

## Sample Test Questions

### Polynomials

1. Subtract the polynomials.

$$2x^2 - 6x - 4 \text{ from } -4x^2 + 6x + 10$$

2. Multiply.

$$(4x - 1)(3x^2 - x + 6)$$

3. Factor completely.

$$ax - 2bx + ay - 2by$$

4. Factor completely.

$$y^3 + 64$$

5. Factor completely.

$$8x^2 + 6x - 9$$

6. Factor completely.

$$x^3 - 9x$$

### Rational Expressions

7. Simplify.

$$\frac{2x^2 - 7x - 4}{x^2 - 5x + 4}$$

8. Multiply.

$$\frac{4a + 36}{a^2 - 7a - 18} \cdot \frac{a^2 - a - 6}{a^2 - 81}$$

9. Divide.

$$\frac{6a^2b^2}{a^2 - 4} \div \frac{3ab^2}{a - 2}$$

10. Subtract.

$$\frac{5}{2x - 5} - \frac{3}{4x + 3}$$

11. Simplify.

$$\frac{\frac{3}{x} + \frac{2}{y}}{\frac{5}{x} - \frac{6}{y^2}}$$

12. Solve.

$$\frac{3}{n} + \frac{1}{6} = \frac{11}{3n}$$

13. Solve.

$$\frac{7}{x-4} = \frac{x}{x^2-16} + \frac{1}{x+4}$$

### Radicals

14. Simplify. All variables represent positive real numbers.

$$\sqrt{75x^3y^4}$$

15. Find the sum.

$$4\sqrt{20x} + 5\sqrt{45x} - 10\sqrt{80x}$$

16. Multiply.

$$(2\sqrt[3]{6})(5\sqrt[3]{4})$$

17. Multiply.

$$(3\sqrt{2} + 2)(5\sqrt{2} - 3)$$

18. Rationalize the denominator.

$$\frac{\sqrt{7}}{\sqrt{12}}$$

19. Solve and check.

$$\sqrt{3x-1} + 1 = 4$$

20. Write the following using positive rational exponents.

$$\sqrt[3]{2y}$$

### Quadratic Equations

21. Solve.

$$z^2 + 9 = 10z$$

22. Solve.

$$x^2 + 6x - 3 = 0$$

23. Solve.

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

### Complex Numbers

24. Add.

$$(-6 + 4i) + (8 - 7i)$$

25. Multiply.

$$(-3 - 2i)(5 + 6i)$$

### Functions

26. Find the domain.

$$f(x) = \frac{-3x}{x+4}$$

27. If  $f(x) = 2x^2 - 5x - 7$ , find  $f(-2)$ .

### Systems of Equations

28. Solve the system of equations.

$$4x - y = 9$$

$$2x + 3y = -27$$

### Absolute Value Equations

29. Solve.

$$|3x - 1| = 11$$

30. Solve.

$$|x + 3| = -4$$