

1. Find the *greatest common factor* (GCF) of the polynomial

$$18x^6y^4z - 48x^2y^3z^3.$$

- a)  $3x^6y^4z$
- b)  $6x^2y^3z^3$
- c)  $6x^2y^3z$
- d)  $3x^2y^3z$

2. Factor the following polynomial by factoring out a GCF with negative coefficient:

$$-8x^3 + 48x^2$$

- a)  $-8(x^3 - 6x^2)$
- b)  $-x^2(8x - 48)$
- c)  $-4x^2(2x - 12)$
- d)  $-8x^2(x - 6)$

3. Factor the polynomial  $x^2 - 11x + 24$ .

- a)  $(x + 2)(x + 12)$
- b)  $(x + 3)(x + 8)$
- c)  $(x - 2)(x - 12)$
- d)  $(x - 8)(x - 3)$

4. Factor the polynomial  $9x^2 - 33x + 10$ .

- a)  $(x - 2)(9x - 5)$
- b)  $(3x - 1)(3x - 10)$
- c)  $(9x + 2)(x - 5)$
- d)  $(3x - 2)(3x - 5)$

5. Factor the perfect square trinomial:

$$16x^2 + 40xy + 25y^2.$$

- a)  $(4x - 5y)^2$
- b)  $(4x + 5y)^2$
- c)  $(16x - 25y)^2$
- d)  $(16x + 25y)^2$

6. Factor the difference of 2 cubes completely:

$$x^3 - 8y^3.$$

- a)  $(x + y)(x^2 - xy + y^2)$
- b)  $(x - y)(x^2 + xy + y^2)$
- c)  $(x - 2y)(x^2 + 4xy + 4y^2)$
- d)  $(x - 2y)(x^2 + 2xy + 4y^2)$

7. Find the zeros of the polynomial function:

$$p(x) = 9x^3 + x^2 - 81x - 9.$$

- a)  $x = -3, x = 3, x = \frac{1}{9}$
- b)  $x = -3, x = 3, x = -\frac{1}{9}$
- c)  $x = 1, x = 2, x = \frac{1}{3}$
- d)  $x = -1, x = 1, x = 3$

8. Solve for  $x$ :

$$(x + 1)(x - 2) = 4.$$

- a)  $x = 3$
- b)  $x = -3$
- c)  $x = -3, x = 2$
- d)  $x = -2, x = 3$

9. Which of the following is the domain of  $f(x) = \frac{x+5}{x+25}$ ? 13. Find the *least common denominator* (LCD) of the following two rational expressions:

- a)  $(-\infty, \infty)$   
 b)  $(-\infty, -25) \cup (-25, \infty)$   
 c)  $(-\infty, -5) \cup (-5, \infty)$   
 d)  $(-\infty, 5) \cup (5, \infty)$

$$\frac{2n-1}{n^2-5n-14}, \quad \frac{n^2+1}{n^2+6n+8}$$

- a)  $n+2$   
 b)  $n+4$   
 c)  $(n-7)(n+2)(n+4)$   
 d)  $(n+2)(n+4)$

10. If  $f(x) = \frac{6x^2-9}{3x+6}$ , find  $f(3)$ .

- a) 3  
 b) 5  
 c) 7  
 d) 6

14. Evaluate the difference:

$$\frac{x}{x^2-36} - \frac{4}{x}$$

- a)  $\frac{-3x^2-144}{x^2-36}$   
 b)  $\frac{-3x^2-144}{x^3-36x}$   
 c)  $\frac{-3x^2+144}{x^3-36x}$   
 d)  $\frac{x-4}{x^3-36x}$

11. Multiply the rational expressions:

$$\frac{2a}{3a+18} \times \frac{5a+30}{a^2+a}$$

- a)  $\frac{3}{a+1}$   
 b)  $\frac{10}{3a+3}$   
 c)  $\frac{10a+10}{3}$   
 d)  $\frac{11a+11}{3}$

15. Which of the following is the simplification for the complex rational function given by  $\frac{\frac{5+x}{x-1}}{3x + \frac{17x-5}{x-1}}$ ?

- a)  $\frac{1}{x-1}$   
 b)  $\frac{1}{3x-1}$   
 c)  $\frac{1}{x+5}$   
 d)  $x+5$

12. Divide the rational expressions:

$$\frac{x^2-y^2}{4x+2y} \div \frac{x^2-4xy-5y^2}{2x^2-9xy-5y^2}$$

- a)  $\frac{x-y}{2}$   
 b)  $\frac{x-y}{3}$   
 c)  $\frac{x-y}{4}$   
 d)  $\frac{x-y}{5}$

16. Solve the rational equation:

$$\frac{7x+6}{x^2-1} - \frac{9x+2}{x+1} = \frac{-9x^2+14x+8}{x^2-1}$$

- a)  $x = 1$
- b)  $x = 3, x = 7$
- c) All real numbers are solutions
- d) All real numbers except  $x = -1$  and  $x = 1$  are solutions

17. Solve the following rational equation:

$$\frac{x+1}{x-4} = \frac{x-5}{x+1}$$

- a)  $x = 1$
- b)  $x = \frac{3}{2}$
- c)  $x = 2$
- d)  $x = \frac{19}{11}$

18. Simplify the radical expression

$$\sqrt{x^2 + 16x + 64}$$

- a)  $x + 8$
- b)  $|x + 8|$
- c)  $x - 4$
- d)  $|x + 4|$

19. Simplify the radical expression

$$\sqrt[3]{-27x^3y^{15}z^9}$$

- a)  $-3xy^5z^3$
- b)  $-9xy^5z^9$
- c)  $3xy^5z^3$
- d)  $-3x^3y^{15}z^9$

20. What is the domain of the radical function  $f(x) = \sqrt{3x-18}$ ?

- a)  $[6, \infty)$
- b)  $[-6, \infty)$
- c)  $(-\infty, 6]$
- d)  $(-\infty, -6]$

- 1. C
- 2. D
- 3. D
- 4. B
- 5. B
- 6. D
- 7. B
- 8. D
- 9. B
- 10. A
- 11. B
- 12. A
- 13. C
- 14. C
- 15. B
- 16. D
- 17. D
- 18. B
- 19. A
- 20. A