

1. (R.2-92) After simplifying, the numerator of $\frac{4x^{-2}(yz)^{-1}}{2^3x^4y}$ is
(a) $2x^2$ (b) $2x^2z$ (c) yz (d) 1 (e) 4
2. (R.3-11) The lengths of the legs of a right triangle are 7 and 24. Find the length of the hypotenuse.
(a) 84 (b) 31 (c) 25 (d) $\sqrt{97}$ (e) $\sqrt{62}$
3. (R.3-b1) Find the volume V and the surface area S of a rectangular box with length 4 feet, width 2 feet, and height 5 feet.
(a) $V = 40$ and $S = 76$ (d) $V = 20$ and $S = 11$
(b) $V = 40$ and $S = 11$ (e) None of these
(c) $V = 20$ and $S = 76$
4. (R.4-c1) Perform the indicated operation and simplify: $(2x - 5)(3x + 4)$
(a) $6x^2 - 20$ (d) $5x^2 - 2x - 20$
(b) $6x^2 - 7x - 20$ (e) $5x - 1$
(c) $5x^2 - 7x - 20$
5. (R.4-c2) Perform the indicated operation and simplify: $(2x^2)^3(4x^3)$
(a) $32x^9$ (d) $6x^8$
(b) $32x^8$ (e) None of these
(c) $8x^8$
6. (R.4-c3) Simplify: $(x^2 - 3x + 1) - (2x - 5)$
(a) $-2x^3 + 11x^2 - 17x + 5$ (d) $x^2 - 5x + 6$
(b) $x^2 - x - 4$ (e) $x^2 - x + 6$
(c) $x^2 - 5x - 4$
7. (R.4-Ex9a) Expand: $(x + 2)^3 =$
(a) $x^3 + 8$ (d) $x^3 - 6x^2 + 12x - 8$
(b) $x^3 + 3x^2 + 3x + 8$ (e) None of these
(c) $x^3 + 6x^2 + 12x + 8$
8. (R.4-Ex9b) Expand: $(x - 1)^3$
(a) $x^3 - 1$ (d) $x^3 - 3x^2 + 3x - 1$
(b) $x^3 - x^2 - x + 1$ (e) None of these
(c) $x^3 - 3x^2 - x + 1$
9. (R.4-64) Multiply and simplify: $(x - 3y)(-2x + y)$
(a) $-2x^2 - 5xy - 3y^2$ (d) $-2x^2 - 7xy + 3y^2$
(b) $-2x^2 - 5xy + 3y^2$ (e) None of these
(c) $-2x^2 - 7xy - 3y^2$
10. (R.4-84) Expand and simplify: $(2x + 3y)^2$
(a) $2x^2 + 3y^2$ (d) $4x^2 + 6xy + 9y^2$
(b) $4x^2 + 9y^2$ (e) None of these
(c) $4x^2 + 12xy + 9y^2$

11. (R.4-87) Expand: $(2x + 1)^3$
- (a) $8(x^3 + 1)$ (d) $8x^3 + 12x^2 + 6x + 1$
(b) $8x^3 + 1$ (e) None of these
(c) $8x^3 + 4x^2 + 2x + 1$
12. (R.5-Ex11) Factor the following expression completely: $x^2 - x - 12$
- (a) $(x - 6)(x + 2)$ (d) $(x - 4)(x + 3)$
(b) $(x + 4)(x - 3)$ (e) None of these
(c) $(x + 6)(x - 2)$
13. (R.5-c1) Which of the following is a factor of $4x^2 + 5x - 6$?
- (a) $4x + 3$ (d) $2x - 3$
(b) $x - 2$ (e) $4x + 5$
(c) $4x - 3$
14. (R.5-b1) Factor completely: $ac^2 + 5bc^2 - a - 5b$
- (a) $(a + 5b)(c + 1)(c - 1)$ (d) $(a - 5b)(c + 1)^2$
(b) $(a - 5b)(c + 1)(c - 1)$ (e) None of these
(c) $(a + 5b)(c + 1)^2$
15. (R.5-111) Factor completely: $3(x^2 + 10x + 25) - 4(x + 5)$
- (a) $3x^2 + 26x + 95$ (d) $-(x + 5)^2$
(b) $(x + 5)(3x - 19)$ (e) None of these
(c) $(x + 5)(3x + 11)$
16. (R.5-122) Factor completely: $4(x + 5)^3(x - 1)^2 + 2(x + 5)^4(x - 1)$
- (a) $8(x + 5)^7(x - 1)^3$
(b) $2(x + 5)^3(x - 1)$
(c) $6(x + 5)^3(x - 1)(x + 1)$
(d) $2(x + 5)^3(x - 1)(3x + 7)$
(e) None of these
17. (R.6-b1) What is the *remainder* when $x^2 + x + 1$ is divided by $x - 2$?
- (a) 7 (b) 6 (c) 5 (d) 4 (e) None of these
18. (R.6-09) When $5x^4 - 3x^2 + x + 1$ is divided by $x^2 + 2$ the *remainder* is
- (a) $x + 27$ (d) $x + 13$
(b) $x + 25$ (e) None of these
(c) $x + 15$

19. (R.6-10) When $5x^4 - x^2 + x - 2$ is divided by $x^2 + 2$ we get

- (a) quotient: $5x^2 - 11$; remainder: $x - 24$
- (b) quotient: $5x^2 - 11$; remainder: $x + 20$
- (c) quotient: $5x^2 + 11$; remainder: $x - 24$
- (d) quotient: $5x^2 + 11$; remainder: $x + 20$
- (e) None of these

20. (R.6-13) When $2x^4 - 3x^3 + x + 1$ is divided by $2x^3 - 1$ the *quotient* is

- (a) $x^2 - 2x$
- (b) $x^2 + 2x$
- (c) $x^2 - 2x + \frac{1}{2}$
- (d) $x^2 + 2x - \frac{1}{2}$
- (e) None of these

21. (R.7-c1) Reduce the following rational expression to lowest terms: $\frac{x^2 + x - 6}{x^2 - 4}$

- (a) $\frac{x + 3}{x + 2}$
- (b) $\frac{x + 3}{x - 2}$
- (c) $\frac{x - 6}{-4}$
- (d) $x - 2$
- (e) None of these

22. (R.7-c2) Simplify; leave your answer in factored form: $\frac{1}{x - 1} - \frac{2}{x + 2}$

- (a) $\frac{-1}{2x + 1}$
- (b) $\frac{2x + 1}{(x + 1)(x + 2)}$
- (c) -1
- (d) $\frac{-x + 4}{(x - 1)(x + 2)}$
- (e) None of these

23. (R.7-45) After simplifying, the *numerator* of $\frac{4}{x - 1} - \frac{2}{x + 2}$ is

- (a) 2
- (b) -8
- (c) $2x + 6$
- (d) $2x - 8$
- (e) None of these

24. (R.7-Ex10) Simplify (assuming $x \neq -3, 0$): $\frac{\frac{1}{2} + \frac{3}{x}}{\frac{x+3}{4}}$
- (a) $\frac{2(x+2)}{x^2}$ (d) $\frac{2(x+6)}{x(x+3)}$
 (b) $\frac{x(x+3)}{8}$ (e) None of these
 (c) $\frac{(x+6)(x+3)}{8x}$

25. (R.7-b1) Simplify: $\frac{\left(\frac{x}{x+1}\right)}{\left(\frac{2x+2}{x^2}\right)}$
- (a) $\frac{x^2}{2x+4}$ (d) $\frac{2}{x}$
 (b) $\frac{x^3}{2x^2+4x+2}$ (e) None of these
 (c) $\frac{x^3}{2x^2+2}$

26. (R.7-66) After simplifying $\frac{2}{(x+2)^2(x-1)} - \frac{6}{(x+2)(x-1)^2}$, the numerator is
- (a) $-8x - 14$ (d) $-4x - 14$
 (b) $-8x + 10$ (e) $-4x + 14$
 (c) $-4x + 10$

27. (R.7-72) After simplifying, the numerator of $\frac{1}{h} \left[\frac{1}{(x+h)^2} - \frac{1}{x^2} \right]$ is
- (a) $-2x - h$ (d) $2x + h$
 (b) $-2x + h$ (e) None of these
 (c) $2x - h$

28. (R.7-76) After simplifying, the *denominator* of $\frac{1 - \frac{x}{x+1}}{2 - \frac{x-1}{x}}$ is

- (a) $x + 1$ (d) $(x - 1)^2$
 (b) $(x + 1)^2$ (e) None of these
 (c) $x^2 - 1$

29. (R.7-b2) Simplify and factor $\frac{4 + \frac{1}{x^2}}{25 - \frac{1}{x^2}}$.

- (a) $\frac{4}{25}$ (d) $\frac{(x+2)(x-2)}{(x+5)(x-5)}$
 (b) $\frac{4x^2 + 1}{(x+5)(x-5)}$ (e) $\frac{4x^2 + 1}{(5x+1)(5x-1)}$
 (c) $\frac{(2x+1)(2x-1)}{(5x+1)(5x-1)}$

30. (R.8-c1) Simplify: $2\sqrt{3} - \sqrt{48}$

- (a) $2\sqrt{3}$ (d) $\sqrt{45}$
 (b) $-14\sqrt{3}$ (e) $-\sqrt{36}$
 (c) $-2\sqrt{3}$

31. (R.8-c2) Simplify: $2\sqrt{3} + 2\sqrt{12}$

- (a) $2\sqrt{15}$ (d) 30
 (b) $6\sqrt{3}$ (e) None of these
 (c) $10\sqrt{3}$

32. (R.8-Ex7a) Simplify: $(x^{2/3}y)(x^{-2}y)^{1/2}$:

- (a) $x^{8/3}$ (b) $\frac{y}{x^{2/3}}$ (c) $\frac{y^{3/2}}{x^{4/3}}$ (d) $\frac{y^{3/2}}{x^{1/3}}$ (e) None of these

33. (R.8-Ex7c) Simplify: $\left(\frac{9x^2y^{1/3}}{x^{1/3}y}\right)^{1/2}$

- (a) $3x$ (d) $\frac{9x^{9/5}}{y^{1/3}}$
 (b) $\frac{3x^{9/5}}{y^{1/3}}$ (e) None of these
 (c) $\frac{3x^{5/6}}{y^{1/3}}$

34. (R.8-16) Simplify (assuming that all variables are positive): $\sqrt[3]{\frac{3xy^2}{81x^4y^2}}$

- (a) $\frac{1}{\sqrt{3}x}$ (d) $\frac{1}{3\sqrt{x}}$
(b) $\frac{\sqrt{3}}{x}$ (e) None of these
(c) $\frac{x}{\sqrt{3}}$

35. (R.8-28) Simplify: $2\sqrt{12} - 3\sqrt{27}$

- (a) $-\sqrt{15}$ (d) $-6\sqrt{324}$
(b) $-19\sqrt{3}$ (e) None of these
(c) $-5\sqrt{3}$

36. (R.8-b2) Simplify: $4\sqrt[3]{7} - 3\sqrt[3]{56}$

- (a) 2 (d) $2\sqrt[3]{7}$
(b) $-3\sqrt[3]{49}$ (e) None of these
(c) $-4\sqrt[3]{7}$

37. (R.8-c3) Rationalize the denominator: $\frac{10}{4 - \sqrt{2}}$

- (a) $5\sqrt{2}$ (d) $\frac{20 - 5\sqrt{2}}{9}$
(b) $\frac{20 - 5\sqrt{2}}{7}$ (e) $\frac{20 + 5\sqrt{2}}{9}$
(c) $\frac{20 + 5\sqrt{2}}{7}$

38. (R.8-c4) Simplify $\left(\frac{27}{8}\right)^{-2/3}$

- (a) $\frac{9}{4}$ (d) $\frac{-16}{81}$
(b) $\frac{4}{9}$ (e) None of these
(c) $\frac{-4}{9}$

39. (R.8-c5) Simplify $\left(\frac{1}{64}\right)^{-2/3}$

- (a) 16 (d) $-\frac{1}{96}$
(b) 512 (e) None of these
(c) $-\frac{1}{16}$

40. (R.8-b1) Factor the expression $x^{1/2}(x^2 + x) + x^{3/2} - 24x^{1/2}$ (where $x \geq 0$).
- (a) $x^{1/2}(x + 1)(x - 3)$ (d) $x^{1/2}(x + 6)(x - 4)$
 (b) $x^{3/2}(x + 1)(x - 3)$ (e) $(x + 6)(x - 4)$
 (c) $x^{3/2}(x + 2)(x - 6)$
41. (R.8-c6) Multiply and simplify $(2\sqrt{x} - 3)(2\sqrt{x} + 5)$
- (a) $4x + 4\sqrt{x} - 15$ (d) $4\sqrt{x} - 15$
 (b) $2x + 4\sqrt{x} - 15$ (e) None of these
 (c) $4x - 15$
42. (R.8-51) After rationalizing the denominator of $\frac{\sqrt{x+h} - \sqrt{x}}{\sqrt{x+h} + \sqrt{x}}$, the numerator is
- (a) $2x + h$ (d) $2x - 2\sqrt{x(x+h)}$
 (b) $2x + h - 2\sqrt{x(x+h)}$ (e) None of these
 (c) $2x + h + 2\sqrt{x(x+h)}$
43. (1.1-c1) Solve for x : $7 - 2x = 9 + 3x$
- (a) $x = 2$ (d) $x = -\frac{2}{5}$
 (b) $x = -2$ (e) $x = -3$
 (c) $x = \frac{2}{5}$
44. (1.1-Ex6) The solution to the equation $\frac{3x}{x-1} + 2 = \frac{3}{x-1}$ is
- (a) $x = 1$ (d) There is no solution
 (b) $x = 5$ (e) None of these
 (c) $x = \frac{1}{5}$
45. (1.1-c2) Solve the equation: $1 - \frac{1}{2}x = 6 + x$.
- (a) $x = -3$ (d) $x = -\frac{10}{3}$
 (b) $x = 2$ (e) None of these
 (c) $x = \frac{10}{3}$
46. (1.1-49) Solve the equation $\frac{x}{x-2} + 3 = \frac{2}{x-2}$.
- (a) $x = 2$ (d) There is no solution
 (b) $x = 1$ (e) None of these
 (c) $x = -1$

47. (1.1-51) Solve this equation: $\frac{2x}{x^2 - 4} = \frac{4}{x^2 - 4} - \frac{3}{x + 2}$
- (a) $x = 2$ or $x = -2$ (d) There is NO SOLUTION
 (b) $x = -1$ (e) None of these
 (c) $x = 2$
48. (1.1-b1) Solve this equation: $\frac{x}{x^2 - 1} - \frac{x + 3}{x^2 - x} = \frac{-3}{x^2 + x}$
- (a) $x = 0$ (d) There is NO SOLUTION
 (b) $x = -6$ (e) None of these
 (c) $x = -\frac{6}{7}$
49. (1.1-b2) Going into the final exam, which will count as two tests, Brooke has test scores of 80,83,71,61, and 89. What score does Brooke need on the final in order to have an average score of 80?
- (a) 90 (b) 88 (c) 85 (d) 82 (e) None of these
50. (1.1-96) A wool suit, discounted by 30% for a clearance sale, has a price tag of \$399. What was the suit's original price?
- (a) Not enough information to determine (d) \$532
 (b) \$306.92 (approximately) (e) \$570
 (c) \$518.70
51. (1.2-b1) Solve for x : $x^2 - 3x + 2 = 0$
- (a) $x = 1$ or $x = 2$ (d) $x = 2$ or $x = -3$
 (b) $x = 1$ or $x = -2$ (e) None of these
 (c) $x = 2$ or $x = 3$
52. (1.2-b2) Solve for x : $x^2 - 2x - 4 = 0$
- (a) $x = 4$ or $x = 2$ (d) $x = 1 + \sqrt{5}$ or $x = 1 - \sqrt{5}$
 (b) $x = \frac{4 + \sqrt{5}}{2}$ or $x = \frac{2 - \sqrt{5}}{2}$ (e) None of these
 (c) $x = \frac{2 + \sqrt{5}}{2}$ or $x = \frac{4 - \sqrt{5}}{2}$
53. (1.2-b3) Find the value of a so that $x^2 + ax + \frac{1}{9}$ is a perfect square.
- (a) $a = \frac{1}{3}$ (b) $a = \frac{2}{3}$ (c) $a = \frac{1}{9}$ (d) $a = \frac{2}{9}$ (e) None of these
54. (1.2-b4) Find the value of k so that $x^2 - \frac{3}{2}x + k$ is a perfect square.
- (a) $\frac{3}{4}$ (b) $-\frac{3}{4}$ (c) $\frac{9}{16}$ (d) $-\frac{9}{16}$ (e) None of these

Answer Key

1. R.2-92 d
2. R.3-11 c
3. R.3-b1 a
4. R.4-c1 b
5. R.4-c2 a
6. R.4-c3 d
7. R.4-Ex9a c
8. R.4-Ex9b d
9. R.4-64 e
10. R.4-84 c
11. R.4-87 d
12. R.5-Ex11 d
13. R.5-c1 c
14. R.5-b1 a
15. R.5-111 c
16. R.5-122 c
17. R.6-b1 a
18. R.6-09 a
19. R.6-10 b
20. R.6-13 e
21. R.7-c1 a
22. R.7-c2 d
23. R.7-45 e
24. R.7-Ex10 d
25. R.7-b1 b
26. R.7-66 d
27. R.7-72 a
28. R.7-76 b
29. R.7-b2 e
30. R.8-c1 c
31. R.8-c2 b
32. R.8-Ex7a d
33. R.8-Ex7c c
34. R.8-16 e
35. R.8-28 c
36. R.8-b2 d
37. R.8-c3 c
38. R.8-c4 b
39. R.8-c5 a
40. R.8-b1 d
41. R.8-c6 a
42. R.8-51 b
43. 1.1-c1 d
44. 1.1-Ex6 d
45. 1.1-c2 d
46. 1.1-49 d
47. 1.1-51 d
48. 1.1-b1 d
49. 1.1-b2 b
50. 1.1-96 e
51. 1.2-b1 a
52. 1.2-b2 d
53. 1.2-b3 b
54. 1.2-b4 c
55. 1.2-51 e
56. 1.2-63 b
57. 1.2-83 b
58. 1.2-97 c
59. 1.2-99 d
60. 1.2-a1 d