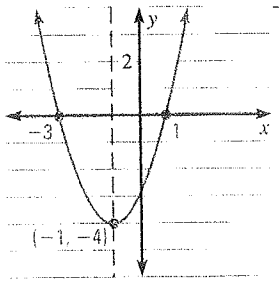
SHEET #59: REVIEW CHAPTER 5.

NAME: _____ Period: ____

GRAPHING QUADRATIC FUNCTIONS

5.1

EXAMPLE You can graph a quadratic function given in standard form, vertex form, or intercept form. For instance, the same function is given below in each of these forms, and its graph is shown.



Standard form: $y = x^2 + 2x - 3$;

axis of symmetry: $x = -\frac{b}{2a} = -\frac{2}{2(1)} = -1$

Vertex form: $y = (x + 1)^2 - 4$; vertex: $(-1, -4)$

Intercept form: $y = (x + 3)(x - 1)$; x-intercepts: $-3, 1$

Graph the quadratic function. FIRST WRITE DOWN VERTEX

1. $y = x^2 + 4x + 7$
2. $y = -3(x - 2)^2 + 5$
3. $y = \frac{1}{2}(x + 1)(x - 5)$

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SOLVING BY FACTORING AND BY FINDING SQUARE ROOTS

EXAMPLES You can use factoring or square roots to solve quadratic equations.

5.2 AND 5.3

Solving by factoring:

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

$(x + 3)(x - 7) = 0$

$x + 3 = 0$ or $x - 7 = 0$

$x = -3$ or $x = 7$

Solving by finding square roots:

$4x^2 - 7 = 65$

$4x^2 = 72$

$x^2 = 18$

$x = \pm\sqrt{18} = \pm 3\sqrt{2}$

Solve the quadratic equation. USE FACTORING OR SQUARE ROOTS. DO NOT USE QUADRATIC FORMULA.

4. $x^2 + 11x + 24 = 0$

5. $x^2 - 8x + 16 = 0$

6. $2x^2 + 3x + 1 = 0$

7. $3u^2 = -4u + 15$

8. $25v^2 - 30v = -9$

9. $2x^2 = 200$

10. $5x^2 - 2 = 13$

11. $4(t + 6)^2 = 160$

12. $-(k - 1)^2 + 7 = -43$

COMPLEX NUMBERS

5.4

EXAMPLE You can add, subtract, multiply, and divide complex numbers. You can also find the absolute value of a complex number.

Addition: $(1 + 8i) + (2 - 3i) = (1 + 2) + (8 - 3)i = 3 + 5i$

Subtraction: $(1 + 8i) - (2 - 3i) = (1 - 2) + (8 + 3)i = -1 + 11i$

Multiplication: $(1 + 8i)(2 - 3i) = 2 - 3i + 16i - 24i^2 = 2 + 13i - 24(-1) = 26 + 13i$

Division: $\frac{1 + 8i}{2 - 3i} = \frac{1 + 8i}{2 - 3i} \cdot \frac{2 + 3i}{2 + 3i} = \frac{-22 + 19i}{13} = -\frac{22}{13} + \frac{19}{13}i$

Absolute value: $|1 + 8i| = \sqrt{1^2 + 8^2} = \sqrt{65}$

In Exercises 13–16, write the expression as a complex number in standard form.

13. $(7 - 4i) + (-2 + 5i)$

14. $(2 + 11i) - (6 - i)$

15. $(3 + 10i)(4 - 9i)$

16. $\frac{8+i}{1-2i}$

THE QUADRATIC FORMULA AND THE DISCRIMINANT

5.6

EXAMPLE You can use the quadratic formula to solve any quadratic equation.

$$3x^2 - 5x = -1$$

$$3x^2 - 5x + 1 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{5 \pm \sqrt{(-5)^2 - 4(3)(1)}}{2(3)} = \frac{5 \pm \sqrt{13}}{6}$$

Use the quadratic formula to solve the equation.

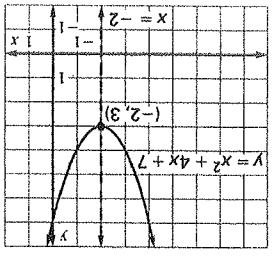
24. $x^2 - 8x + 5 = 0$

25. $9x^2 = 1 - 7x$

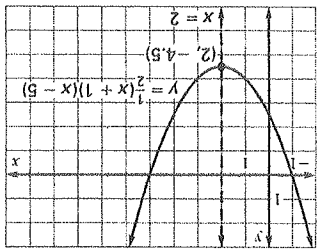
26. $5v^2 + 6v + 7 = v^2 - 4v$

CHAPTER 5 REVIEW

1.



3.



5. 4 7. $-3, \frac{5}{3}$

9. $-10, 10$

11. $-6 - 2\sqrt{10}$, $-6 + 2\sqrt{10}$

13. $5 + i$ 15. $102 + 13i$

25. $-\frac{7}{18} - \frac{\sqrt{85}}{18}, -\frac{7}{18} + \frac{\sqrt{85}}{18}$

5-8 | MODELING WITH QUADRATIC FUNCTIONS

WRITE A QUADRATIC FUNCTION WHOSE GRAPH HAS THE FOLLOWING CHARACTERISTICS.

33. Vertex = (6, 1)
POINT ON GRAPH = (4, 5)

34. X-INTERCEPTS: −4, 3
POINT ON GRAPH = (1, 20)

6-7 | POLYNOMIALS: ZEROS

- WRITE A POLYNOMIAL FUNCTION OF LEAST DEGREE THAT HAS REAL COEFFICIENTS; THE GIVEN ZEROS, AND A LEADING COEFFICIENT OF 1.

36. ZEROS = 2, 1, 4

37. ZEROS = 1, −4, 5

- USE THE CALCULATOR TO FIND ALL REAL ZEROS, TO 2 DECIMALS.

38. $f(x) = x^3 - x^2 - 5x + 3$

39. $f(x) = x^4 - x^3 - 3x^2 - x + 1$

ANS: 5-8 33. $y = (x-6)^2 + 1$ 34. $y = -2(x+4)(x-3)$
36. $y = (x-2)(x-1)(x-4)$ 37. $y = (x-1)(x+4)(x-5)$
38. $x = -2.09, 0.57, 2.51$ 39. $x = 0.42, 2.37$