

CALCULATOR SIDE

1. Find the quadratic function that goes through the points $(-2, 7)$, $(6, 19)$ and $(16, 106)$

$$f(x) = .4x^2 - .1x + 5.2$$

Based on your quadratic function, what is $f(3)$?

$$f(3) = 8.5$$

2. *Trajectory of a Ball:* The path of a ball thrown by a child is modeled by the equation $y = -\frac{1}{10}x^2 + x + 3$ where y is the height (in feet) above the ground and x is the horizontal distance (in feet) from where the ball is thrown.

- a. How high off the ground is the ball when it leaves the child's hand?

$$\begin{array}{l} \text{y, int} \\ 3 \text{ feet} \end{array}$$

- b. How high above the ground is the ball when it is at its maximum height?

$$x = \frac{-b}{2a} = \frac{-1}{2(-\frac{1}{10})} = 5$$

$$\begin{array}{l} y = -\frac{1}{10}(5)^2 + 5 + 3 \\ = \boxed{5.5 \text{ feet}} \end{array}$$

- c. How far from the child does the ball strike the ground?

$$0 = -\frac{1}{10}x^2 + x + 3$$

$$x = \frac{-1 \pm \sqrt{1 - 4(-\frac{1}{10})(3)}}{-1/5} = \boxed{12.42 \text{ feet}}$$

3. Find the particular equation of the quadratic function with vertex $(2, 3)$ and y -intercept of 5 . $(0, 5)$

$$\begin{array}{l} y = a(x-h)^2 + k \\ 5 = a(0-2)^2 + 3 \\ 5 = 4a + 3 \\ 2 = 4a \\ \frac{1}{2} = a \end{array}$$

$$\begin{array}{l} y = \frac{1}{2}(x-2)^2 + 3 \\ \text{OR} \\ y = \frac{1}{2}x^2 - 2x + 5 \end{array}$$

NO CALCULATOR ON THIS SIDE

4. Given the function $f(x) = 2x^2 + bx + 6$. The value of b is chosen so that the point $(3, 12)$ is on the graph of this parabola. What is the ordered pair of the vertex?

$$12 = 2(3)^2 + b(3) + 6$$

$$12 = 18 + 3b + 6$$

$$-12 = 3b$$

$$-4 = b$$

$$f(x) = 2x^2 - 4x + 6$$

$$x = \frac{4}{2 \cdot 2} = 1$$

$$y = 2(1)^2 - 4(1) + 6 = 4$$

$$V: (1, 4)$$

5. Graph the following function: $f(x) = 2x^2 + 4x - 6$. Be sure to find and label coordinates of the vertex, x-intercept(s), y-intercept and symmetric point to y-intercept.

$$V: x = \frac{-4}{2 \cdot 2} = -1$$

$$(-1, -8)$$

$$y = 2(-1)^2 - 4 - 6 = -8$$

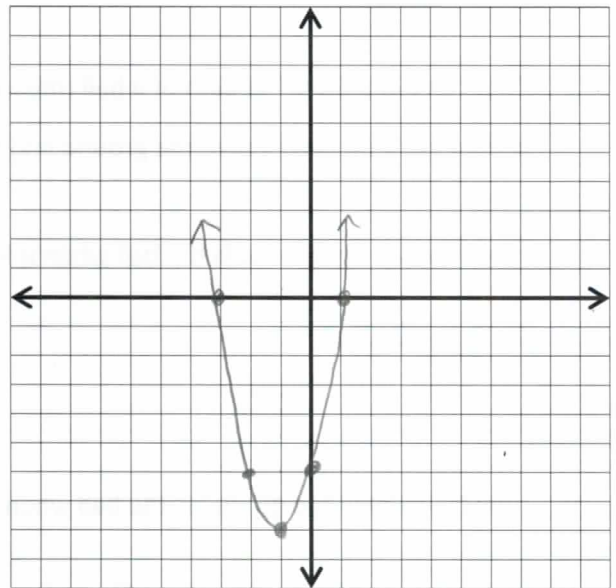
$$\begin{array}{l} \text{y-int} \\ (0, -6) \end{array} \quad \begin{array}{l} \text{sym. pt} \\ (-2, -6) \end{array}$$

x-int

$$0 = 2(x^2 + 2x - 3)$$

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

$$x = -3, 1$$



6. Solve: $7x^2 - 5x = 3$

$$7x^2 - 5x - 3 = 0$$

$$x = \frac{5 \pm \sqrt{25 - 4(7)(-3)}}{14}$$

$$= \frac{5 \pm \sqrt{25 + 84}}{14}$$

$$= \frac{5 \pm \sqrt{109}}{14}$$

7. Solve: $x^2 + 2x + 26 = 0$

$$x = \frac{-2 \pm \sqrt{4 - 4 \cdot 26}}{2} = \frac{-2 \pm \sqrt{-100}}{2}$$

$$= \frac{-2 \pm 10i}{2} = \boxed{-1 \pm 5i}$$