6.3 Completing the Square

Recap: a) $(x+4)^2$ b) $(x-3)^2$ c) $(x+a)^2$

Are these perfect squares? How else could you write them?

a) $y = x^2 + 2x + 1$ b) $x^2 - 6x + 9$

What numbers could complete the square?
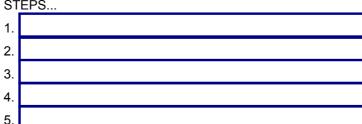
a) $y = x^2 + 10x + ?$ b) $x^2 + ?x + 36$ a) $y = x^2 + 7x + ?$

The process of finding the "?" to make a perfect square trinomial can also be used to change an expression into vertex form. In this case, however, we can't just make the number we want magically appear, so we must use a little trick.........

Example 1: Write the quadratic relation $y = x^2 - 8x - 2$ in vertex form.
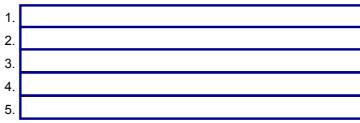
$y = x^2 - 8x - 2$

STEPS...

1.	
2.	
3.	
4.	
5.	

- →

Example 2: Write the quadratic relation $y = 3x^2 + 18x + 20$ in vertex form.

$y = 3x^2 + 18x + 20$

STEPS...

1.	
2.	
3.	
4.	
5.	

Example 3: Write the quadratic relation $y = 2x^2 + 9x + 5$ in vertex form.

So what's the point?

Well, now we have ANOTHER way (and maybe a weeeee bit faster) to get a expression into vertex form... which is useful for finding the vertex, and for solving.

Try this one:

Gumdrop Joe slips on the slippery FH parking lot and falls to the ground. His hat however flies into the air with the greatest of ease. The height of his hat is described by the equation $h = -5t^2 + 20t + 1$

(a) What is the maximum height of the hat?

(b) When will the hat hit the ground?