

Unit 9 Test Review

Name _____ Per _____

Solve each of the following quadratic equations.

1. $x^2 - x - 12 = 0$	2. $x^2 - 40 = -3x$
3. $3(x-9)^2 = 81$	4. $x^2 - 25 = 0$
5. $5x^2 - 35x + 60 = 0$	6. $2x^2 + 4x - 1 = 7x^2 - 7x + 1$

7. Factor completely.

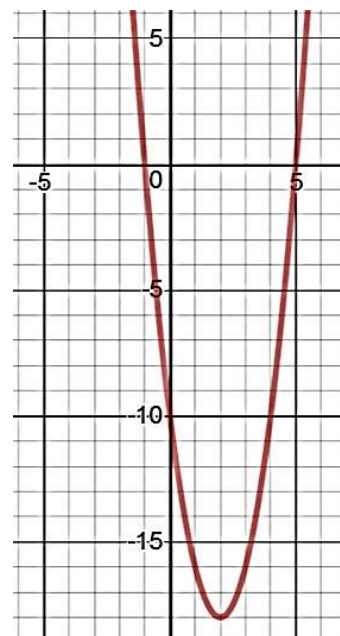
a. $x^2 - 11x + 30$	b. $h^2 + h - 90$
c. $3n^2 - 27$	d. $15m^2 - 27m - 6$

8. Use the function $m(x) = -(x + 5)(x - 3)$ to answer the following.

<p>a. What is the vertex?</p>	<p>b. Does $m(x)$ have a maximum or minimum? Explain how you know.</p>
<p>c. What is the y-intercept?</p>	<p>d. If the zeros are at $x=a$ and $x=b$, where $a < b$, then what are the values of a and b?</p> <p>a= _____</p> <p>b= _____</p>
<p>e. What is $m(7)$?</p>	<p>f. What is the axis of symmetry?</p>

9. Use the graph to the right to answer the following questions.

<p>a. What is the minimum value?</p>	<p>b. What are the roots?</p>
<p>c. What is the equation of the parabola in standard form?</p>	<p>d. Is the point $(-3, 32)$ on this parabola? Show your work.</p>



10. Use the function $n(x) = 3x^2 - 18x + 24$ for the following.

<p>a. Which of the following are equivalent to the function above? Circle all that apply.</p> <p>i. $n(x) = 3(x - 2)(x - 4)$ ii. $n(x) = (3x - 6)(x - 4)$ iii. $n(x) = (x - 2)(x - 4)$ iv. $n(x) = 3(x^2 - 6x + 8)$ v. $n(x) = (3x - 6)(3x - 12)$ vi. $n(x) = (x - 2)(3x - 12)$</p>	<p>b. What are the x-intercepts?</p>
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11. The area of a rectangular garden can be modeled by the expression $4x^2 - 10x - 24$. Rewrite the area in terms of its linear factors.

12. A rectangle has a base that is one less than three times its height. The area of the rectangle is 10 square meters. What are the dimensions of the rectangle? Solve using algebra.

13. Two consecutive even integers have a product of 288. What are the integers? Solve using algebra.

14. What are two other vocabulary words used to describe x-intercepts? _____

Graph each of the following quadratic functions (including the dashed axis of symmetry). Identify all key features of the graph.

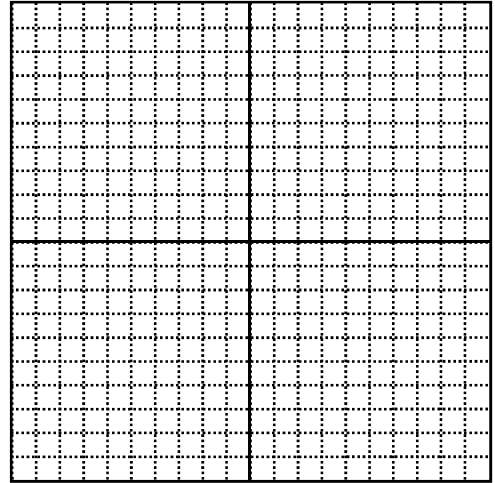
15. $f(x) = -x^2 - 6x - 5$

x-intercept(s) _____

y-intercept _____

vertex _____

axis of symmetry _____



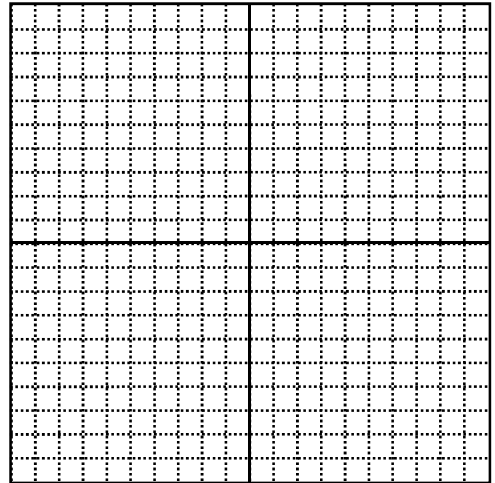
16. $g(x) = 2(x-1)(x-3)$

root(s) _____

y-intercept _____

vertex _____

axis of symmetry _____



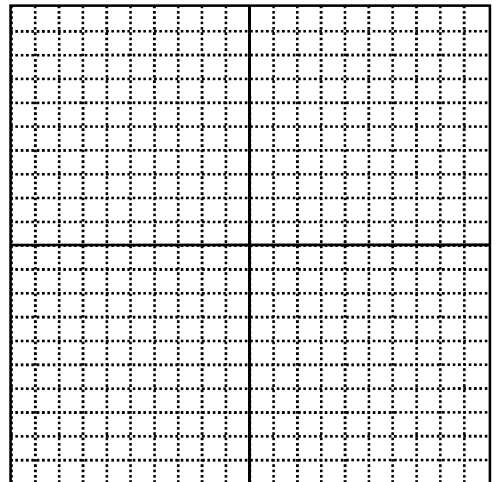
17. $h(x) = 3x^2 + 12x + 9$

zero(s) _____

y-intercept _____

vertex _____

axis of symmetry _____



18. A cannonball is shot from an initial height of 112 feet. The following equation models the height of the cannonball, h , with respect to time, t , in seconds.

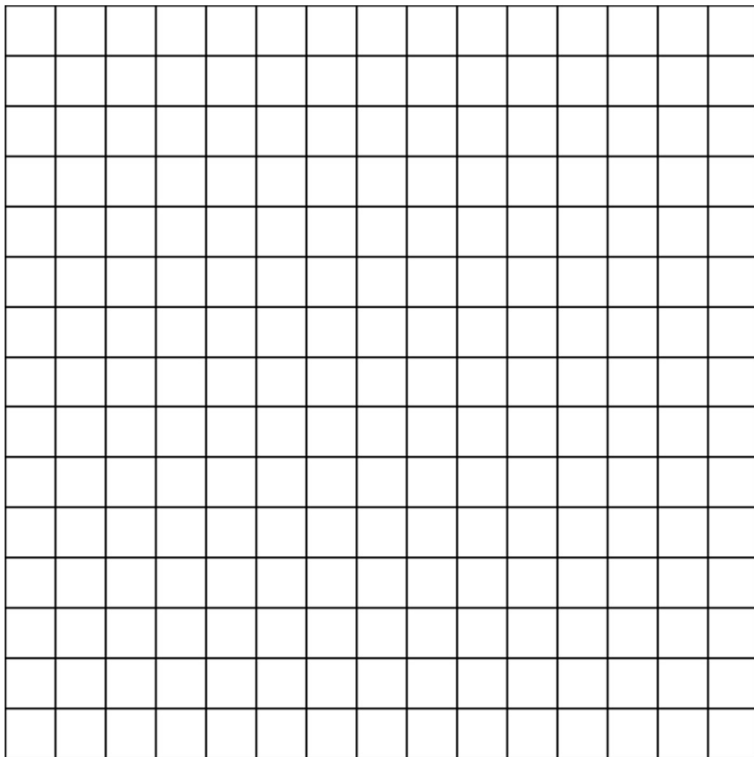
$$h(t) = -16t^2 + 96t + 112$$

a. What is the maximum height reached by the cannonball?

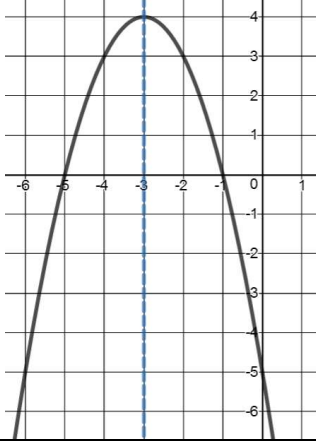
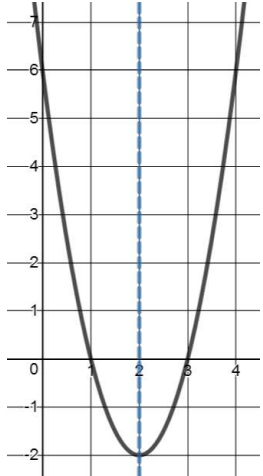
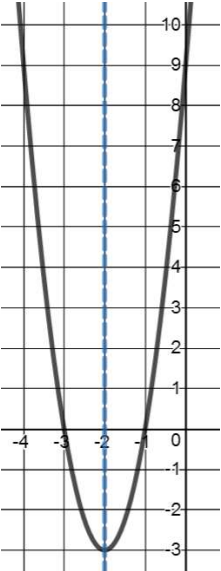
b. When does the cannonball reach its maximum height?

c. How long is it until the cannonball hits the ground?

d. Graph the function. Use appropriate scales and labels.



Answer Key

1. $x = 4, -3$	2. $x = 5, -8$	3. $x = 9 \pm 3\sqrt{3}$
4. $x = \pm 5$	5. $x = 3, 4$	6. $x = \frac{1}{5}, 2$
7. a. $(x - 5)(x - 6)$ b. $(h - 9)(h + 10)$ c. $3(n + 3)(n - 3)$ d. $3(5n + 1)(n - 2)$	8. a. $(-1, 16)$ b. It has a maximum since $a = -1$, so the parabola opens down and the vertex is at the top. c. 15 d. $a = -5, b = 3$ e. -48 f. $x = -1$	9. a. -18 b. -1 and 5 c. $y = 2x^2 - 8x - 10$ d. Yes
10. a. i, ii, iv, vi b. 2 and 4	11. $2(x - 4)(2x + 3)$	12. Height = 2 meters Base = 5 meters
13. 16 and 18 or -18 and -16	14. roots and zeros	15. x-int: -5 and -1 y-int: -5 vertex: $(-3, 4)$ axis of sym: $x = -3$ 
16. roots: 1 and 3 y-int: 6 vertex: $(2, -2)$ axis of sym: $x = 2$ 	17. zeros: -3 and -1 y-int: 9 vertex: $(-2, -3)$ axis of sym: $x = -2$ 	18. a. 256 feet b. 3 seconds c. 7 seconds d. 