1. (R.2 p27 #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.4) 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) \(5x^2 - 7x - 20\)

4. (R.4) 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) \(8x^8\)

5. (R.4) 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) \(x^2 - 5x - 4\)

6. (R.4 Example 9) \((x + 2)^3 =\)
   (a) \(x^3 + 8\) (d) \(x^3 - 6x^2 + 12x - 8\)
   (b) \(x^3 + 3x^2 + 3x + 8\) (e) None of these
   (c) \(x^3 + 6x^2 + 12x + 8\)

7. (R.4 Example 9b) Multiply out: \((x - 1)^3\)
   (a) \(x^3 - 1\) (d) \(x^3 - 3x^2 + 3x - 1\)
   (b) \(x^3 - x^2 - x + 1\) (e) None of these
   (c) \(x^3 - 3x^2 - x + 1\)

8. (R.4 #64) Multiply and simplify: \((x - 3y)(-2x + y)\)
   (a) \(-2x^2 - 5xy - 3y^2\) (d) \(-2x^2 - 7xy + 3y^2\)
   (b) \(-2x^2 - 5xy + 3y^2\) (c) None of these
   (c) \(-2x^2 - 7xy - 3y^2\)

9. (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) \(4x^2 + 12xy + 9y^2\)
10. (R.5 Example 11) 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) \((x + 6)(x - 2)\)

11. (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) \((x + 5)(3x + 11)\)

12. (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

13. (R.6) 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

14. (R.6 #9) 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) \(x + 15\)

15. (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

16. (R.6 #13) When \(2x^4 - 3x^3 + x + 1\) is divided by \(2x^3 - 1\) the quotient is
   (a) \(x^2 - 2x\)  (d) \(x^2 + 2x - \frac{1}{2}\)
   (b) \(x^2 + 2x\)  (e) None of these
   (c) \(x^2 - 2x + \frac{1}{2}\)
17. (R.7) 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

18. (R.7) 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

19. (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

20. (R.7) Simplify: \( \frac{\left( \frac{x}{x + 1} \right)}{\left( \frac{2x + 2}{x^2} \right)} \)

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

21. (R.7 #66) After simplifying \( \frac{2}{(x + 2)^2(x - 1)} - \frac{6}{(x + 2)(x - 1)^2} \), the numerator is

(a) \(-8x - 14\)  
(b) \(-8x + 10\)  
(c) \(-4x + 10\)  
(d) \(-4x - 14\)  
(e) \(-4x + 14\)

22. (R.7 #72) After simplifying, the numerator of \( \frac{1}{h} \left[ \frac{1}{(x + h)^2} - \frac{1}{x^2} \right] \) is

(a) \(-2x - h\)  
(b) \(-2x + h\)  
(c) \(2x - h\)  
(d) \(2x + h\)  
(e) None of these
23. (R.7 #76) After simplifying, the denominator of \( \frac{1 - \frac{x}{x+1}}{2 - \frac{x}{x-1}} \) is

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

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

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

25. (R.8) Simplify: \( 2\sqrt{3} - \sqrt{48} \)

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

26. (R.8) Simplify: \( 2\sqrt{3} + 2\sqrt{12} \)

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

27. (R.8 Example 7) Simplify: \( (x^{2/3}y)(x^{-2}y)^{1/2} \):

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

28. (R.8 Example 7c) Simplify: \( \left( \frac{9x^2y^{1/3}}{x^{1/3}y} \right)^{1/2} \)

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

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

(a) \( -\sqrt{15} \)  
(b) \( -19\sqrt{3} \)  
(c) \( -5\sqrt{3} \)  
(d) \( -6\sqrt{324} \)  
(e) None of these
30. (R.8) Rationalize the denominator: \( \frac{10}{4 - \sqrt{2}} \)

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

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

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

32. (R.8) Factor the expression \( x^{1/2}(x^2 + x) + x^{3/2} - 24x^{1/2} \) (where \( x \geq 0 \)).

(a) \( x^{1/2}(x + 1)(x - 3) \)  
(b) \( x^{3/2}(x + 1)(x - 3) \)  
(c) \( x^{3/2}(x + 2)(x - 6) \)  
(d) \( x^{1/2}(x + 6)(x - 4) \)  
(e) \( (x + 6)(x - 4) \)

33. (R.8) Multiply and simplify \( (2\sqrt{x} - 3)(2\sqrt{x} + 5) \)

(a) \( 4x + 4\sqrt{x} - 15 \)  
(b) \( 2x + 4\sqrt{x} - 15 \)  
(c) \( 4x - 15 \)  
(d) \( 4\sqrt{x} - 15 \)  
(e) None of these

34. (R.8 #51) After rationalizing the denominator of \( \frac{\sqrt{x+h} - \sqrt{x}}{\sqrt{x+h} + \sqrt{x}} \), the numerator is

(a) \( 2x + h \)  
(b) \( 2x + h - 2\sqrt{x(x + h)} \)  
(c) \( 2x + h + 2\sqrt{x(x + h)} \)  
(d) \( 2x - 2\sqrt{x(x + h)} \)  
(e) None of these

35. (1.1) Solve for \( x \): \( 7 - 2x = 9 + 3x \)

(a) \( x = 2 \)  
(b) \( x = -2 \)  
(c) \( x = \frac{2}{5} \)  
(d) \( x = -\frac{2}{5} \)  
(e) \( x = -3 \)

36. (1.1 Example 6) The solution to the equation \( \frac{3x}{x - 1} + 2 = \frac{3}{x - 1} \) is

(a) \( x = 1 \)  
(b) \( x = 5 \)  
(c) \( x = \frac{1}{5} \)  
(d) There is no solution  
(e) None of these
37. (1.1) Solve the equation: \(1 - \frac{1}{2}x = 6 + x\).

(a) \(x = -3\)  
(b) \(x = 2\)  
(c) \(x = \frac{10}{3}\)

(d) \(x = -\frac{10}{3}\)  
(e) None of these

38. (1.1 #49) Solve the equation \(\frac{x}{x-2} + 3 = \frac{2}{x-2}\).

(a) \(x = 2\)  
(b) \(x = 1\)  
(c) \(x = -1\)

(d) There is no solution  
(e) None of these

39. (1.1 #51) Solve this equation: \(\frac{2x}{x^2 - 4} = \frac{4}{x^2 - 4} - \frac{3}{x + 2}\).

(a) \(x = 2\) or \(x = -2\)  
(b) \(x = -1\)

(d) There is NO SOLUTION  
(e) None of these

40. (see 1.1 #89) 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

41. (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  
(b) $306.92 (approximately)  
(c) $518.70  
(d) $532  
(e) $570

42. (1.2) Solve for \(x\): \(x^2 - 3x + 2 = 0\)

(a) \(x = 1\) or \(x = 2\)  
(b) \(x = 1\) or \(x = -2\)

(d) \(x = 2\) or \(x = -3\)  
(e) None of these

(c) \(x = 2\)

43. (1.2) Solve for \(x\): \(x^2 - 2x - 4 = 0\)

(a) \(x = 4\) or \(x = 2\)  
(b) \(x = \frac{4 + \sqrt{5}}{2}\) or \(x = \frac{2 - \sqrt{5}}{2}\)

(d) \(x = 1 + \sqrt{5}\) or \(x = 1 - \sqrt{5}\)  
(e) None of these

(c) \(x = \frac{2 + \sqrt{5}}{2}\) or \(x = \frac{4 - \sqrt{5}}{2}\)

44. (1.2) 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
45. (1.2) 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

46. (1.2 #51) Use the quadratic formula to solve the equation \( \frac{2}{3}x^2 - \frac{5}{3}x + 1 = 0 \). The solutions are
   (a) \( x = -1 \) and \( x = -2 \)  (d) \( x_1 \) and \( x_2 = 2 \)
   (b) \( x = -1 \) and \( x = -\frac{3}{2} \)  (e) None of these
   (c) \( x_1 = 1 \) and \( x_2 = -\frac{3}{2} \)

47. (1.2 #83) Use the quadratic formula to find the real solutions: \( x^2 + \sqrt{2}x - \frac{1}{2} = 0 \).
   (a) \( x = \frac{\sqrt{2} \pm 2}{2} \)  (d) \( x = \frac{-\sqrt{2} \pm \sqrt{3}}{2} \)
   (b) \( x = \frac{-\sqrt{2} \pm 2}{2} \)  (e) None of these
   (c) \( x = \frac{\sqrt{2} \pm \sqrt{3}}{2} \)

48. (1.2 #97) An open box is to be constructed from a square piece of sheet metal by removing a square of side 1 foot from each corner and turning up the edges. If the box is to hold 4 cubic feet, then the dimensions of the sheet metal should be
   (a) 1 foot by 1 foot  (d) 8 feet by 8 feet
   (b) 2 feet by 2 feet  (e) None of these
   (c) 4 feet by 4 feet

49. (1.2 #99) A ball is thrown vertically upward from the top of a building 96 feet tall with an initial velocity of 80 feet per second. The height \( s \) (in feet) of the ball above the ground after \( t \) seconds is \( s = 96 + 80t - 16t^2 \). After how many seconds does the ball strike the ground? That is, after how many seconds is the height equal to zero?
   (a) \( t = 1 \)  (b) \( t = 2 \)  (c) \( t = 3 \)  (d) \( t = 6 \)  (e) None of these

50. (1.2) The equation \( 1 - \frac{1}{x} - \frac{12}{x^2} = 0 \) has
   (a) NO real solutions
   (b) exactly ONE real solution, which is POSITIVE
   (c) exactly ONE real solution, which is NEGATIVE
   (d) exactly TWO real solutions, whose product is \(-12\)
   (e) exactly TWO real solutions, whose product is \(-\frac{1}{12}\)