

Square Roots, Complex Numbers, & Quadratic
Formula Review

1. Simplify: $\sqrt{64}$

- a. -8
- b. 8**
- c. $\sqrt{8}$
- d. $-\sqrt{8}$

2. Simplify: $2\sqrt{44}$

- a. $2\sqrt{11}$
- b. $4\sqrt{11}$**
- c. $8\sqrt{11}$
- d. $11\sqrt{2}$

3. Simplify: $\sqrt{5} + 6\sqrt{5}$

- a. $7\sqrt{5}$**
- b. $6\sqrt{5}$
- c. $7\sqrt{10}$
- d. $5\sqrt{6}$

4. Simplify: $\sqrt{32x^3}$

- a. $x\sqrt{32x}$
- b. $4x\sqrt{2x}$**
- c. $\sqrt{2x}$
- d. $4x\sqrt{8x}$

$\sqrt{32x^3}$ ~~$\times \times \times$~~

$\begin{matrix} \sqrt{32} & \sqrt{x^3} \\ 4\sqrt{2} & x\sqrt{x} \\ 4\sqrt{2} & x\sqrt{x} \end{matrix}$

$4x\sqrt{2x}$

5. Simplify: $\sqrt{2}(1 + \sqrt{3})$

- a. $\sqrt{2} + \sqrt{6}$**
- b. $\sqrt{2} + 2\sqrt{3}$
- c. $2 + \sqrt{5}$
- d. $\sqrt{15}$

$\sqrt{2} + \sqrt{6}$

6. Simplify: $4\sqrt{12} - \sqrt{27}$

- a. $4\sqrt{-30}$
- b. $3\sqrt{6}$
- c. $5\sqrt{3}$**
- d. $9\sqrt{6}$

$4\sqrt{12} - \sqrt{27}$

$4\sqrt{4 \cdot 3} - \sqrt{9 \cdot 3}$

$8\sqrt{3} - 3\sqrt{3}$

7. Simplify: $i\sqrt{-42}$

- a. $6i\sqrt{7}$
- b. $9i\sqrt{2}$
- c. $3\sqrt{2}$
- d. $i\sqrt{42}$**

$i\sqrt{42}$

$\begin{matrix} \sqrt{42} \\ 2 \cdot 21 \\ 7 \cdot 3 \end{matrix}$

8. Simplify: $(1 - \sqrt{3})(1 + \sqrt{3})$

- a. -2**
- b. $-1 + \sqrt{3}$
- c. $-1 - 2\sqrt{3}$
- d. $1 - \sqrt{6}$

$\begin{matrix} 1 & \sqrt{3} \\ 1 & \sqrt{3} \\ -\sqrt{3} & -\sqrt{3} \\ -3 & -3 \end{matrix}$

$1 - 3 = -2$

9. Simplify: $7i - 9i$

- a. -2
- b. 2
- c. $-2i$**
- d. $2i$

10. Simplify: $(5 + 3i) + (-3 - 6i)$

- a. $2 - 3i$**
- b. 8
- c. $-2 - 18i$
- d. $-1 + 3i$

$\begin{matrix} -3 & -6i \\ -6 & -12i \\ -9 & -18i \end{matrix}$

11. Simplify: $(2 + 3i)(-3 - 6i)$

- a. 12
- b. -24
- c. $12 - 21i$**
- d. $-24 - 21i$

$3i$

$-6 - 12i - 9i - 18i^2$

$-6 - 21i + 18$

$12 - 21i$

12. What is an equivalent form of i^{63} ?

- a. i
- b. -1
- c. $-i$**
- d. 1

$\begin{matrix} 15 \\ 4 \overline{) 63} \\ 4 \\ \underline{23} \\ 20 \\ \underline{3} \end{matrix}$

$i^3 = -i$

13. What does $\sqrt{-4}$ equal?

- a. $2i$**
- b. -2
- c. $i\sqrt{4}$
- d. $2\sqrt{-1}$

14. What is the real number in the expression: $5 + 2i$

- a. 2
- b. $2i$
- c. 5
- d. i

15. Solve the equation: $n^2 = 2n - 10$

$$n^2 - 2n + 10 = 0$$

$$\frac{2 \pm \sqrt{(-2)^2 - 4(1)(10)}}{2(1)}$$

$$\frac{2 \pm \sqrt{-36}}{2}$$

$$\boxed{1+3i \quad 1-3i}$$

$$\frac{2 \pm i\sqrt{36}}{2} = \frac{2 \pm 6i}{2} = \boxed{\frac{1 \pm 3i}{1}}$$

16. Solve the equation: $2n^2 - 6n - 6 = 2$

$$2n^2 - 6n - 8$$

$$2(n^2 - 3n - 4)$$

$$\begin{array}{r|l} -4 & -3 \\ \hline -4 & 1 \end{array} \quad 2(n-4)(n+1)$$

$$\begin{array}{r|l} -4 & 1 \\ \hline -4 & 1 \end{array} \quad n-4=0 \quad n+1=0$$

$$\boxed{n=4} \quad \boxed{n=-1}$$

$$\begin{array}{r|l} n & n^2 & -4n \\ +1 & 1n & -4 \end{array}$$

17. Solve the equation: $3x^2 - 11 = 8x$

$$3x^2 - 8x - 11 = 0$$

$$\frac{8 \pm \sqrt{(-8)^2 - 4(3)(-11)}}{2(3)}$$

$$\frac{8 \pm \sqrt{196}}{6} = \frac{8 \pm 14}{6}$$

$$\frac{8+14}{6} = \frac{22}{6} \text{ or } 3.67 \quad \frac{8-14}{6} = \frac{-6}{6} = \boxed{-1}$$

18. Solve the equation: $x^2 - 6x + 7 = 0$

$$x^2 - 6x + 7 = 0$$

$$\frac{6 \pm \sqrt{(-6)^2 - 4(1)(7)}}{2(1)}$$

$$\frac{6 \pm \sqrt{8}}{2}$$

$$\frac{6 \pm 2\sqrt{2}}{2} = \frac{3 \pm \sqrt{2}}{1} = \boxed{3 \pm \sqrt{2}}$$

$$\boxed{3+\sqrt{2} \quad 3-\sqrt{2}}$$