

HONORS ALGEBRA 2
Chapter 6
Test A – KEY

Name _____
Date _____
Period _____

The solutions are in blue for each problem on the test. Calculators were allowed.

Solve each equation or inequality.

1. $6x^2 - 7x - 3 = 0$

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

$$x = -\frac{1}{3}, \frac{3}{2}$$

2. $5 - (2c + 3)^2 = -11$

$$(2c + 3)^2 = 16$$

$$2c + 3 = \pm 4$$

$$c = \frac{-3 \pm 4}{2}$$

$$c = -\frac{7}{2}, \frac{1}{2}$$

3. $n^2 > n + 12$

$$n^2 - n - 12 > 0$$

$$(n+3)(n-4) > 0$$



$$(-\infty, -3) \cup (4, \infty)$$

4. $y^2 + 4y + 29 = 0$

$$y = \frac{-(4) \pm \sqrt{(4)^2 - 4(1)(29)}}{2(1)}$$

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

$$= \frac{-4 \pm 10i}{2}$$

$$= -2 \pm 5i$$

A catapult launches a projectile from a 70-meter cliff with an upward vertical velocity of 25 meters per second. Use the model $h(t) = -\frac{1}{2}gt^2 + v_0t + h_0$ to answer the following.

5. Write $h(t)$ to model the projectile's height from the ground with respect to time.

Gravity is $g = 9.8 \text{ m/s}^2$, initial velocity is $v_0 = 25 \text{ m/s}$, and initial height is $h_0 = 70 \text{ m}$.

$$h(t) = -\frac{1}{2}(9.8)t^2 + (25)t + (70)$$

$$h(t) = -4.9t^2 + 25t + 70$$

6. Find the maximum height of the projectile.

The maximum height occurs at the vertex, when $t = \frac{-b}{2a} = \frac{-25}{-9.8} = 2.55102$.

The maximum function value is $y = h(2.55102) = 101.88776$.

Therefore, the maximum height is about 102 meters.

7. How long will the projectile be in the air from launch to landing?

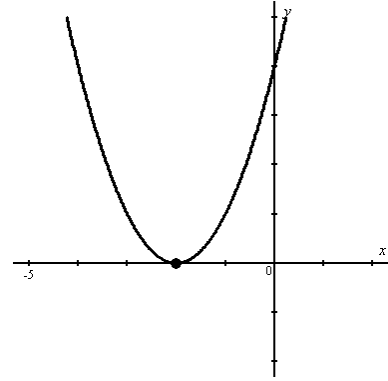
The projectile will hit the ground when $h(t) = 0$.

$$0 = -4.9t^2 + 25t + 70$$

$$t = -2.009, 7.111$$

Therefore, the projectile is in the air for about 7.1 seconds.

Suppose the graph of $f(x) = ax^2 + bx + c$ is shown at the right. Answer the following.



8. State the vertex and axis-of-symmetry of the parabola.

vertex: $(-2, 0)$

axis-of-symmetry: $x = -2$

9. What is the significance of the vertex for the function?

It is the minimum value of the function.

It is the point where the parabola changes from decreasing to increasing.

The vertex is also the x -intercept, which shows the solution $x = -2$ for the equation $ax^2 + bx + c = 0$.

10. Describe the domain and range of $f(x)$.

domain: $(-\infty, \infty)$

range: $[0, \infty)$

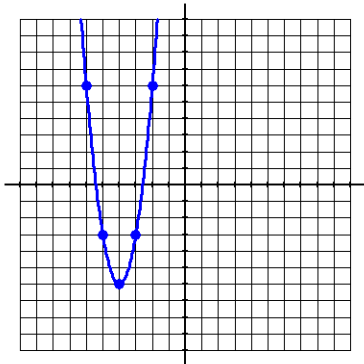
11. Find the intervals of increase and decrease for $f(x)$.

increase: $(-2, \infty)$

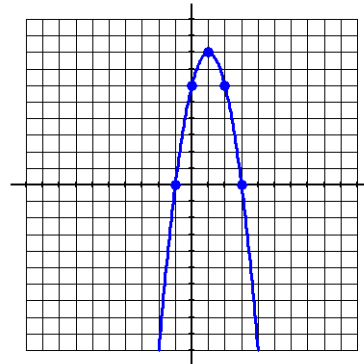
decrease: $(-\infty, -2)$

Graph each equation or inequality in the window provided.

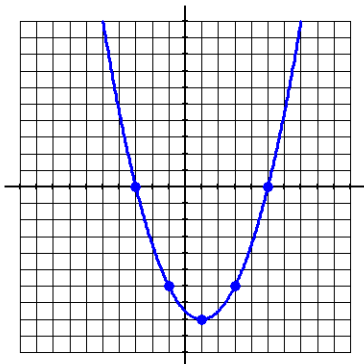
12. $g(x) = 3(x+4)^2 - 6$



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



14. $h(x) = \frac{1}{2}(x+3)(x-5)$



15. $y < 9 - x^2$

