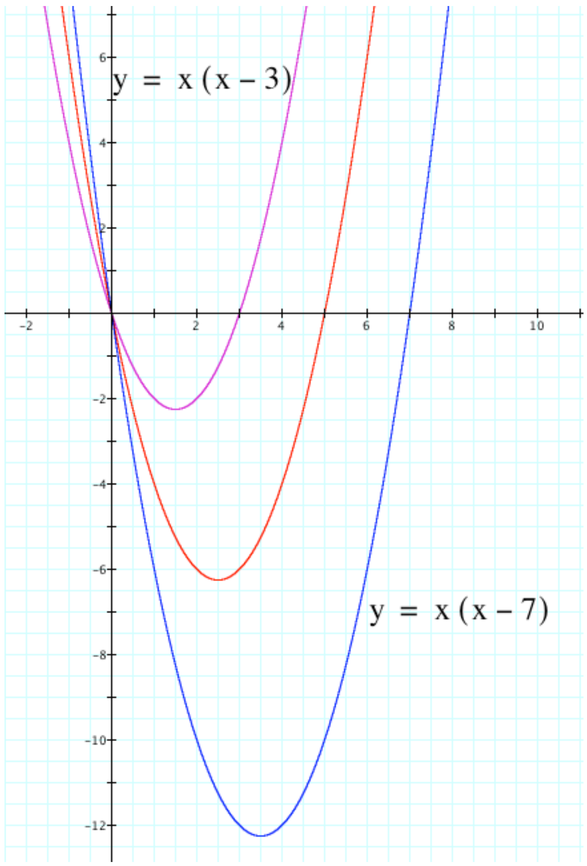
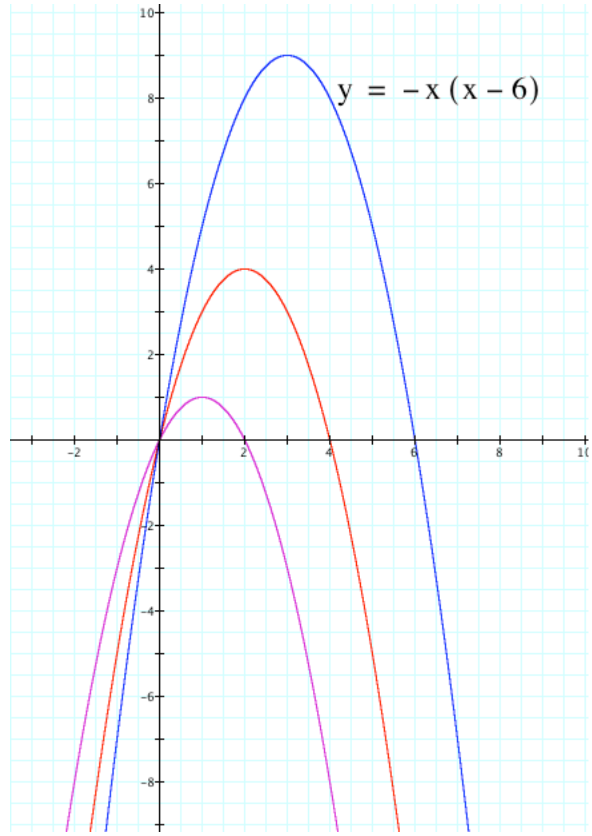
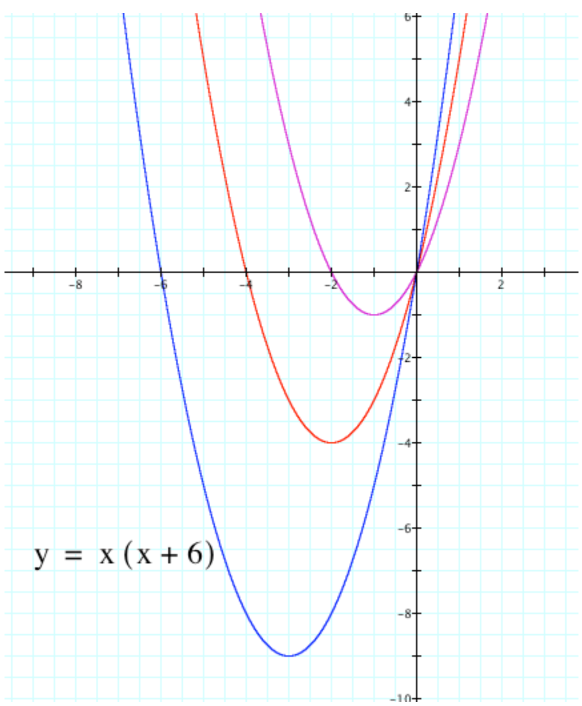
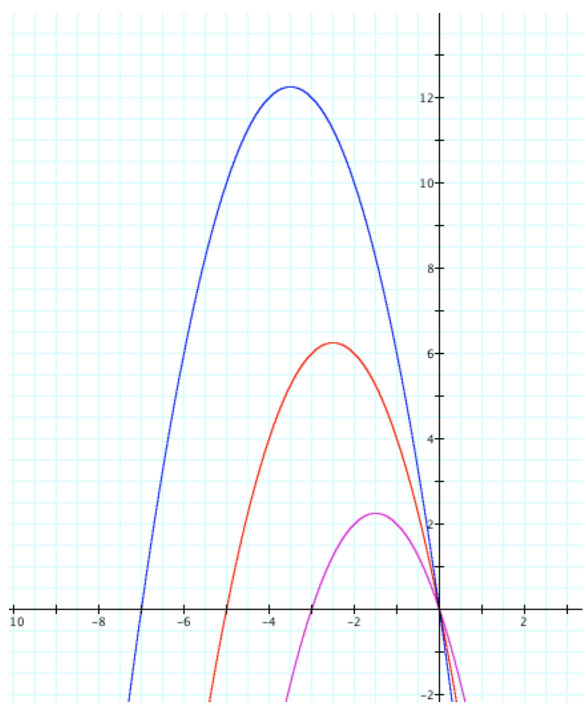
QUADRATIC FUNCTIONS REMEDIATION

Graphing quadratics of the form $y = x(x - b)$. Write the equations of the unknown graphs







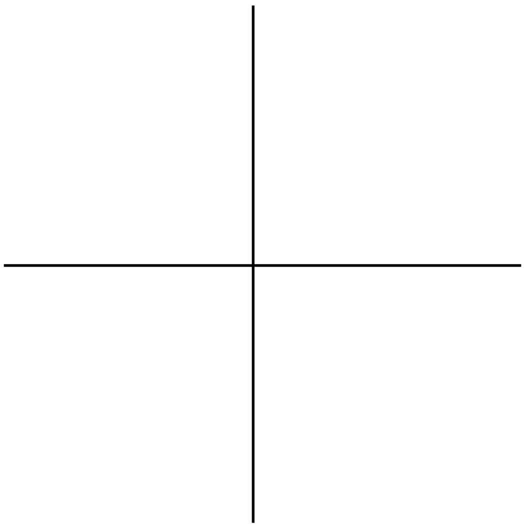


What is common to all of the above graphs? What's this connection to the equation?

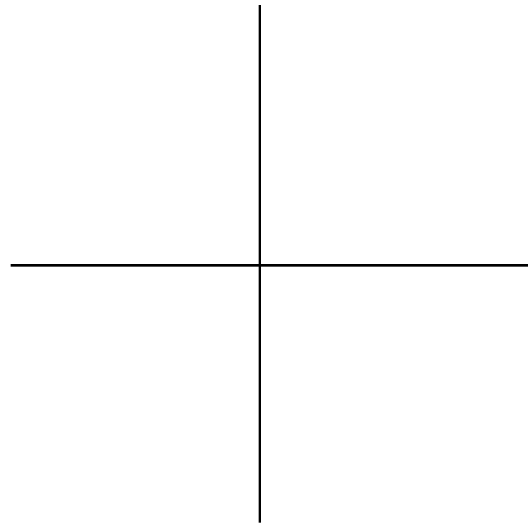
Note: the form $y = x^2 - bx$ can be factored to $y = x(x - b)$.

Factor the following then sketch the graphs on each set of axes.

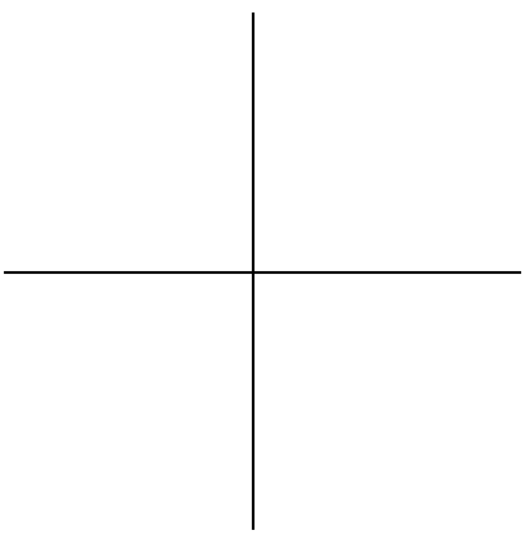
$y = x^2 - 11x$



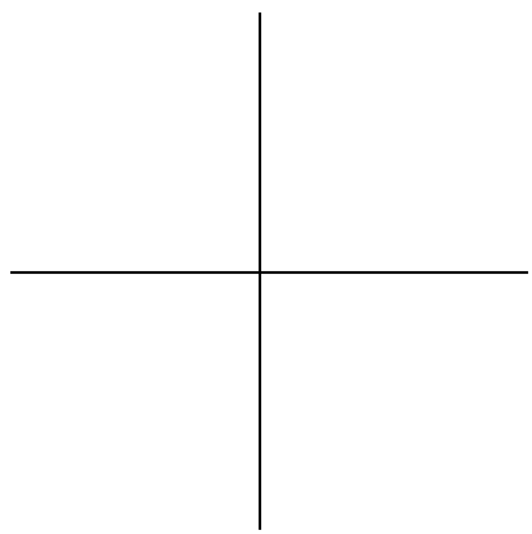
$y = -x^2 - 8x$



$y = x^2 + 10x$

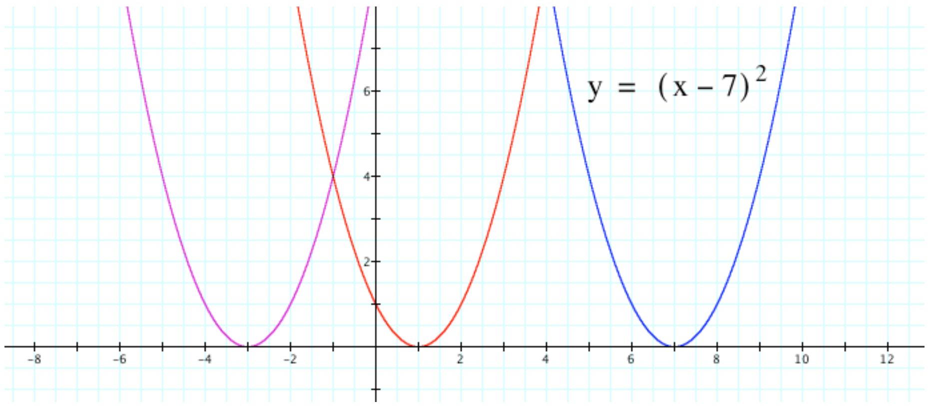


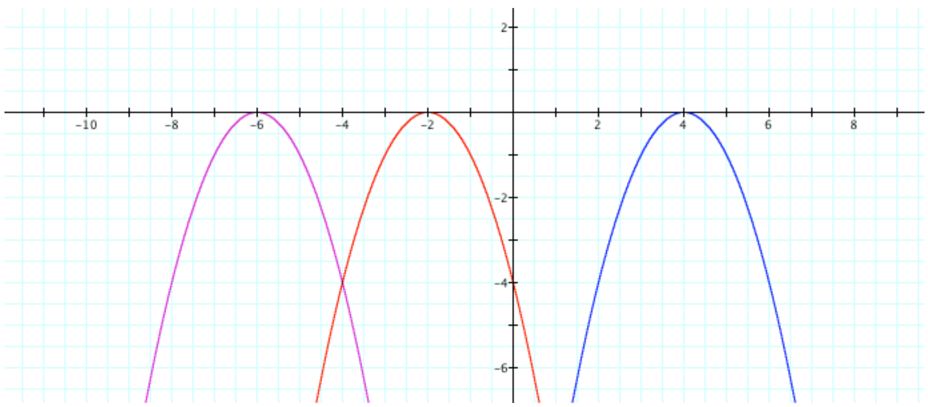
$y = -x^2 + 9x$



How do you know where the x intercepts are from the factored form of the equation?

Graphing quadratics of the form $y=(x-p)^2$. Write the equations of the unknown graphs.





Note: the form $y=x^2-2p+p^2$ is a perfect square. It can be factored to $y=(x-p)(x-p)$ which equals $y=(x-p)^2$. The form $y=x^2+2p+p^2$ is also a perfect square. It an be factored to $y=(x+p)(x+p)$ which equals $y=(x+p)^2$.

Here are a some examples:

$y=x^2-10x+25$
$y=x^2-2(5)x+5^2$
$y=(x-5)(x-5)$
$y=(x-5)^2$

$y=x^2+12x+36$
$y=x^2+2(6)x+6^2$
$y=(x+6)(x+6)$
$y=(x+6)^2$

$y=x^2-14x+49$
$y=x^2-2(7)x+7^2$
$y=(x-7)(x-7)$
$y=(x-7)^2$

$y=x^2+18x+64$
$y=x^2-2(9)x+8^2$
Not a perfect square.

Factor those which are perfect squares then sketch.

$y = x^2 + 6x + 9$

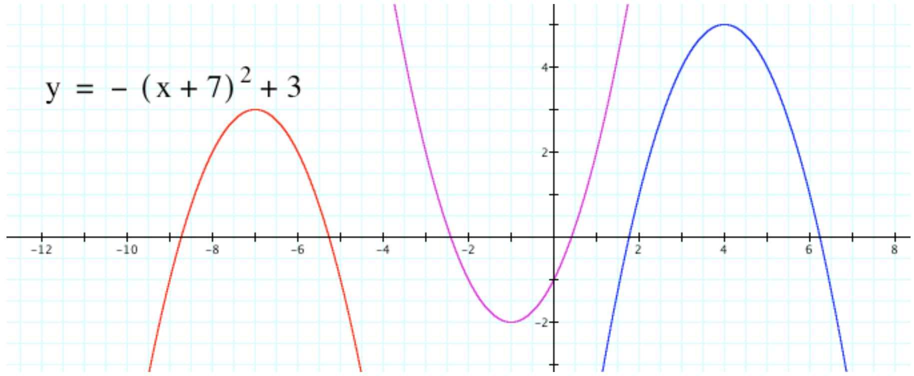
$y = x^2 - 8x + 16$

$y = x^2 + 12x + 25$

$y = x^2 - 4x + 4$

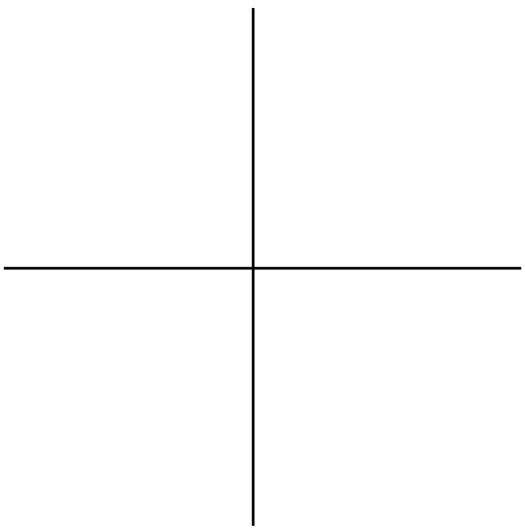
Explain how you know if a trinomial is a perfect square.

Graphing quadratics of the form $y=(x-p)^2+q$. Write the equations of the unknown graphs.

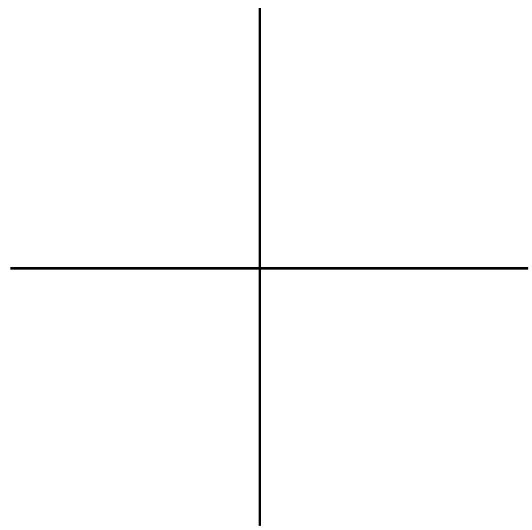


Sketch the following:

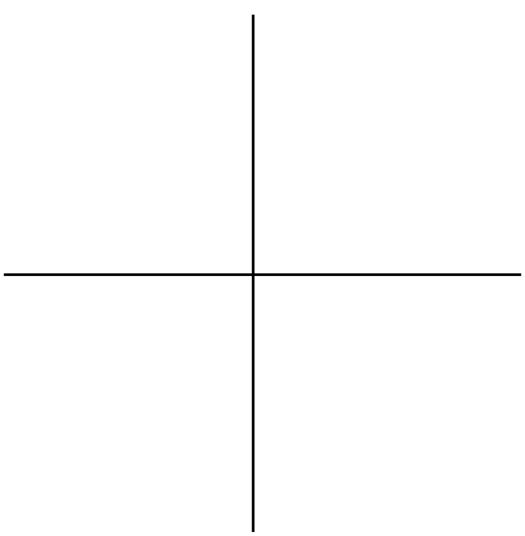
$y=(x-8)^2-3$



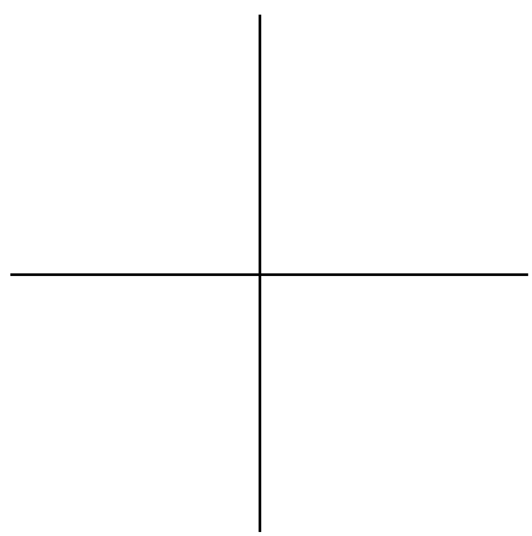
$y=(x-1)^2+2$



$y=-(x+5)^2+4$



$y=-(x+6)^2-7$



Note: the form $y = ax^2 + bx + c$ can be written such that part of it is a perfect square.

For a trinomial to be a perfect square, half of the coefficient of the middle term, $\frac{b}{2}$, must be equal to the square root of the last term, $\sqrt{c}$.

Here are a couple examples of how to complete the square.

(Divide the coefficient of the middle term by 2 then add and subtract its square.)

$$y = x^2 + 6x + 15$$

$$y = x^2 + 6x + \left(\frac{6}{2}\right)^2 - \left(\frac{6}{2}\right)^2 + 15$$

$$y = \left(x^2 + 6x + \left(\frac{6}{2}\right)^2\right) - \frac{36}{4} + \frac{60}{4}$$

$$y = \left(x + \frac{6}{2}\right)^2 + \frac{24}{4}$$

$$y = (x + 3)^2 + 6$$

$$y = 2x^2 - 16x + 37$$

$$y = 2(x^2 - 8x) + 37$$

$$y = 2\left(x^2 - 8x + \left(\frac{8}{2}\right)^2 - \left(\frac{8}{2}\right)^2\right) + 37$$

$$y = 2\left(x^2 - 8x + \left(\frac{8}{2}\right)^2\right) - 2\left(\frac{8}{2}\right)^2 + 37$$

$$y = 2\left(x^2 - 4x + (4)^2\right) - 2(4)^2 + 37$$

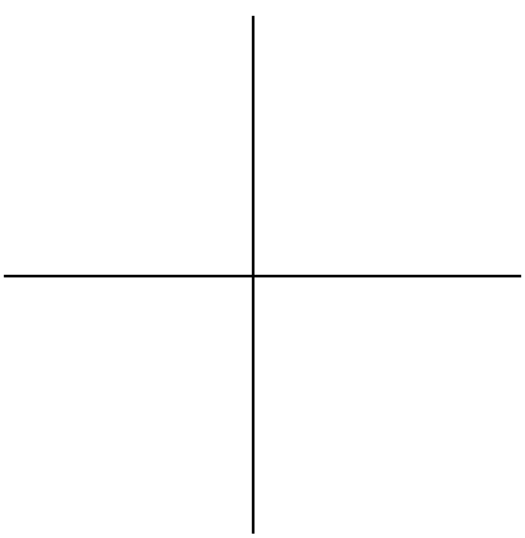
$$y = 2(x - 4)^2 - 32 + 37$$

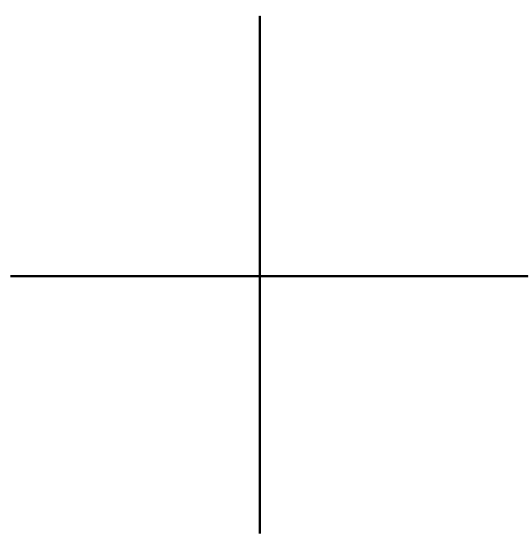
$$y = 2(x - 4)^2 + 5$$

Complete the squares of the following then sketch.

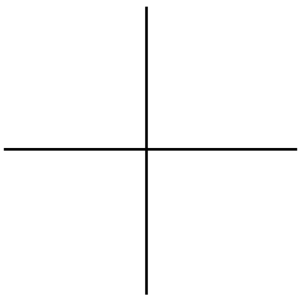
$y = x^2 + 10x + 20$

$y = x^2 + 14x - 3$

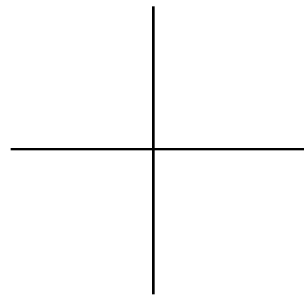




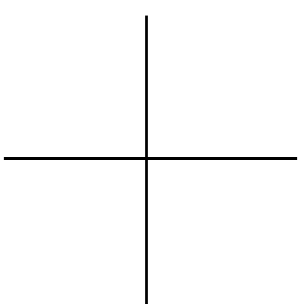
$y = x^2 - 11x + 5$



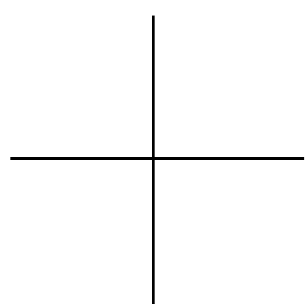
$y = x^2 - 5x + 12$



$y = 2x^2 + 12x + 3$



$y = 2x^2 - 8x + 14$



$y = 3x^2 - 24x + 1$

$y = 3x^2 - 14x - 5$