

**Advanced Algebra - Unit 3 Review****3.1 - Graphing Quadratic Functions**

For numbers 1 -3:

- a). State the form (standard, vertex or intercept)      d). Find the vertex  
b). State whether the parabola has a max or a min      e). Find the value of the max or min  
c). Write the equation for the axis of symmetry      f). Find the y-intercept

1.  $y = 2x^2 + 20x - 12$

2.  $y = -3(x - 10)(x + 2)$

a). \_\_\_\_\_

d). \_\_\_\_\_

a). \_\_\_\_\_

d). \_\_\_\_\_

b). \_\_\_\_\_

e). \_\_\_\_\_

b). \_\_\_\_\_

e). \_\_\_\_\_

c). \_\_\_\_\_

f). \_\_\_\_\_

c). \_\_\_\_\_

f). \_\_\_\_\_

3.  $y = 5(x + 1)^2 + 18$

4. The parabola with equation  $y = -6x^2$  has been translated 3 to the right and 5 units down. Write the equation for this parabola in vertex form.

a). \_\_\_\_\_

d). \_\_\_\_\_

4. \_\_\_\_\_

b). \_\_\_\_\_

e). \_\_\_\_\_

c). \_\_\_\_\_

f). \_\_\_\_\_

5. The height of an object propelled straight upward from Earth can be modeled by the equation  $h(t) = -16t(t - 5)$  where  $h$  is the height of the object above the ground (in feet) and  $t$  is the time (in seconds) after the object is propelled.

a) How many seconds after the object is propelled will it hit the ground?

b) What is the object's maximum height?

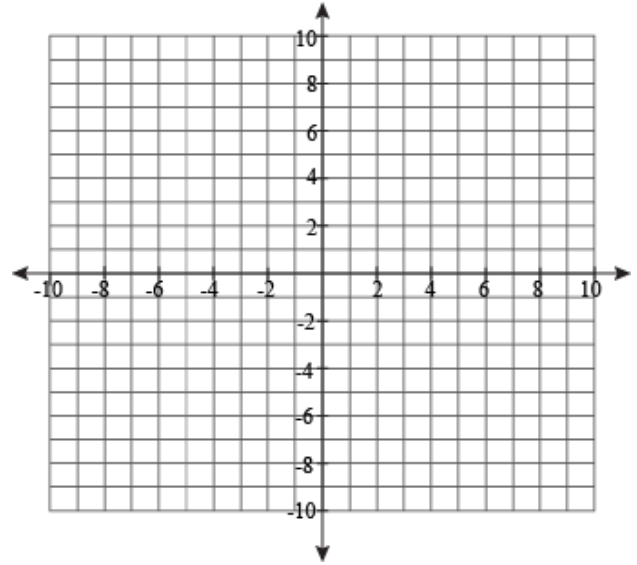
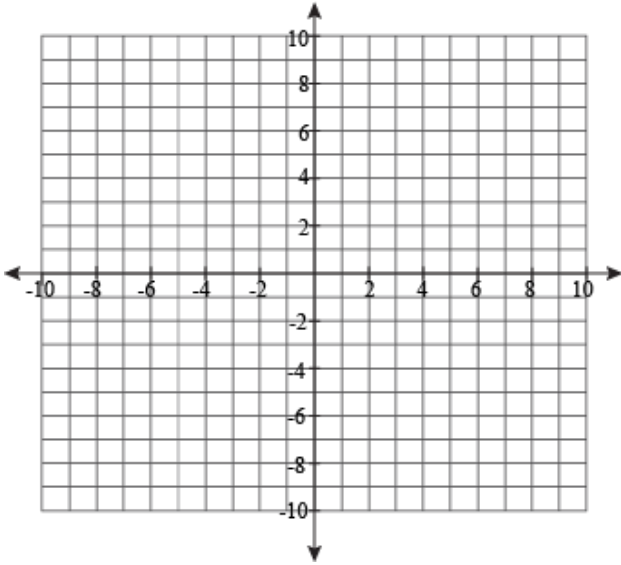
For numbers 6 and 7, graph the parabola. Identify the axis of symmetry and 5 points.

6.  $y = -2x^2 + 4x + 1$

7.  $y = 2(x - 1)^2 - 3$

AOS: \_\_\_\_\_ Vertex: \_\_\_\_\_

AOS: \_\_\_\_\_ Vertex: \_\_\_\_\_



### 3.2 Solving Quadratic Equations Using Square Roots

Simplify. Do not convert to decimals.

8.  $3\sqrt{48}$

9.  $\sqrt{\frac{5}{7}}$

10.  $\frac{2}{3-\sqrt{5}}$

Solve and simplify your answer.

11.  $3(x+2)^2 + 5 = 113$

12.  $2x^2 - 7 = 143$

13. When an object is dropped, the height (h) in feet of the object after t seconds can be modeled by the equation  $h = -16t^2 + h_0$ . An object is dropped from an initial height of 25 feet. How long will it take for the object to hit the ground? Round your answer to the nearest hundredth.

### 3.3 – Solving Equations by Factoring

Factor completely.

14.  $5x^3 + 10x^2 - 15x$

15.  $18x^2 - 66x - 24$

Solve by factoring.

16.  $x^2 - 2x = 15$

17.  $20x^2 - 19x + 3 = 0$

### 3.4 – Solving Equations Using the Quadratic Formula

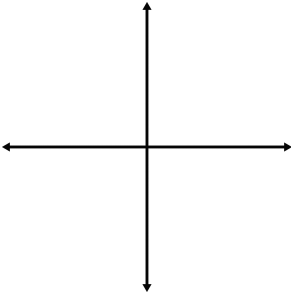
Use the quadratic formula to solve. Simplify your answer. No decimals.

18.  $3x^2 - 12x = -12$

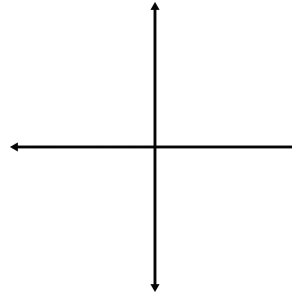
19.  $5x^2 + 2x = -8x + 3$

Consider the function  $y = ax^2 + bx + c$ . Sketch a parabola such that:

20. The discriminant is negative and  $a < 0$ .



21. The discriminant is zero and  $a > 0$ .



### 3.5 - Perform Operations with Complex Numbers

Perform the operation and simplify.

22.  $(2 - 4i) - (-7 + 8i)$

23.  $(6 + 9i) + 4(5 - 6i)$

24.  $(4 - 5i)(8 + 3i)$

Simplify.

25.  $\sqrt{-50}$

26.  $\frac{4 - 9i}{-3i}$

27.  $\frac{7i}{2 + 5i}$

Solve. Simplify your answers.

28.  $2x^2 + 10 = -80$

29.  $2x^2 - x = -6$

30.  $5x^2 + 2x + 5 = 0$

### Unit 3 Review Answers

1. a. Standard      b. Min      c.  $x = 5$       d.  $(-5, -62)$       e.  $-62$       f.  $(0, -12)$

2. a. Intercept      b. Max      c.  $x = 4$       d.  $(4, 108)$       e.  $108$       f.  $(0, 60)$

3. a. Vertex      b. Min      c.  $x = -1$       d.  $(-1, 18)$       e.  $18$       f.  $(0, 23)$

4.  $y = -6(x - 3)^2 - 5$       5. a. 5 sec    b. 100 ft      6. AOS:  $x = 1$  Vertex  $(1, 3)$

7. AOS:  $x = 1$  Vertex  $(1, -3)$       8.  $12\sqrt{3}$       9.  $\frac{\sqrt{35}}{7}$       10.  $\frac{3 + \sqrt{5}}{2}$

11.  $x = 4$  or  $-8$       12.  $x = \pm 5\sqrt{3}$       13.  $t = 1.25$  sec      14.  $5x(x - 1)(x + 3)$

15.  $6(3x + 1)(x - 4)$       16.  $x = 5$  or  $-3$       17.  $x = \frac{3}{4}$  or  $\frac{1}{5}$       18.  $x = 2$

19.  $\frac{-5 \pm 2\sqrt{10}}{5}$       20 and 21. Answers will vary      22.  $9 - 12i$

23.  $26 - 15i$       24.  $47 - 28i$       25.  $5i\sqrt{2}$       26.  $\frac{9 + 4i}{3}$

27.  $\frac{35 + 14i}{29}$       28.  $x = \pm 3i\sqrt{5}$       29.  $x = \frac{1 \pm i\sqrt{47}}{4}$       30.  $x = \frac{-1 \pm 2i\sqrt{6}}{5}$