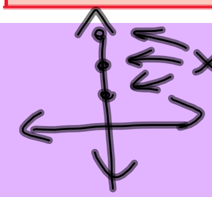
Roots and Graphs

➔ For quadratic functions in standard form $y = ax^2 + bx + c$, the graph crosses the y-axis at $(0, c)$.
The equation of the axis of symmetry is $x = \frac{-b}{2a}$.



x is zero on the y-axis

yes, but why?

$y = a(0)^2 + b(0) + c$

....hmmm

$y = 0 + 0 + c$

$y = c$

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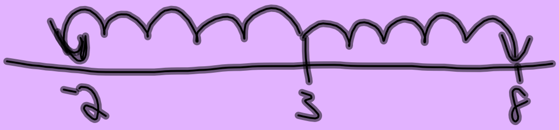
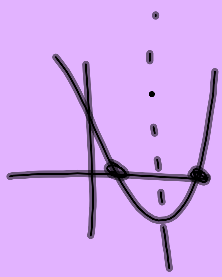
WHAT IS IT ABOUT THE STRUCTURE OF THIS ?

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b}{2a} - \frac{\sqrt{b^2-4ac}}{2a}, \quad \frac{-b}{2a} + \frac{\sqrt{b^2-4ac}}{2a}$$

$3 - 5 \qquad 3 + 5$





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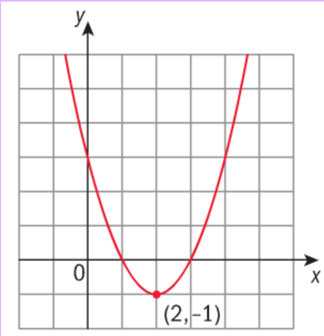
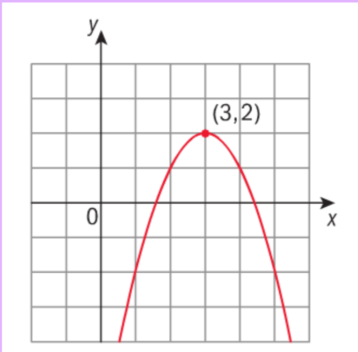
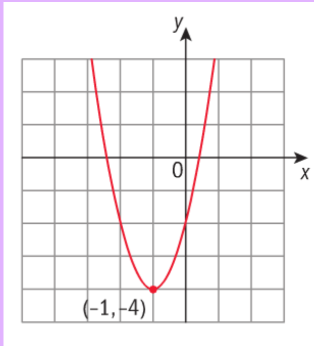
$y = (x-2)^2 - 1$

$y = 2(x+1)^2 - 4$

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







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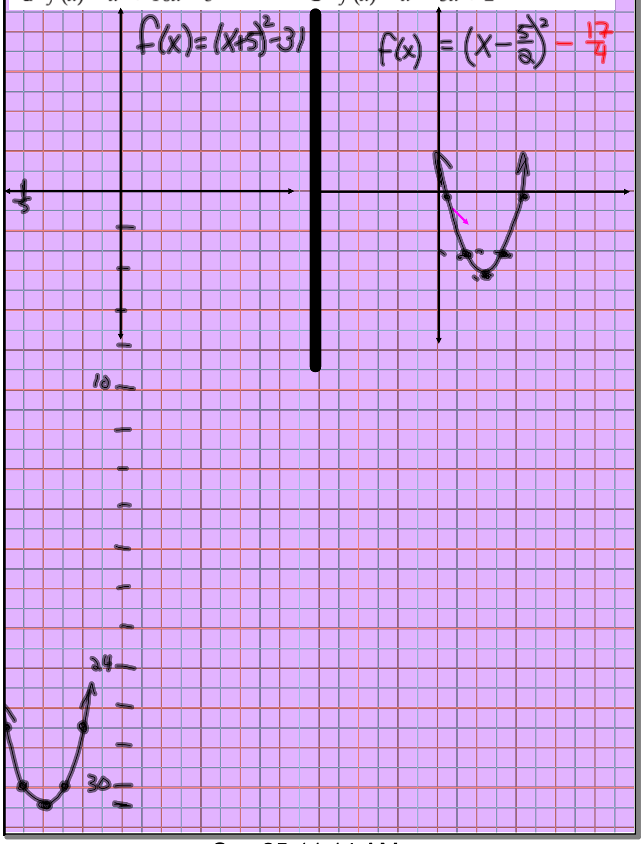
Write each function in the form $f(x) = a(x-h)^2 + k$. Then sketch the graph of the function, labeling the vertex and the y-intercept.

a $f(x) = x^2 + 10x - 6$

$f(x) = (x+5)^2 - 31$

b $f(x) = x^2 - 5x + 2$

$f(x) = (x - \frac{5}{2})^2 - \frac{17}{4}$



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$$f(x) = x^2 - 5x + 2$$

$$f(x) = x^2 - 5x + \frac{25}{4} + 2 - \frac{25}{4}$$

$$f(x) = \left(x - \frac{5}{2}\right)^2 - \frac{17}{4}$$

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$$f(x) = x^2 + 10x - 6$$

$$f(x) = \underbrace{x^2 + 10x + 25}\ -6-25$$

$$f(x) = (x+5)(x+5) - 31$$

$$f(x) = (x+5)^2 - 31$$

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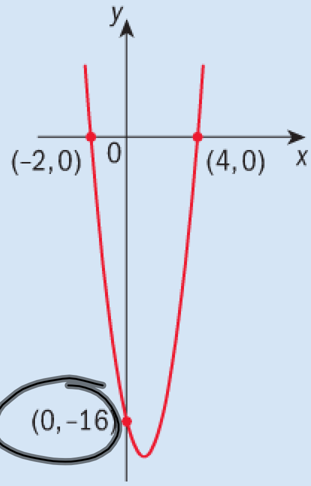
Using the information provided in the graph, write the equation of the quadratic function. Write your final answer in standard form $y = ax^2 + bx + c$.



$y = a(x+2)(x-4)$

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

$-16 = a(-8)$

$2 = a$

$y = 2x^2 - 4x - 16$

$x = -2 \quad x = 4$

$a(x+2)(x-4)$

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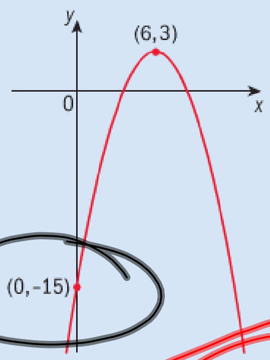
Write the equation of the quadratic function shown in the graph.
Write your final answer in standard form $y = ax^2 + bx + c$.



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

$-15 = a(0-6)^2 + 3$

$-15 = a(36) + 3$

$-18 = a(36)$

$-\frac{1}{2} = a$

$y = -\frac{1}{2}(x-6)^2 + 3$

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