1. The equation $5x^4 + 16 = 0$ has
   (a) No real solutions. (d) Exactly three real solutions.
   (b) Exactly one real solution. (e) Exactly four real solutions.
   (c) Exactly two real solutions.

2. Find the value of $k$ so that $x^2 - \frac{3}{2}x + k$ is a perfect square.
   (a) $\frac{3}{4}$ (d) $\frac{9}{16}$
   (b) $-\frac{3}{4}$ (e) $-\frac{9}{16}$
   (c) $\frac{9}{4}$

3. Simplify $4^{-2} + \left(\frac{1}{5}\right)^{1/2}$.
   (a) $\frac{7}{3}$ (d) $\frac{49}{16}$
   (b) $\frac{19}{48}$ (e) $-\frac{5}{3}$
   (c) $\frac{5}{6}$

4. Simplify $\frac{\sqrt{x^2y} \sqrt{125x^3}}{\sqrt{8x^3y^2}}$.
   (a) $\frac{512y^9}{125x^6}$ (d) $\frac{5\sqrt{x^2}}{2y}$
   (b) $\frac{25x^2}{8\sqrt{y}}$ (e) $\frac{125\sqrt{x^2}}{8y}$
   (c) $\frac{5x}{6y}$

5. Find the quotient and remainder upon dividing $6x^3 + 17x^2 + 10x + 3$ by $2x + 3$.
   (a) quotient 6 remainder $3x^2 + 4x - 1$
   (b) quotient $3x^2 + 4x - 1$ remainder 6
   (c) quotient $-36$ remainder $3x^2 + 4x + 11$
   (d) quotient $3x^2 + 4x + 11$ remainder $-36$
   (e) none of the above
6. Simplify \((16x^2y^{-1/3})^{3/4}\) (where \(x > 0\) and \(y > 0\)).

(a) \(16x^{11/4}y^{5/3}\) 
(b) \(8x^{11/4}y^{5/3}\) 
(c) \(8x^{3/2}y^{1/4}\)

(d) \(\frac{8x^{3/2}}{y^{1/4}}\) 
(e) \(\frac{32\sqrt[3]{2}x^{3/2}}{y^{1/4}}\)

7. Rationalize the denominator of \(\frac{\sqrt[3]{3}}{2\sqrt[3]{3} + 3}\).

(a) \(\frac{2 - \sqrt[3]{3}}{7}\) 
(b) \(2 + \sqrt[3]{3}\) 
(c) \(2 - \sqrt[3]{3}\)

(d) \(6 - \sqrt[3]{3}\) 
(e) \(6 + \sqrt[3]{3}\)

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) \(2\sqrt{x} + 2\)

9. Simplify \(\frac{(x^2)^{-3}y^3}{(x^3y)^{-2}}\).

(a) \(\frac{x^{12}}{y^9}\) 
(b) \(y^5x^{12}\) 
(c) \(\frac{y^5}{x^{12}}\)

(d) \(\frac{1}{y^3}\) 
(e) \(y^5\)

10. 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) \(\frac{4x^2 + 1}{(5x + 1)(5x - 1)}\)
11. 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 \(-\frac{1}{12}\).

12. The equation \(0 = x^3 + 8x^2 + 20x\) has

(a) NO real solutions.
(b) exactly ONE real solution.
(c) exactly TWO real solutions, both positive.
(d) exactly TWO real solutions, both negative.
(e) exactly THREE real solutions.

13. Find the factored, reduced form of the expression \(\frac{x^2 - 9}{16 - x^2}\). 

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

14. 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) \((x + 6)(x - 4)\)

15. Which of the following is true of the equation \(\frac{4}{x - 2} = \frac{7}{(x + 5)(x - 2)} - \frac{3}{x + 5}\)?

(a) It has NO real solutions.
(b) It has exactly ONE real solution, which is POSITIVE.
(c) It has exactly ONE real solution, which is NEGATIVE.
(d) It has exactly TWO real solutions, whose sum is \(\frac{5}{4}\).
(e) It has exactly TWO real solutions, whose sum is \(-\frac{5}{4}\).
16. Which of the following is true of the equation \((x + 2)^4 = 5(x + 2)^5\)?

(a) It has NO real solutions.
(b) It has exactly ONE real solution, which is POSITIVE.
(c) It has exactly ONE real solution, which is NEGATIVE.
(d) It has exactly TWO real solutions, whose product is \(-\frac{18}{5}\).
(e) It has exactly TWO real solutions, whose product is \(\frac{18}{5}\).

17. Find the factored, reduced form of \(\frac{(x + 4)^{1/2} - 2x(x + 4)^{-1/2}}{x + 4}\), where \(x > -4\).

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

18. Find the factored, reduced form of the expression \(\frac{x}{x - 3} - \frac{x + 1}{x^2 + 5x - 24}\).

(a) \(\frac{x^2 + 7x - 1}{(x - 3)(x + 8)}\)
(b) \(-\frac{1}{(x - 3)^2(x + 8)}\)
(c) \(-\frac{1}{x + 8}\)
(d) \(\frac{x^2 + 7x + 1}{(x - 3)(x + 8)}\)
(e) \(\frac{x^2 + 7x + 1}{(x - 3)(x - 8)}\)

19. If \(x\) pounds of oats costing $1.50 per pound are to be combined with \(y\) pounds of raisins costing $3.00 per pound to make 10 pounds of cereal costing $2.25 per pound, then what is \(\frac{x}{y}\)?

(a) 1
(b) 10
(c) \(\frac{1}{10}\)
(d) 2
(e) cannot be determined

20. A builder of yard sheds reduced the price of a model by 15%. If the new price is $850, what was the original price?

(a) 835 dollars
(b) 1000 dollars
(c) \(\frac{17000}{23}\) dollars
(d) 865 dollars
(e) none of the above
21. The equation of the vertical line passing through the point (4, 7) is
   (a) $x = 4$
   (b) $x = 7$
   (c) $y = 4$
   (d) $y = 7$
   (e) $4x = 7y$

22. The solution set of the combined inequality $-1 < 3 - 2x \leq 15$ is
   (a) $(-6, 2]$  
   (b) $[-6, 2)$  
   (c) $(2, 6]$  
   (d) $[2, 6)$  
   (e) $[-13/2, \infty)$

23. Find the distance between the points (2, 5) and (4, -3) in the plane.
   (a) $2\sqrt{2}$  
   (b) 10  
   (c) $\sqrt{10}$  
   (d) $2\sqrt{17}$  
   (e) 68

24. The midpoint of the line segment joining the points (1, 6) and (-3, 4) is
   (a) $\left(\frac{1}{2}, \frac{7}{2}\right)$  
   (b) $\left(\frac{7}{2}, \frac{1}{2}\right)$  
   (c) (-1, 5)  
   (d) (-2, -1)  
   (e) (16, 4)

25. The graph of $y = \frac{x^3}{x^2 - 9}$ is symmetric with respect to
   (a) the x-axis and y-axis, but NOT the origin.
   (b) the origin, but NOT the x-axis or y-axis.
   (c) the x-axis and the origin, but NOT the y-axis.
   (d) the y-axis and origin, but NOT the x-axis.
   (e) the x-axis, the y-axis and the origin.
26. Which of the following is an equation of the line passing through the point (5, −4) and PARALLEL to the line with equation 3x − 5y + 2 = 0?

(a) \( y = 3x - 4 \)
(b) \( y = 3x - 19 \)
(c) \( y = \frac{3}{5}x - 7 \)
(d) \( y = \frac{3}{5}x - 4 \)
(e) \( y = -\frac{5}{3}x - 9 \)

27. The graph of the line with equation 3x − 5y + 2 = 0 has

(a) x-intercept \((-2/3, 0)\) and y-intercept \((0, 2/5)\)
(b) x-intercept \((2/5, 0)\) and y-intercept \((0, -2/3)\)
(c) x-intercept \((3, 0)\) and y-intercept \((0, -5)\)
(d) x-intercept \((-5, 0)\) and y-intercept \((0, 3)\)
(e) x-intercept \((3/2, 0)\) and y-intercept \((0, -5/2)\)

28. The graph of the equation \(4x^2 + 9y^2 = 36\) has

(a) x-intercept \((0, 0)\) and y-intercept \((0, 0)\)
(b) x-intercept \((3, 0)\) and y-intercept \((0, 2)\)
(c) x-intercept \((2, 0)\) and y-intercept \((0, 3)\)
(d) x-intercepts \((3, 0)\) and \((-3, 0)\) and y-intercepts \((0, 2)\) and \((0, -2)\)
(e) x-intercepts \((2, 0)\) and \((-2, 0)\) and y-intercepts \((0, 3)\) and \((0, -3)\)

29. The line which is PERPENDICULAR to the line given by \(y = 4x - 3\) and which passes through the point (0, 5) passes also through which of the following points?

(a) \((4, 0)\)
(b) \((4, 13)\)
(c) \((4, 4)\)
(d) \((4, 6)\)
(e) \((4, -11)\)

30. The graph of the equation \(x^2 + y^2 - 6x + 2y + 7 = 0\) is

(a) a circle with center \((3, -1)\) and radius 3.
(b) a circle with center \((3, -1)\) and radius \(\sqrt{3}\).
(c) a circle with center \((3, 1)\) and radius \(\sqrt{7}\).
(d) a circle with center \((1, 3)\) and radius \(\sqrt{3}\).
(e) not a circle.
31. The slope of a line perpendicular to the line with equation $2x - 5y + 3 = 0$ is
(a) 2
(b) $2/5$
(c) $5/2$
(d) $-5/2$
(e) not enough information to determine

32. Which of the following is true of the equation $2 + \sqrt{1 - x + x^2} = x$?
(a) It has NO real solutions.
(b) It has exactly ONE real solution, which is POSITIVE.
(c) It has exactly ONE real solution, which is NEGATIVE.
(d) It has exactly TWO real solutions, whose SUM is 0.
(e) It has exactly TWO real solutions, whose SUM is 4.

33. Which of the following is true of the equation $x^4 - 10x^2 + 25 = 0$?
(a) It has NO real solutions.
(b) It has exactly ONE real solution, which is POSITIVE.
(c) It has exactly ONE real solution, which is NEGATIVE.
(d) It has exactly TWO real solutions, whose PRODUCT is $-5$.
(e) It has exactly TWO real solutions, whose PRODUCT is 25.

34. Find the solution set of the equation $9 - 4(2 - x) \leq -3x + 6$.
(a) the inequality has no solutions
(b) $[-5, \infty)$
(c) $[5/7, \infty)$
(d) $(-\infty, -5]$ 
(e) $(-\infty, 5/7]$

35. Which of the following is true of the equation $x^{1/2} - 3x^{1/4} + 2 = 0$?
(a) It has NO solutions.
(b) It has exactly ONE real solution.
(c) It has exactly TWO real solutions, whose SUM is 3.
(d) It has exactly TWO real solutions, whose SUM is 1/3.
(e) It has exactly TWO real solutions, whose SUM is 17.
36. Which of the following is true of the equation $x^{-2} + 3x^{-1} = 28$?

(a) It has NO real solutions
(b) It has exactly ONE real solution, which is positive.
(c) It has exactly ONE real solution, which is negative.
(d) It has exactly TWO real solutions, whose PRODUCT is $-28$.
(e) It has exactly TWO real solutions, whose PRODUCT is $-1/28$.

37. Which of the following is true of the equation $x^{3/4} = 9x^{1/4}$?

(a) It has NO real solutions.
(b) It has exactly ONE real solution, which is POSITIVE.
(c) It has exactly TWO real solutions, whose SUM is 3.
(d) It has exactly TWO real solutions, whose SUM is 81.
(e) It has exactly TWO real solutions, whose SUM is 9.

38. The solution set of the inequality $0 < (x - 4)^{-1} < 1/2$ is

(a) $(0, 2)$
(b) $(0, 6)$
(c) $(6, \infty)$
(d) $(-\infty, 6)$
(e) $(2, 3)$

39. Find the solution set of the inequality $|3 - 2x| \geq 7$.

(a) $\{x : x \leq 5 \text{ or } x \geq -2\}$
(b) $\{x : x \geq 5 \text{ or } x \leq -2\}$
(c) $[-2, 5]$  
(d) all real numbers
(e) $(-\infty, -2]$  

40. Find the solution set of the inequality $|5 - 2x| < 9$.

(a) the empty set (no solutions)
(b) $\{x : x > 7 \text{ or } x < -2\}$
(c) $(-2, 7)$
(d) $(-2, \infty)$
(e) $(-\infty, 7)$

41. The solution set of the inequality $x(9x - 5) \leq (3x - 1)^2$ is

(a) $(-\infty, 1]$  
(b) $[1, \infty)$
(c) the empty set
(d) $[1/5, \infty)$
(e) $\{0, 5/9, 1/3\}$
42. What is the domain of the function $f$ defined by $f(x) = \sqrt{4 - 3x}$?
   (a) $(-\infty, 0]$  (d) $(-\infty, 4/3]$
   (b) $(-\infty, 0)$  (e) $(-\infty, 4/3)$
   (c) $[4/3, \infty)$

43. What is the domain of the function $G$ defined by $G(x) = x^3 + 4x$?
   (a) all reals except $-4$
   (b) all reals except $2, -2$
   (c) all reals except $0, 2, -2$
   (d) $\{0, 2, -2\}$
   (e) $\{0, 2, -2, -4\}$

44. If $f(x) = \frac{2x + 1}{3x - 5}$, then what is $f(3x + 1)$?
   (a) $f(3x + 1) = 3 \cdot \left(\frac{2x + 1}{3x - 5}\right) + 1$
   (b) $f(3x + 1) = \frac{6x + 2}{9x - 4}$
   (c) $f(3x + 1) = \frac{6x + 3}{9x - 2}$
   (d) $f(3x + 1) = \frac{(2x + 1)(3x + 1)}{3x - 5}$
   (e) none of the above

45. If $f(x) = 5x - 2$ and $g(x) = 3 - x^2$, compute $(g \circ f)(x)$ and simplify.
   (a) $(g \circ f)(x) = -5x^3 + 2x^2 + 15x - 6$
   (b) $(g \circ f)(x) = -5x^2 + 13$
   (c) $(g \circ f)(x) = -25x^2 - 20x + 7$
   (d) $(g \circ f)(x) = -25x^2 - 1$
   (e) $(g \circ f)(x) = -25x^2 + 20x - 1$

46. If $f(x) = \frac{x}{x - 1}$ and $g(x) = \frac{-4}{x}$ then find $(f \circ g)(x)$ and simplify.
   (a) $(f \circ g)(x) = \frac{-4x + 4}{x}$
   (b) $(f \circ g)(x) = \frac{4}{x}$
   (c) $(f \circ g)(x) = \frac{-4}{x - 1}$
   (d) $(f \circ g)(x) = \frac{4}{4 + x}$
   (e) $(f \circ g)(x) = -1$

47. The graph of $f(x) = 3x^2 + 5x + 4$ has
   (a) $x$-intercepts $(-\frac{5}{6} \pm \frac{\sqrt{23}}{6}, 0)$, vertex $(-\frac{5}{6}, \frac{23}{12})$
   (b) $x$-intercepts $\left(\frac{5}{6} \pm \frac{\sqrt{23}}{6}, 0\right)$, vertex $\left(\frac{5}{6}, \frac{123}{12}\right)$
   (c) $x$-intercept $(4, 0)$, vertex $(-\frac{5}{6}, \frac{23}{12})$
   (d) no $x$-intercepts, vertex $(-\frac{5}{6}, \frac{23}{12})$
   (e) no x-intercepts, vertex $\left(\frac{5}{6}, \frac{123}{12}\right)$
48. The line $x = 4$ is a vertical asymptote of the graph of which of the following functions? [There is only one correct answer!]

(a) $f(x) = \frac{2x - 8}{x - 4}$

(b) $f(x) = \frac{1}{x^2 - 16}$

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

(d) $f(x) = \frac{4x + 1}{x + 2}$

(e) $f(x) = x - 4$

49. Which of the following functions does not have a horizontal asymptote?

(a) $f(x) = \frac{2}{3x - 5}$

(b) $f(x) = \frac{2x^2 + 1}{3x^2 - 5}$

(c) $f(x) = 2 + \frac{6}{3x^2 - 5}$

(d) $f(x) = \frac{3x^2 + 2}{x - 1}$

(e) $f(x) = \frac{4x}{x^2 + 1}$

50. On which intervals is the function $f(x) = -2(x + 3)^2(x - 1)$ positive?

(a) $(-\infty, -3)$ and $(1, \infty)$

(b) $(-\infty, -3)$ and $(-3, 1)$

(c) $(-3, 1)$ and $(1, \infty)$

(d) $(-3, 1)$ only

(e) $(1, \infty)$ only

51. Find the $x$-intercepts and vertical asymptotes of the graph of $f(x) = \frac{x^2 - 3x}{x^2 - 2x - 8}$

(a) $x$-intercepts $(4, 0), (3, 0), (-2, 0), (0, 0)$ v.a. $x = 4, x = 3, x = -2, x = ?$

(b) $x$-intercepts $(-4, 0), (2, 0)$ v.a. $x = 0, x = 3$

(c) $x$-intercepts $(4, 0), (-2, 0)$ v.a. $x = 0, x = 3$

(d) $x$-intercepts $(0, 0), (3, 0)$ v.a. $x = 4, x = -2$

(e) $x$-intercepts $(0, 0), (3, 0)$ v.a. $x = -4, x = 2$

52. If $f$ is an odd function and $(a, b)$ lies on the graph of $f$, what other point(s) must also lie on the graph of $f$?

(a) $(-a, b)$

(b) $(a, -b)$

(c) $(-a, -b)$

(d) $(a, -b)$ and $(-a, b)$

(e) $(a, -b)$ and $(-a, -b)$
53. Which answer describes the graph of the exponential function \( f(x) = e^x \)?

(a) The graph goes through \((0, e)\) and decreases as \(x\) increases.
(b) The graph goes through \((0, e)\) and increases as \(x\) increases.
(c) The graph goes through \((0, 1)\) and decreases as \(x\) increases.
(d) The graph goes through \((0, 1)\) and increases as \(x\) increases.
(e) The graph is a straight line through \((1, e)\).

54. \( \log_{\sqrt{2}} 4 = \)

(a) 0  
(b) 1  
(c) 2  
(d) 3  
(e) 4

55. List the properties of the graph of \( y = \ln x \).

A: The graph has a vertical asymptote at \(x = 1\).
B: The graph has a vertical asymptote at \(x = 0\).
C: The graph goes through \((e, 0)\).
D: The graph goes through \((1, 0)\).
E: The graph has a horizontal asymptote.
F: The graph increases as \(x\) increases.

(a) A, C, and E  
(b) A, D, and E  
(c) A, C, and F  
(d) B, D, and E  
(e) B, D, and F

56. The equation \( \log_{\pi} x = \frac{1}{2} \) can be written in exponential form as

(a) \( x = \left(\frac{1}{2}\right)^\pi \)  
(b) \( x = \pi^{1/2} \)  
(c) \( x^\pi = \frac{1}{2} \)

(d) \( \pi = x^{1/2} \)  
(e) \( \pi = \left(\frac{1}{2}\right)^x \)

57. Express \( y \) as a function of \( x \) (the constant \( C \) is positive). \( \ln y = 3x + \ln C \)

(a) \( y = 3x + C \)  
(b) \( y = \ln 3x + C \)  
(c) \( y = Ce^{3x} \)

(d) \( y = C^{3x} \)  
(e) \( y = e^{3x} + C \)

58. Solve for \( x \): \( 9^{2x} = 27 \)

(a) \( x = \log_9 27 \)  
(b) \( x = \log_3 27 \)  
(c) \( x = 4/3 \)

(d) \( x = 3/4 \)  
(e) None of these
59. Solve for \( x \): \( \log_a x + \log_a (x - 2) = \log_a (x + 4) \)

(a) \( x = 4 \)  
(b) \( x = 4 \) or \( x = -1 \)  
(c) \( x = -4 \)

(d) \( x = -4 \) or \( x = 1 \)  
(e) None of these

60. Let \( f(x) = 2x \) and \( g(x) = 3x^2 + 1 \). Find the composite function \((g \circ f)(x)\).

(a) \( 12x^2 + 1 \)  
(b) \( 6x^2 + 2 \)  
(c) \( 6x^2 + 1 \)

(d) \( 6x^3 + 2x \)  
(e) \( 6x^3 + 1 \)

61. Find the domain of \( f \circ g \) if \( f(x) = \frac{1}{x+2} \) and \( g(x) = \frac{4}{x-1} \).

(a) \( x \neq \pm1 \)  
(b) \( x \neq 1 \)  
(c) \( x \neq 2 \)

(d) \( x \neq -2 \)  
(e) None of these

62. \( \log \frac{x^3\sqrt{x+1}}{(x-2)^2} = \)

(a) \( 3\log x + \frac{1}{2} \log(x+1) - 2\log(x-2) \)
(b) \( 3\log x + \frac{1}{2} \log(x+1) + 2\log(x-2) \)
(c) \( 3\log x + \log(x+1) - \log(x-2) \)
(d) \( 3\log x + \log(x+1) + \log(x-2) \)
(e) None of these

63. Let \( f(x) = 3x + 1 \) and \( g(x) = x^2 \). Find the composite function \((g \circ f)(x)\).

(a) \( x^2 + 3x + 1 \)  
(b) \( 9x^2 + 1 \)  
(c) \( 3x^3 + x^2 \)

(d) \( 9x^2 + 6x + 1 \)  
(e) None of these

64. The function \( f(x) = \sqrt{x - 2} \), for \( x \geq 2 \), is a one-to-one function. Find the inverse function \( f^{-1} \) for \( f \).

(a) \( f^{-1}(x) = x^2 + 2 \), for \( x \geq 0 \)  
(b) \( f^{-1}(x) = x^2 + 2 \), for \( x \geq 2 \)

(c) \( f^{-1}(x) = x^2 + 2 \), for all \( x \)

(d) \( f^{-1}(x) = -\sqrt{x - 2} \), for \( x \geq 2 \)

(e) \( f^{-1}(x) = \frac{1}{\sqrt{x - 2}} \), for \( x > 2 \)
65. The function \( f(x) = \frac{4}{2 - x} \), for \( x \neq 2 \), is a one-to-one function. Find the inverse function \( f^{-1} \) for \( f \).

(a) \( f^{-1}(x) = \frac{2x - 4}{x} \)
(b) \( f^{-1}(x) = \frac{2 - x}{4} \)
(c) \( f^{-1}(x) = \frac{-4}{2 - x} \)
(d) \( f^{-1}(x) = \frac{4 - 2x}{x} \)
(e) None of these

66. \( \ln \frac{5x \sqrt{1 - 3x}}{(x - 4)^3} = \)

(a) \( 5 \ln x + \ln(1 - 3x) + \ln(x - 4) \)
(b) \( 5 \ln x + \ln(1 - 3x) - \ln(x - 4) \)
(c) \( \ln 5 + \ln x + \frac{1}{2} \ln(1 - 3x) - 3 \ln(x - 4) \)
(d) \( \ln 5 + \ln x + \frac{1}{2} \ln(1 - 3x) + 3 \ln(x - 4) \)
(e) None of these

67. If \( f(x) = 2x^2 + 5 \) and \( g(x) = 3x + a \), find \( a \) so that the graph of \( f \circ g \) crosses the \( y \)-axis at 23.

(a) \( a = 8 \)  (d) \( a = \pm 3 \)
(b) \( a = -8 \)  (e) None of these
(c) \( a = 3 \)

68. Solve for \( x \): \( e^x + e^{-x} = 2 \).

(a) \( x = -1 \)  (d) \( x = \ln 2 \)
(b) \( x = 0 \)  (e) None of these
(c) \( x = 1 \)

69. \( (\log_2 6)(\log_6 8) = \)

(a) \( 3 \)  (d) \( \log_2 \frac{4}{3} \)
(b) \( 2 \)  (e) None of these
(c) \( \log_6 4 \)

70. Solve for \( x \): \( \log_9 x + 3 \log_3 x = 14 \)

(a) \( 27 \)  (d) \( \log_3 14 \)
(b) \( 9 \)  (e) None of these
(c) \( \log_9 14 \)