Name Key Class Date

Chapter 5.4 – 5.8 Test Review

Find the type and number of solutions of each equation using the discriminant.

1. $x^2 + 6x + 10 = 0$

$36 - 4(1)(10)$

$36 - 40 = -4$

$\boxed{\text{2 Complex Roots}}$

2. $x^2 - 4x - 1 = 0$

$16 - 4(1)(-1)$

$16 + 4 = 20$

$\boxed{\text{2 Real Roots}}$

3. $x^2 + 6x + 9 = 0$

$36 - 4(1)(9) = 0$

$\boxed{\text{1 Real Root (Double Root)}}$

4. $x^2 - 8x + 15 = 0$

$64 - 4(1)(15)$

$64 - 60 = 4$

$\boxed{2\ \mathbb{R}}$

5. $x^2 - 5x + 7 = 0$

$25 - 4(1)(7)$

$25 - 28 = -3$

$\boxed{2\ \mathbb{C}}$

6. $x^2 - 4x + 5 = 0$

$16 - 4(1)(5)$

$16 - 20 = -4$

$\boxed{2\ \mathbb{C}}$

Simplify each expression.

7. $\sqrt{40}$

$8 \cdot 5$

$2 \cdot 4$

$2 \cdot 2$

$\boxed{2\sqrt{10}}$

8. $\sqrt{-88}$

$i\sqrt{88}$

$8 \cdot 11$

$2 \cdot 4$

$2 \cdot 2$

$\boxed{2i\sqrt{22}}$

9. $-\sqrt{-36}$

$-i\sqrt{36}$

$\boxed{-6i}$

10. $(5 + 14i) - (10 - 2i)$

$+5 + 14i - 10 + 2i$

$\boxed{-5 + 16i}$

11. $(1 + 5i)(6 - 3i)$

$6 - 3i + 30i - 15i^2$

$6 + 27i - 15(-1)$

$6 + 15 + 27i = \boxed{21 + 27i}$

12. $(6 + 2i) + (1 - 2i)$

$7 + 0i$

$\boxed{7}$

Solve each equation using any method.

13. $4x^2 + 100 = 0$

$4x^2 = -100$

$\sqrt{x^2} = \sqrt{-25}$

$\boxed{x = \pm 5i}$

14. $x^2 - 7x + 10 = 0$

$(x - 5)(x - 2) = 0$

$\boxed{x = 5,\ x = 2}$

15. $2x^2 + 40 = 0$

$2 \cdot 2 \cdot 9 \cdot 2 \cdot 2$

$2x^2 = -40$

$\sqrt{x^2} = \sqrt{-20}$

$x = \pm i\sqrt{20}$

$\boxed{x = \pm 2i\sqrt{5}}$

16. $x^2 + 4x + 4 = 0$

$(x + 2)(x + 2) = 0$

$\boxed{x = -2}$

17. $x^2 + 49 = 0$

$x^2 = -49$

$\boxed{x = \pm 7i}$

18. $x^2 + 7x - 8 = 0$

$(x + 8)(x - 1) = 0$

$\boxed{x = -8,\ x = 1}$

19. $x^2 - 6x = 0$

$x(x - 6) = 0$

$x - 6 = 0$

$x = 0$

$\boxed{x = 0,\ x = 6}$

20. $2x^2 - 9x + 4 = 0$

$x = \dfrac{9 \pm \sqrt{81 - 4(2)(4)}}{2(2)}$

$x = \dfrac{9 \pm \sqrt{49}}{4} = \dfrac{9 \pm 7}{4}$ → $\dfrac{16}{4} = 4$, $\dfrac{2}{4} = \dfrac{1}{2}$

$\boxed{x = 4,\ x = \frac{1}{2}}$

21. $9x^2 - 4 = 0$

$\dfrac{9x^2}{9} = \dfrac{4}{9}$

$\sqrt{x^2} = \sqrt{\dfrac{4}{9}}$

$\boxed{x = \pm 2}$