1. Find the value of x in the solution for the following system. \[
\begin{aligned}
3x - 2y &= 1 \\
4x + 3y &= 2
\end{aligned}
\]
a) \(\frac{2}{17}\)  
 b) \(\frac{7}{17}\)  
 c) \(\frac{3}{17}\)  
 d) \(\frac{63}{17}\)  
 e) none of these

2. Solve \(2x^4 + 9x^2 - 5 = 0\).
   a) \(\left\{ \frac{1}{2}, -5 \right\}\)  
   b) \(\left\{ \pm \frac{\sqrt{2}}{2}, \pm i\sqrt{5} \right\}\)  
   c) \(\left\{ \pm \frac{\sqrt{2}}{2}, \pm \sqrt{5} \right\}\)  
   d) \(\left\{ \pm \frac{1}{2}, \pm \sqrt{5} \right\}\)  
   e) none of these

3. Find the distance between the points (5,4) and (1,-1).
   a) 5  
   b) \(3\sqrt{5}\)  
   c) 9  
   d) 41  
   e) none of these

4. Consider the following types of symmetry.
   I. symmetry with respect to the x-axis
   II. symmetry with respect to the y-axis
   III. symmetry with respect to the origin

   Which of the types of symmetry does the graph of \(y^2 = x^3 - 1\) possess?
   a) only I  
   b) only II  
   c) only III  
   d) only II and III  
   e) I, II, and III

5. Find the center and radius of the circle whose equation is \(x^2 - 10x + y^2 + 6y - 1 = 0\).
   a) center = (-5,3); radius = \(\sqrt{35}\)  
   b) center = (-5,3); radius = 35  
   c) center = (5,-3); radius = \(\sqrt{35}\)  
   d) center = (5,-3); radius = 35  
   e) center = (5,-3); radius = 1

6. Solve \(|1 - 2x| + 10 = 9\).
   a) \{1\}  
   b) \{-1\}  
   c) \{\pm 1\}  
   d) \{1,10\}  
   e) \{\}\n
7. If \(f(x) = 1 - x\) and \(g(x) = -3x^2 - x - 1\), find \((g \circ f)(x)\).
   a) \(-3x^2 + 7x - 4\)  
   b) \(3x^2 + x + 2\)  
   c) \(-3x^2 + 7x - 5\)  
   d) \(-3x^2 + 5x - 4\)  
   e) none of these

8. Find the domain and range of \(f(x) = |x - 5|\).
   a) domain = \((-\infty, \infty)\), range = \((-\infty, \infty)\)  
   b) domain = \((-\infty, \infty)\), range = [0,\(\infty\)]  
   c) domain = \((-\infty, \infty)\), range = [5,\(\infty\)]  
   d) domain = [0,\(\infty\)], range = [-5,\(\infty\)]  
   e) domain = [0,\(\infty\)], range = [0,\(\infty\)]
9. Which of the following is the graph of \( g(x) = -\sqrt{x + 2} + 1 \)?

a)  

b)  

c)  

d)  

e)  

10. Solve \( 3^{4x-1} = 6 \).

a) \( \left\{ \frac{3}{4} \right\} \)  

b) \( \left\{ \frac{6 + \ln 3}{4 \ln 3} \right\} \)  

c) \( \left\{ \frac{\ln 6 + \ln 3}{4 \ln 3} \right\} \)  

d) \( \left\{ \frac{\ln 6}{4 \ln 3} \right\} \)  

e) \( \left\{ \frac{\ln 9}{4 \ln 3} \right\} \)  

11. Which of the following is the graph of the compound inequality \( 2x - 3y \leq 4 \) and \( y \geq 1 \)?

a)  

b)  

c)  

d)  

e)  

12. Evaluate \( \log_3 \frac{1}{9} \).

a) \( \frac{1}{2} \)  

b) \( -\frac{1}{2} \)  

c) 2  

d) -2  

e) \( \frac{1}{3} \)  

13. Solve: \( 1 + \frac{2}{3x^2} = \frac{7}{3x} \)

a) \( \{-3, -2\} \)  

b) \( \{\pm 1\} \)  

c) \( \left\{ \frac{1}{9} \right\} \)  

d) \( \left\{ \frac{1}{3}, 2 \right\} \)  

e) none of these  

14. Simplify \( \ln e^{6/5} \).

a) \( \frac{5}{6} \)  

b) \( \frac{6}{5} \)  

c) \( e^{6/5} \)  

d) 1  

e) \( \frac{6}{5}e \)
15. Solve $|3x - 2| \leq 5$.
   a) $(-\infty, -1]$  b) $[-1, \frac{7}{3}]$  c) $(-\infty, \frac{7}{3}]$  d) $(-\infty, -1] \cup \left[\frac{7}{3}, \infty\right)$  e) $\left[-1, \frac{7}{3}\right]$ 

16. Solve $\log_2(2x + 3) = 3 + \log_2(x - 1)$.
   a) $\{6\}$  b) $\left\{\frac{11}{6}\right\}$  c) $\{-1\}$  d) $\{\}$  e) none of these

17. Find the value of $x$ in the solution for the following system.
   \[
   \begin{align*}
   3x - y - z &= 5 \\
   2x + 3y - z &= -16 \\
   x + 2y + 4z &= 3
   \end{align*}
   \]
   a) 1  b) $-2$  c) 0  d) 3  e) none of these

18. Find the remainder when $4x^3 + x - 5$ is divided by $2x + 1$.
   a) $-4$  b) $-6$  c) 1  d) $-1$  e) none of these

19. $\log_8 \sqrt{2}$ equals
   a) $\frac{1}{3}$  b) $\frac{1}{8}$  c) $\frac{3}{2}$  d) $\frac{1}{6}$  e) none of these

20. Which equation can be used to determine how long it will it take an investment to double if it invested at 6% interest compounded continuously?
   a) $2P = P(1.06)^t$  b) $P = 2P(1.06)^t$  c) $P = 2Pe^{0.06t}$  d) $2 = Pe^{0.06t}$  e) $2P = Pe^{0.06t}$

21. Solve: $\frac{10}{x} - \frac{3}{x - 1} = 2$
   a) $\left\{-\frac{6}{7}\right\}$  b) $\left\{2, \frac{5}{2}\right\}$  c) $\left\{\frac{12}{7}\right\}$  d) $\left\{-2, -\frac{5}{4}\right\}$  e) none of these

22. Subtract: $\frac{2x}{x^2 - 2x - 3} - \frac{x}{x^2 - 4x + 3}$
   a) $\frac{x}{(x - 3)(x + 1)}$  b) $\frac{x}{(x + 1)(x - 1)}$  c) $\frac{x}{x - 3}$  d) $\frac{x}{(x - 3)(x + 1)(x - 1)}$  e) $\frac{x^2 - 3}{(x - 3)(x + 1)(x - 1)}$
23. Let \( f(x) = -\frac{4}{3}x + 5 \). Find \( f^{-1}(x) \).
   
   a) \( f^{-1}(x) = \frac{4}{3}x - 5 \)  
   b) \( f^{-1}(x) = -\frac{3}{4}x + \frac{1}{5} \)  
   c) \( f^{-1}(x) = -\frac{3}{4}x + \frac{15}{4} \)  
   d) \( f^{-1}(x) = \frac{3}{4}x - \frac{15}{4} \)  
   e) \( f^{-1}(x) = -\frac{3}{4}x + \frac{5}{4} \)

24. How many solutions does the following system have? \[
\begin{align*}
6x - 4y &= 18 \\
\frac{3}{2}x - \frac{9}{2}y &= 1
\end{align*}
\]
   a) 0  
   b) 1  
   c) 2  
   d) 3  
   e) infinitely many

25. Let \( f(x) = 2x^2 - 2x + 1 \). Find and simplify \( \frac{f(x+h) - f(x)}{h} \).
   
   a) \( 4x + 2h + 2 \)  
   b) \( 4x + 2h - 2 \)  
   c) \( 2x + 2h - 2 \)  
   d) \( 2x + h - 2 \)  
   e) 1

26. Solve \( 32^{2x} = \left(\frac{1}{2}\right)^{5x-1} \).
   
   a) \( \left\{ \frac{1}{5} \right\} \)  
   b) \( \left\{ -\frac{1}{5} \right\} \)  
   c) \( \left\{ \frac{1}{15} \right\} \)  
   d) \( \left\{ -\frac{1}{15} \right\} \)  
   e) none of these

27. Solve \( x^{-2/3} + 2x^{-1/3} - 15 = 0 \).
   
   a) \( \{-5,3\} \)  
   b) \( \left\{ -\frac{1}{5}, \frac{1}{3} \right\} \)  
   c) \( \left\{ \frac{1}{125}, \frac{1}{27} \right\} \)  
   d) \( \left\{ \frac{1}{125}, -\frac{1}{27} \right\} \)  
   e) \( \{-125,27\} \)

28. Find the x intercepts for the graph of \( f(x) = 3x^2 - 2x + 1 \).
   
   a) \( -1 \) and 3  
   b) \( \frac{1 \pm \sqrt{2}}{3} \)  
   c) \( \frac{2 \pm \sqrt{14}}{6} \)  
   d) \( -\frac{1}{3} \) and 1  
   e) no x intercepts

29. Solve \( \sqrt{2x+13} - \sqrt{x+10} = 1 \).
   
   a) \( \{\pm6\} \)  
   b) \( \{4,-8\} \)  
   c) \( \{6\} \)  
   d) \( \{\} \)  
   e) none of these

30. Simplify \( \frac{6}{x-3} - \frac{1}{x-3} \).
   
   a) \( \frac{2x-3}{2} \)  
   b) \( \frac{5x+3}{4x-6} \)  
   c) \( \frac{5x-3}{4x-6} \)  
   d) \( \frac{5}{4} \)  
   e) \( \frac{4}{5} \)
31. Solve \( \frac{x-3}{x-4} \geq 1. \)
   a) \((4,\infty)\)  b) \([4,\infty)\)  c) \([3,4)\)  d) \((-\infty,3) \cup [4,\infty)\)  e) \((-\infty,3) \cup (4,\infty)\)

32. To solve \(3x^2 - x - 2 = 0\) by completing the square, which of the following equations needs to be solved?
   a) \(\left(x - \frac{1}{6}\right)^2 = \frac{2}{3}\)  b) \(\left(x - \frac{1}{6}\right)^2 = \frac{73}{36}\)  c) \(\left(x - \frac{1}{6}\right)^2 = \frac{25}{36}\)  d) \(\left(x + \frac{1}{6}\right)^2 = \frac{25}{36}\)  e) \(\left(3x - \frac{1}{2}\right)^2 = \frac{9}{4}\)

33. Find the vertex of \(y = -3x^2 + 6x - 5.\)
   a) \((2,-5)\)  b) \((-1,-14)\)  c) \((1,10)\)  d) \((1,-2)\)  e) none of these

34. Find the domain of \(f(x) = \sqrt{9-x^2}.\)
   a) \([-3,3]\)  b) \([3,\infty)\)  c) \([0,\infty)\)  d) \{\(x \mid x \neq -3, x \neq 3\}\)  e) \((-\infty,-3) \cup [3,\infty)\)

35. \(\frac{1}{2} \log_b y - 4 \log_b x - \log_b z\) equals
   a) \(\log_b\left(\frac{1}{2} y - 4x - z\right)\)  b) \(\log_b(\sqrt{y} - x^4 - z)\)  c) \(\log_b \frac{\sqrt{y}}{x^4 z}\)  d) \(\log_b \frac{\sqrt{y}}{x^4 - \log_b z}\)

36. If \(f(x) = \frac{9}{x+12}\) and \(g(x) = \sqrt{x}\), find \((g \circ f)(4).\)
   a) \(\frac{3}{4}\)  b) \(\frac{9}{14}\)  c) \(\frac{9}{8}\)  d) \(\frac{9}{16}\)  e) none of these

37. Solve \(|2x + 3| = |3x - 4|\).
   a) \(\left\{7, \frac{1}{5}\right\}\)  b) \(\left\{-1, -\frac{7}{5}\right\}\)  c) \(\left\{7, -\frac{7}{5}\right\}\)  d) \(\{7\}\)  e) \(\{-1\}\)

38. Which of the following is the graph of \(f(x) = 2^{-x}\)?
   a)  b)  c)  d)  e)
39. If \( f(x) = \begin{cases} 
\frac{2x+3}{6} & \text{for } x \leq -1 \\
\frac{x-1}{5} & \text{for } -1 < x < 0 \\
\frac{5}{8} & \text{for } x \geq 0 
\end{cases} \), find \( f(0) \).

a) 3  

b) -1  

c) 0  

d) 1  

e) none of these

40. Which of the following functions is odd?

a) \( f(x) = x^2 + 4 \)  

b) \( f(x) = x^3 + 4 \)  

c) \( f(x) = x^2 + 4x \)  

d) \( f(x) = x^3 + 4x \)  

e) \( f(x) = x + 4 \)

41. Which of the following is the graph of \( f(x) = -2x^3 \)?

a)  

b)  

c)  

d)  

e)  

42. The graph of \( y = f(x) \) is . Which of the following is the graph of \( y = f(x) - 3 \)?

a)  

b)  

c)  

d)  

e)  

43. Solve \( \ln(5t + 1) - \ln(t + 2) = \ln 3 \).

a) \( \{1\} \)  

b) \( \{0\} \)  

c) \( \left\{ \frac{3}{2} \right\} \)  

d) \( \left\{ \frac{5}{2} \right\} \)  

e) \( \{\} \)

44. Find the value of \( y \) in the solution for the following system.

\[
\begin{align*}
\begin{cases}
x - 3z &= 10 \\
3x - y + z &= 10 \\
2y - 3z &= 6
\end{cases}
\end{align*}
\]

a) -1  

b) 0  

c) 1  

d) 2  

e) none of these
45. Solve \( \log x + \log (2x + 1) = 1 \).
   a) \( \left\{ \frac{1}{2} \right\} \)  
   b) \( \left\{ \frac{5}{2}, 2 \right\} \)  
   c) \( \left\{ -\frac{5}{2}, 2 \right\} \)  
   d) \( \left\{ -1, \frac{1}{2} \right\} \)  
   e) \{2\}

46. Solve: \( \frac{a + 3}{a} - \frac{a + 4}{a + 5} = \frac{15}{a^2 + 5a} \)
   a) \{-5\}  
   b) \{0\}  
   c) \{-1\}  
   d) \{\}  
   e) none of these

47. The graph of \( f(x) = \log_2(x - 1) \) is
   a)  
   b)  
   c)  
   d)  
   e)  

Answers
1. b  
2. b  
3. e  
4. a  
5. c  
6. e  
7. c  
8. b  
9. c  
10. c  
11. b  
12. d  
13. d  
14. b  
15. b  
16. b  
17. a  
18. b  
19. e  
20. e  
21. b  
22. b  
23. c  
24. e  
25. b  
26. c  
27. c  
28. e  
29. c  
30. b  
31. a  
32. c  
33. d  
34. a  
35. d  
36. a  
37. a  
38. b  
39. e  
40. d  
41. c  
42. a  
43. d  
44. b  
45. e  
46. d  
47. a