

Identify the vertex, axis of symmetry, the maximum or minimum value, and the domain and the range of each function.

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

Vertex _____

aos _____

Max or Min value _____

Domain _____

Range _____

2. $y = -3x^2 - 12x - 8$

Vertex _____

aos _____

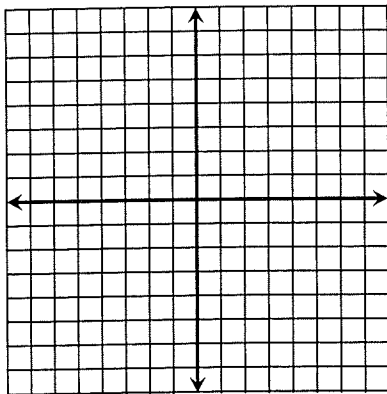
Max or Min value _____

Domain _____

Range _____

Describe how to transform the parent function $y = x^2$ to the graph of each function below. Graph both functions on the same axes.

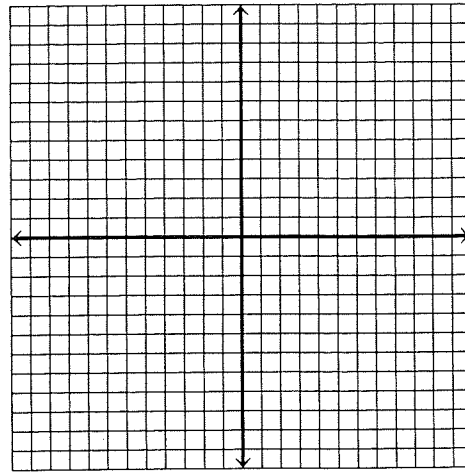
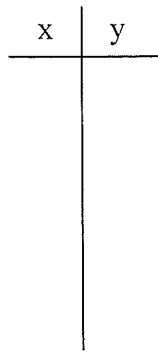
3. $y = -2(x + 3)^2 - 1$



4. A model rocket is launched from the ground. It reaches a maximum altitude of 243 ft when it is above a location 18ft from the launch site. What quadratic function models the height of the rocket?

Graph each function.

5. $y = 3x^2 - 6x + 4$



6. Mrs. Howe uses the formula $P(x) = -x^2 + 50x - 350$ to estimate her profit, where, P , depends on the number of cases, x , of decorator napkins that are sold.

a) How many cases of napkins must she sell to make to the **maximum** profit? **Show work.**

b) What is the **maximum profit** that she can make? **Show work.**

c) What are the break-even points (the number of cases for which the profit is zero)? Round answer to the nearest case. **Show work.**

Factor **completely**.

7. $6x^2 - 21x + 18$

8. $5x^2 + 47x - 30$

9. $49x^2 + 70x + 25$

10. $12 - 27x^2$

Solve each equation by factoring and applying the Zero-Product Property. **SHOW WORK**

11. $4x^2 + 6 = 11x$

12. $3x^2 - 9x - 30 = 0$

Use factoring and the Zero-Product Property to find the zeros of the function. **SHOW WORK**

13. $f(x) = 6x^2 - 10 + 11x$

14. $g(x) = x^2 - \frac{9}{2}x + 2$

Solve the equation. Give **exact** solutions. Then **approximate** the solution to the nearest hundredth, if necessary. **SHOW WORK**

15. $5(x - 3)^2 + 5 = 65$

15. _____
exact

approximate

Solve the equation. Give you answer as a simplified radical.

16. $16x^2 + 8x + 1 = 18$

Solve each quadratic equation by **completing the square**. Give exact, simplified solutions. Then give answers rounded to the nearest hundredth, if necessary. **SHOW ALL WORK.**

17. $x^2 - 8x + 4 = 0$

18. $2x^2 + 6x - 11 = 0$

For problems 19-20, write each quadratic function in vertex form by completing the square. Give the **coordinates** of the vertex and the **equation** for the axis of symmetry. Then describe the transformations from $g(x) = x^2$ to f **SHOW ALL WORK.**

19. $f(x) = x^2 + 8x + 5$

19. vf _____
 Vertex _____ aos _____

20. $f(x) = -3x^2 + 9x - 4$

20. vf _____
 Vertex _____ aos _____

Evaluate the discriminant for each equation. Determine the number of real solutions.

21. $x^2 - 5x - 4 = 0$

22. $-9x^2 + 12x - 4 = 0$

$d =$ _____

$d =$ _____

of sol. = _____

of sol. = _____

Find the zeros of equation using the **Quadratic Formula**. Give irrational answers as both exact solutions **and** decimal approximations, rounded to the nearest hundredth. Simplify all radicals.

23. $f(x) = x(2x - 7) + 4$

24. $f(x) = 3x^2 - 2x - 7$

25. The principal at a high school is planning a concert to raise money for the music programs. He determines the profit p from ticket sales depends on the cost c of a ticket according to the equation $p = -200c^2 + 3600c - 6400$. All amounts are in dollars. If the goal is to raise \$8500, what is the smallest amount the school should charge for a ticket to the concert?

Simplify each number by using the imaginary number i . Simplify all radicals.

26. $\sqrt{-7}$

27. $\sqrt{-48}$

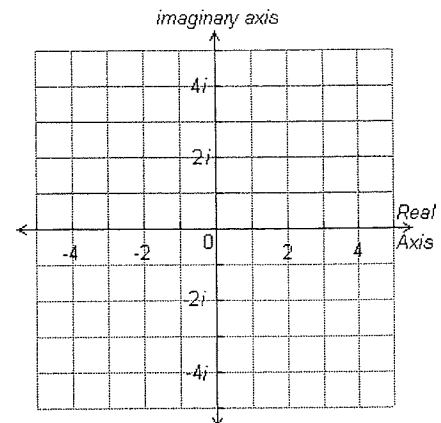
Plot and label each complex number **and** find its absolute value.

28. $A = -3i$

29. $B = -4 - 5i$

$|-3i| = \underline{\hspace{2cm}}$

$|-4 - 5i| = \underline{\hspace{2cm}}$



Simplify each expression. Write in $a + bi$ form. Be careful – is it addition, subtraction, or multiplication?

30. $(4 - 2i) - (-1 + 3i)$

31. $(-1 + 3i)^2$

32. $2(3 - 7i) - i(-4 + 5i)$

33. $(2 + \sqrt{-4})(-1 + \sqrt{-9})$

Write each quotient as a complex number in $a + bi$ form.

34. $\frac{5 + 2i}{4i}$

35. $\frac{3 - 2i}{4 - 3i}$

Find the zeros for each function. Simplify all radicals.

36. $f(x) = 2x^2 + 36$

Find all solutions to each quadratic equation. Simplify all radicals.

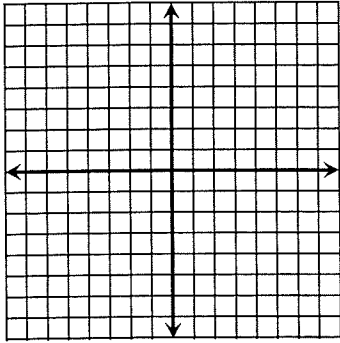
37. $x^2 + 2x + 5 = 0$

38. $3x^2 = -2x - 5$

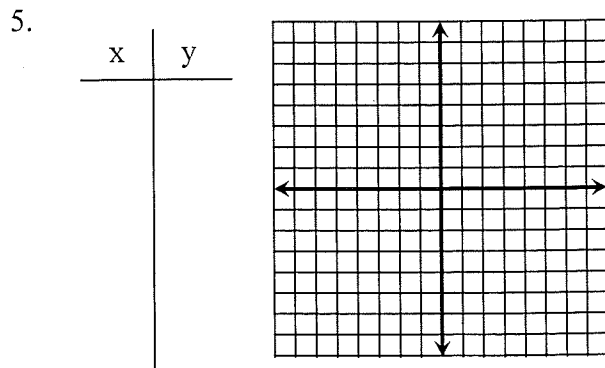
Algebra 2
Review Sheet Chapter 4
Answers

1. Vertex $(-6, -4)$
aos $x = -6$
Min value -4
Domain $\{x: \mathbb{R}\}$
Range $\{y: y \geq -4\}$
2. Vertex $(-2, 4)$
aos $x = -2$
Max value 4
Domain $\{x: \mathbb{R}\}$
Range $\{y: y \leq 4\}$

3. reflection across the x-axis
Vertical stretch by a factor of 2
Horizontal translation 3 units left
Vertical translation 1 unit down



4. $y = -\frac{3}{4}(x-18)^2 + 243$



6. a. 25 cases
b. \$275
c. 9 cases and 41 cases

7. $-3(2x-3)(x-2)$
8. $(5x-3)(x+10)$
9. $(7x+5)^2$
10. $-3(3x-2)(3x+2)$
11. $x = \frac{3}{4}, 2$
12. $x = 5, -2$
13. $x = \frac{2}{3}, -\frac{5}{2}$
14. $x = \frac{1}{2}, 4$

15. exact $x = 3 \pm 2\sqrt{3}$
Approx $x = 6.46, -0.46$

16. $x = -\frac{1}{4} \pm \frac{3}{4}\sqrt{2}$

17. exact $x = 4 \pm 2\sqrt{3}$
Approx $x = 7.46, 0.54$

18. exact $x = -\frac{3}{2} \pm \frac{\sqrt{31}}{2}$
Approx $x = 1.28, -4.28$

19. $f(x) = (x+4)^2 - 11$
Vertex $(-4, -11)$ aos $x = -4$
Horizontal translation 4 units left
Vertical translation 11 units down

20. $f(x) = -3\left(x - \frac{3}{2}\right)^2 + \frac{11}{4}$
Vertex $\left(\frac{3}{2}, \frac{11}{4}\right)$ aos $x = \frac{3}{2}$
Reflection across the x-axis
Vertical stretch by a factor of 3
Horizontal translation $\frac{3}{2}$ units right
Vertical translation $\frac{11}{4}$ units up

21. $d = 41$, 2 solutions
22. $d = 0$, 1 solution

$$23. \quad x = \frac{7}{4} \pm \frac{\sqrt{17}}{4} \quad x \approx 2.78, 0.72$$

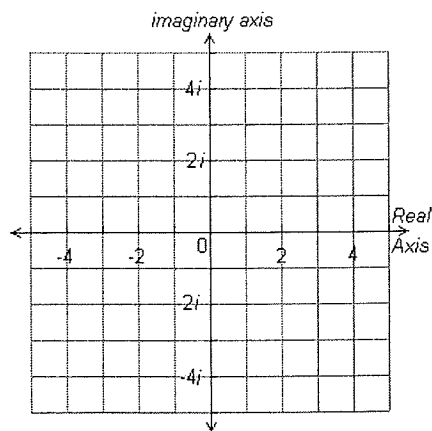
$$24. \quad x = \frac{1}{3} \pm \frac{1}{3}\sqrt{22} \quad x \approx 1.90, -1.23$$

$$25. \quad \$6.45$$

$$26. \quad i\sqrt{7}$$

$$27. \quad 4i\sqrt{3}$$

28-29



$$28. \quad |-3i| = 3$$

$$29. \quad |-4-5i| = \sqrt{41}$$

$$30. \quad 5-5i$$

$$31. \quad -8-6i$$

$$32. \quad 11-10i$$

$$33. \quad -8+4i$$

$$34. \quad \frac{1}{2} - \frac{5}{4}i$$

$$35. \quad \frac{18}{25} + \frac{1}{25}i$$

$$36. \quad x = \pm 3i\sqrt{2}$$

$$37. \quad x = -1 \pm 2i$$

$$38. \quad x = -\frac{1}{3} \pm \frac{1}{3}i\sqrt{14}$$