\_)$ → $\frac{-2}{2} = -1$, $(-1)^2 = 1$

$2(x-1)(x-1)$

$5x^2 + 20x + \_\_\_\_$ → $\frac{5x^2}{5} + \frac{20x}{5}$

$5(x^2 + 4x + 4)$ → $\frac{4}{2} = 2$, $(2)^2 =$

$3x^2 - 15x + \_\_\_\_$ → $\frac{3x^2}{3} - \frac{15x}{3}$

$3(x^2 - 5x + 6.25)$ → $\frac{-5}{2} = -2.5$, $(-2.5)^2$

$4x^2 - 24x + \_\_\_\_$ → $\frac{4x^2}{4} - \frac{24x}{4}$

$4(x^2 - 6x + 9)$ → $\frac{-6}{2} = -3$, $(-3)^2$

$10x^2 + 10x + \_\_\_\_$ → $\frac{10x^2}{10} + \frac{10x}{10}$

$10(x^2 + x + 0.25)$ → $\frac{1}{2}$, $(\frac{1}{2})^2 = 0.25$