Key

Test Review 5.5, 5.6, 5.7, 5.9   Algebra 2   Name _____

Simplify. Express each number in terms of *i*.

1. $\sqrt{-27}$ $\boxed{3\sqrt{3}\,i}$

2. $\sqrt{-48}$ $\boxed{4\sqrt{3}\,i}$

Solve each equation.

3. $x^2 = -256$ $\boxed{\pm 16i}$

4. $4x^2 + 144 = 0$
$x^2 = -36$ $\boxed{x = \pm 6i}$

Find each complex conjugate.

5. $\sqrt{13} + 9i$ $\boxed{\sqrt{13} - 9i}$

6. $-11 + 45i$ $\boxed{-11 - 45i}$

Find the value of the discriminant ($b^2 - 4ac$), the number of solutions, and the type of solutions.

7. $-x^2 - 5x + 6 = 0$
$a = -1$ $(-5)^2 - 4(-1)(6)$
$b = -5$ $\boxed{49}$ $\boxed{2\ REAL}$
$c = 6$

8. $4x^2 - 5x - 6 = 0$
$a = 4$ $(-5)^2 - 4(4)(-6)$
$b = -5$ $\boxed{121}$ $\boxed{2\ REAL}$
$c = -6$

9. $x^2 - 6x + 9 = 0$
$a = 1$ $(-6)^2 - 4(1)(9)$
$b = -6$ $\boxed{0}$ $\boxed{ONE\ REAL}$
$c = 9$

Find the zeros of the functions.

10. $x^2 - 3x - 10 = 0$
$a = 1$ $\dfrac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-10)}}{2(1)}$
$b = -3$
$c = -10$ $\boxed{x = -2 \quad x = 5}$

11. $x^2 - 16 = 0$
$a = 1$ $\dfrac{-(0) \pm \sqrt{0^2 - 4(1)(-16)}}{2(1)}$
$b = 0$
$c = -16$ $\boxed{x = \pm 4}$

12. $4x^2 + 4x = 15$ $4x^2 + 4x - 15 = 0$
$a = 4$ $\dfrac{-4 \pm \sqrt{4^2 - 4(4)(-15)}}{2(4)}$
$b = 4$
$c = -15$ $\boxed{x = \dfrac{-5}{2} \quad x = \dfrac{3}{2}}$

13. $x^2 - 16x + 64 = 0$
$a = 1$ $\dfrac{-(-16) \pm \sqrt{(-16)^2 - 4(1)(64)}}{2(1)}$
$b = -16$
$c = 64$ $\boxed{x = 8}$

Solve each quadratic inequality algebraically.

17. $x^2 - 11x + 13 < 25$
$x^2 - 11x + 13 = 25$
$x^2 - 11x - 12 = 0$
$(x - 12)(x + 1) = 0$
$-1 + 12$
$\boxed{-1 < x < 12}$

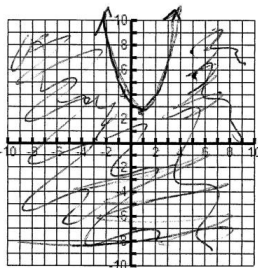18. $x^2 - 5x - 24 \geq 0$
$(x - 8)(x + 3) = 0$
-3 and 8
$\boxed{x \leq -3 \text{ or } x \geq 8}$

19. $x^2 - 5x + 3 \leq 3$
$x(x - 5) \leq 0$
$x = 0 \quad x = 5$
0 and 5
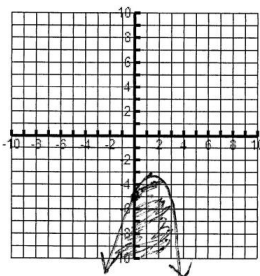$\boxed{0 \leq x \leq 5}$

Key
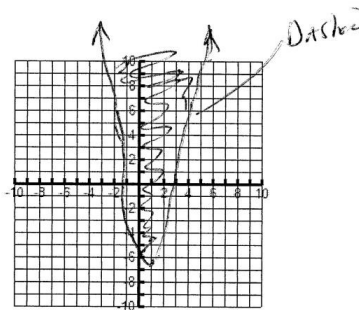
Graph each quadratic inequality.

20. $y \le x^2 - 2x + 4$

21. $y \le -x^2 + 3x - 5$

22. $y > 2x^2 - 3x - 6$

Dashed

Add and Subtract the Complex Number.

23. $(2 + 4i) + (3 - 2i)$

$5 + 2i$

24. $(-5 - 6i) + (1 - 12i)$

$-4 - 18i$

25. $(-8 - 3i) - (-6 - 7i)$

$-2 + 4i$

Multiply or simplify the complex number.

26. $(2 + 2i)(4 - i)$

$10 + 6i$

27. $(4 + 3i)^2$

$7 + 24i$

28. $\dfrac{5 - 2i}{3 + i}$

$\dfrac{13}{10} - \dfrac{11}{10}i$