For each problem given below, the answer is listed at the end of this document, and the corresponding lesson number is listed next to the problem. You can review the video lessons and PowerPoint presentations on the MA 15300 website.

To search for a problem from a particular lesson, use the "Find" option in the upper right-hand corner of the screen.

1. Which of the following equations has only real solutions? *(Lessons 11, 13, 14)*

I.	$x^2 + 2x + 3 = 0$
II.	$x^3 - 3x^2 + 10x = 0$
III.	$3x^4 + 10x^2 - 8 = 0$

A. I only
B. II only
C. III only
D. I, II, and III
E. None have only real solutions

2. The base of a triangle is three inches more than its height. If each is increased by 3 inches the area is 14 square inches. Find the original base (b) and the original height (h) in inches. *(Lesson 12)*

A. $b = 4, h = 1$
B. $b = 9, h = 6$
C. $b = 8, h = 5$
D. $b = \frac{7}{2}, h = \frac{1}{2}$
E. None of the above

3. Simplify $\dfrac{\left(25x^4y^{16}z^9\right)^{-\frac{1}{2}}}{x^{-5}y\sqrt{z}}$. *(Lesson 2)*

A. $\dfrac{x^3}{5y^9z^5}$
B. $\dfrac{5x^7y^3z^2}{2}$
C. $\dfrac{2}{5x^7y^7z^4}$
D. $\dfrac{x^7}{5y^7z^4}$
E. None of the above

4. Subtract and simplify. *(Lesson 5)*

$$\frac{3x}{3x+1} - \frac{x}{x-2}$$

A. $\frac{2x^2-1}{(3x+1)(x-2)}$

B. $\frac{-3x^2}{(3x+1)(x-2)}$

C. $\frac{-7x}{(3x+1)(x-2)}$

D. $\frac{2x}{(3x+1)(x-2)}$

E. None of the above

5. Simplify; do not include negative exponents in your final answer. *(Lesson 6)*

$$\frac{1-\frac{a}{b}}{1-\frac{a^2}{b^2}}$$

A. $\frac{1}{1+a}$

B. $\frac{b}{b-a}$

C. $\frac{1}{a}$

D. $\frac{b}{a+b}$

E. a

6. If the point $P(-6, 12)$ is on the graph of the function $y = f(x)$, which of the following is the corresponding point on the graph of the function $y = -2f(3x) + 4$. *(Lesson 22)*

A. $(-18, -20)$

B. $(-2, -10)$

C. $(-18, -2)$

D. $(-2, -20)$

E. $(-18, -10)$

7. Express $f(x) = -2x^2 + 12x - 14$ in the form $y = a(x-h)^2 + k$. *(Lesson 25)*

A. $y = -2(x+3)^2 + 4$
B. $y = -2(x+3)^2 + 32$
C. $y = -2(x-3)^2 + 32$
D. $y = -2(x-3)^2 + 4$
E. $y = -2(x-6)^2 - 14$

8. Which of the following statements is/are true about the function $f(x) = 2^{-x}$? *(Lesson 35)*

I.	The domain of $f(x)$ is $(-\infty, \infty)$
II.	The range of $f(x)$ is $(-\infty, \infty)$
III.	$f(x) \neq 0$

A. I only
B. II only
C. I and III only
D. II and III only
E. I, II, and III

9. A woman rows a boat 1.75 miles upstream against a constant current in 35 minutes. She then rows the same distance downstream (with the same current) in 15 minutes. What is the rate of the current? *(Lesson 8 or Lesson 33)*

A. 2 mph
B. 5 mph
C. $\frac{1}{30}$ mph
D. 1 mph
E. $\frac{17}{60}$ mph

10. A job takes 45 minutes for two people working together. If one person works alone he can do the job in 2 hours. How long will it take the other person working alone to complete the job? *(Lesson 9)*

A. $\frac{90}{43}$ hours

B. 1 hour and 15 minutes

C. 43 minutes

D. 1 hour

E. 1 hour and 12 minutes

11. Which of the following statements is/are true? *(Lessons 14 and 15)*

I.	$\lvert x-2\rvert = -2$, when $x = 0, 4$
II.	$\lvert x-2\rvert > -2$, when $0 < x < 4$
III.	$\lvert x-2\rvert < -2$, when $0 < x < 4$

A. I only

B. II only

C. III only

D. All are true

E. None are true

12. Rationalizing the denominators and simplify. *(Lesson 2)*

$$\sqrt{\frac{1}{18x^3y^4}}$$

A. $\frac{1}{6x^2y^2}$

B. $\frac{\sqrt{2x}}{6x^2y^2}$

C. $\frac{1}{9\sqrt[3]{x^2}y^2}$

D. $\frac{\sqrt{2x}}{12x^3y^2}$

E. $\frac{1}{3xy^2}$

13. Let x and y be two consecutive positive integers such that x is less than y and the difference of their squares is 145. Find x. (hint: set-up a system of equations) *(Lesson 8 or Lesson 33)*

A. 73

B. 72

C. 12

D. 8

E. None of the above

14. Given the formula $f = \frac{1}{\frac{1}{a}+\frac{1}{b}}$, solve for b. *(Lesson 7)*

A. $b = \frac{af}{a+f}$

B. $b = \frac{1}{2}$

C. $b = \frac{f}{a}$

D. $b = \frac{a}{af-1}$

E. $b = \frac{af}{a-f}$

15. Which of the following is equivalent to $\log\left(\frac{z^3}{x\sqrt{y}}\right)$? *(Lesson 37)*

A. $3\log z - \log x - \frac{1}{2}\log y$

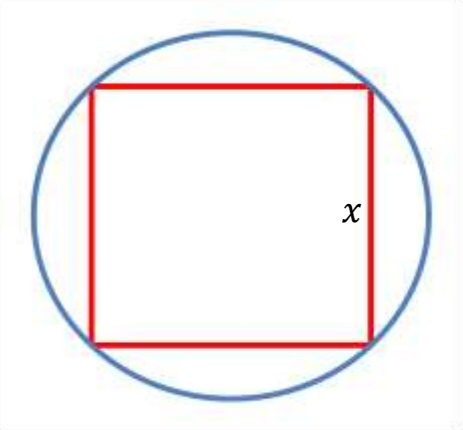
B. $\frac{3}{2}\log(z - xy)$

C. $3\log z - \log x - 2\log y$

D. $\frac{3}{2}\log(z - x + y)$

E. $3\log z - \log x + \frac{1}{2}\log y$

16. A square of side x is inscribed in a circle. Express the area A of the circle as a function of x. *(Lesson 21)*



A. $A(x) = \frac{\pi}{2}x^2$

B. $A(x) = x^2$

C. $A(x) = \pi x^2$

D. $A(x) = \frac{\pi}{4}x^2$

E. None of the above

17. If $f(x) = \sqrt{2-3x}$ and $g(x) = \frac{1}{x^2}$, which of the following statements is/are true? *(Lessons 20, 34, 27)*

I.	The domain of f is $[0, \infty)$
II.	$g(x)$ is a one-to-one function
III.	$(g \circ f)(0) = \frac{1}{2}$

A. I only

B. III only

C. I and III only

D. II and III only

E. I, II, and III

18. How many ml of a 50% acid solution should be added to 40 ml of a 20% acid solution to obtain a solution that is 25% acid? *(Lesson 8 or Lesson 33)*

A. 10 ml

B. 8 ml

C. 6 ml

D. 4 ml

E. None of the above

19. Solve for x. Choose the answer that best describes the solution(s). *(Lesson 14)*

$$x + \sqrt{5x + 19} = -1$$

A. There are two solutions.
One is positive and one is negative.

B. There are two solutions.
Both are positive.

C. There are two solutions.
Both are negative.

D. There is one solution.
It is positive.

E. There is one solution.
It is negative.

20. Find the domain of f. *(Lesson 20)*

$$f(x) = \sqrt{3x - 2} + 1$$

A. $(-\infty, \infty)$

B. $\left[\frac{3}{2}, \infty\right)$

C. $\left[\frac{2}{3}, \infty\right)$

D. $\left(-\infty, \frac{2}{3}\right]$

E. $[0, \infty)$

21. Which of the following equations is/are true? *(Lesson 36)*

I.	$\ln 0 = 1$
II.	$10^{\log 8} = 8$
III.	$\log_4 8 = 2$

A. I only

B. II only

C. III only

D. I, II, and III

E. None of the equations are true

22. Solve for x. Choose the answer that best describes the solution(s). *(Lessons 13, 14)*

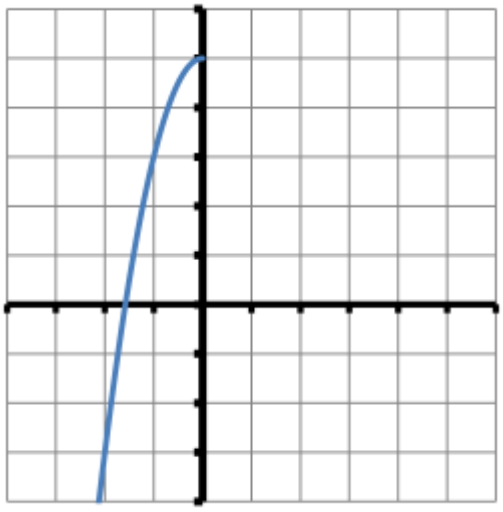
$$x^4 - x^2 - 6 = 0$$

A. There are four solutions.
   All are real.
B. There are four solutions.
   Two are real and two are imaginary.
C. There are four solutions.
   All are imaginary.
D. There are two solutions.
   Both are real.
E. There are no solutions.

23. Given the function $f(x) = 5 - 2x^2, x \leq 0$ and its graph, determine which of the following statements is/are true. (Assume each tick mark represents one unit on the graph) *(Lessons 21, 34)*

I.	The range of f is $(-\infty, 5]$
II.	$f^{-1}(x) = \sqrt{\frac{5-x}{2}}$
III.	The graph of f^{-1} will pass through the point $(3, -1)$

A. I and II only
B. I and III only
C. II and III only
D. All are true
E. None are true



24. Solve $81x^2 \geq 16x$ and express the solutions in interval notation. *(Lesson 28)*

A. $(-\infty, 0] \cup \left[\frac{16}{81}, \infty\right)$

B. $\left[-\frac{4}{9}, \frac{4}{9}\right]$

C. $(-\infty, \infty)$

D. $\left[\frac{16}{81}, \infty\right)$

E. $\left(-\infty, -\frac{4}{9}\right] \cup \left[\frac{4}{9}, \infty\right)$

25. Solve the inequality and express the solution in interval notation. *(Lesson 15)*

$$-\frac{1}{2} < \frac{3-2x}{5} \leq \frac{3}{2}$$

A. $\left[-\frac{9}{4}, \frac{11}{4}\right)$

B. $\left(-\frac{9}{4}, \frac{11}{4}\right]$

C. $\left[-\frac{11}{4}, \frac{9}{4}\right)$

D. $\left(-\frac{11}{4}, \frac{9}{4}\right]$

E. None of the above

26. Simplify; do not include negative exponents in your final answer. *(Lesson 6)*

$$\frac{xy^{-1}}{(x+y)^{-1}}$$

A. $\frac{x(x+y)}{y}$

B. $\frac{x^2}{x+y}$

C. $\frac{x+y}{xy}$

D. $\frac{xy}{x+y}$

E. None of the above

27. Find all values of c, so that the solutions of the following equation are real numbers: *(Lesson 11)*

$$2x^2 - 4x + c = 0$$

A. $c = 2$

B. $c > 2$

C. $c \geq 2$

D. $c \leq 2$

E. None of the above

28. Which of the following equations is/are true? *(Lesson 3)*

I.	$(x + y)^2 = x^2 + y^2$
II.	$\left(\sqrt{x} + \sqrt{y}\right)\left(\sqrt{x} - \sqrt{y}\right) = x - y$
III.	$(x - y)^2 - (x + y)^2 = -4xy$

A. I only

B. II only

C. III only

D. II and III

E. I, II, and III

29. Which of the following statements is **TRUE** regarding the solutions of the following system? *(Lesson 31)*

$$2x^2 + y^2 = 1$$
$$x - y = 1$$

A. There is a solution in QI

B. There is a solution in QII

C. There is a solution in QIII

D. There is a solution in QIV

E. There is a solution that lies on the x-axis

30. If $(2, 3)$ is the midpoint of segment AB, and point A has coordinates $(1, -2)$, find the coordinates of the point B. *(Lesson 16)*

A. $(1, 5)$

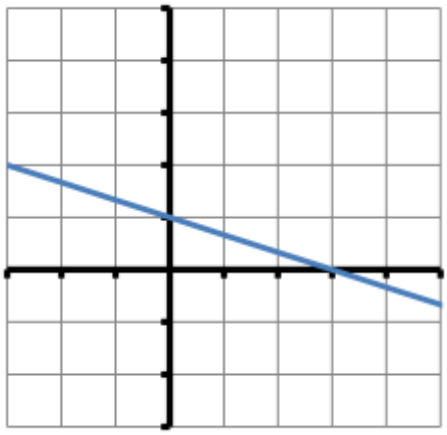
B. $(3, 1)$

C. $(3, 8)$

D. $\left(\frac{3}{2}, \frac{1}{2}\right)$

E. None of the above

31. The slope of a line perpendicular to the line drawn is? *(Lesson 18)*
(Assume each tick mark represents one unit on the graph)



A. $\frac{1}{3}$

B. $-\frac{1}{3}$

C. -3

D. 3

E. None of the above

32. M varies jointly with x cubed and y, and inversely with the square root of z. Find the constant of proportionality k if $M = 64$ when $x = 8, y = 5,$ and $z = 4$. *(Lesson 30)*

A. $k = \frac{64}{5}$

B. $k = \frac{1}{20}$

C. $k = \frac{5}{4}$

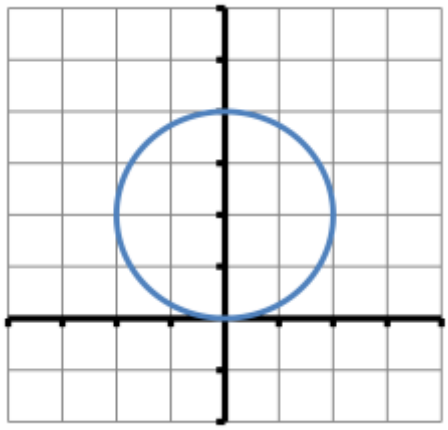
D. $k = \frac{2}{5}$

E. None of the above

33. Given that $\log_3 m = 8, \log_3 n = 10,$ and $\log_3 p = 6$, calculate $\log_3\left(\frac{\sqrt{mn}}{p^3}\right)$. *(Lesson 37)*

A. -9
B. $\frac{2\sqrt{5}}{27}$
C. 22
D. -56
E. -4

34. The equation for the circle show is? *(Lesson 17)*
(Assume each tick mark represents one unit on the graph)



A. $x^2 + y^2 = 4$
B. $x^2 + y^2 - 4y = 0$
C. $x^2(y - 2) = 4$
D. $x^2 + y^2 + 4y = 0$
E. $x^2 + y^2 + 4x + 4y - 8 = 0$

35. Given the functions $f(x) = \frac{2-x}{x+4}$ and $g(x) = x - 1$, determine which of the following is/are true. *(Lessons 27, 34)*

I.	$\left(\frac{g}{f}\right)(2) = 0$
II.	$(f \circ g)(x) = 0$ when $x = -3$
III.	$f^{-1}(x) = \frac{1-2x}{x+1}$

A. I. only
B. II. only
C. III. only
D. All are true
E. None are true

36. If $f(x) = \frac{x}{x^2+1}$, find $f\left(\frac{1}{3}\right)$ and $\frac{1}{f(3)}$. *(Lesson 20)*

A. $f\left(\frac{1}{3}\right) = \frac{3}{10}, \frac{1}{f(3)} = \frac{3}{10}$

B. $f\left(\frac{1}{3}\right) = \frac{10}{27}, \frac{1}{f(3)} = \frac{3}{10}$

C. $f\left(\frac{1}{3}\right) = \frac{10}{27}, \frac{1}{f(3)} = \frac{10}{13}$

D. $f\left(\frac{1}{3}\right) = \frac{3}{10}, \frac{1}{f(3)} = \frac{10}{3}$

E. None of the above

37. Solve $x^2 + 5x + 6 \leq 0$ and express the solutions in interval notation. *(Lesson 28)*

A. $[-3, -2]$

B. $[-3, 2]$

C. $[2, 3]$

D. $[-6, 1]$

E. $[-1, 6]$

38. Solve the Pythagorean theorem $a^2 + b^2 = c^2$ for b. *(Lesson 11)*

A. $b = -\sqrt{c^2 - a^2}$

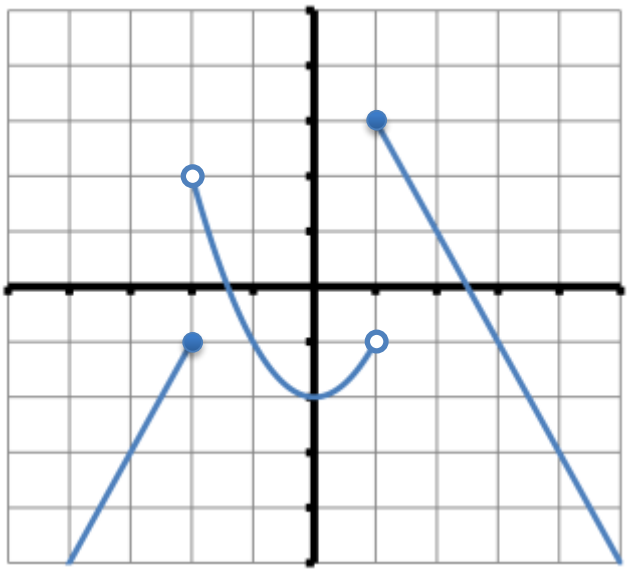
B. $b = c - a$

C. $b = \sqrt{c^2 - a^2}$

D. $b = a - c$

E. $b = \sqrt{c^2 + a^2}$

39. Which of the following statements about the graph of f is/are true? *(Lesson 24)*
(Assume each tick mark represents one unit on the graph)



I.	Increasing intervals: $(-\infty, -2] \cup [0, 1)$
II.	Range: $(-\infty, 3]$
III.	y-intecept: $(0, 2)$

A. I only
B. I and II only
C. I and III only
D. I, II, and III
E. None are true

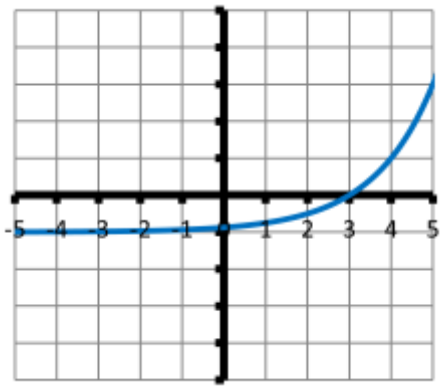
40. If $x < 0$ and $y > 0$, which of the following inequalities is/are true? *(Lesson 1)*

I.	$x^2y > 0$
II.	$\frac{y-x}{xy} < 0$
III.	$y(x-y) < 0$

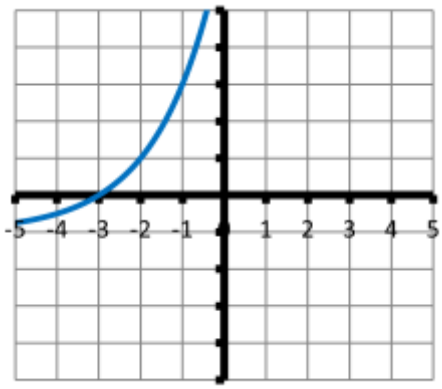
A. I and II only
B. I and III only
C. II and III only
D. I, II, and III
E. None of the above

41. If $f(x) = 2^x$, which of the following graphs represents $f(x-3)+1$? *(Lessons 22, 23, 35)* (Assume each tick mark represents one unit on the graph)

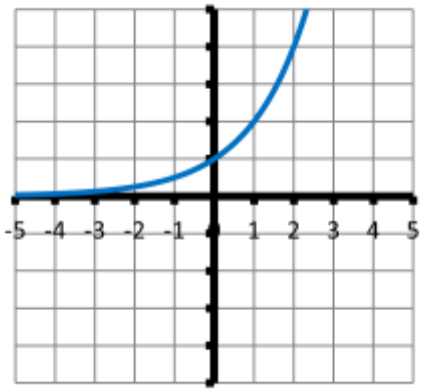
A.



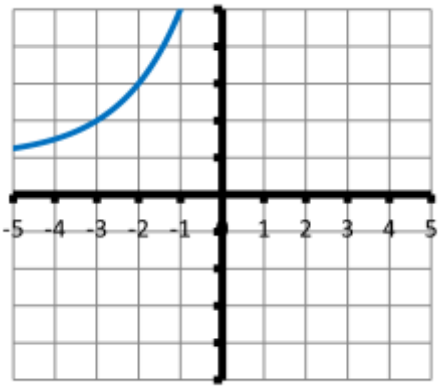
B.



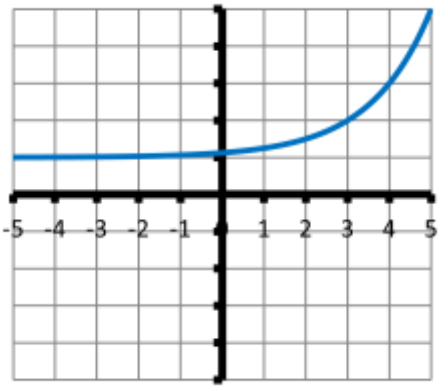
C.



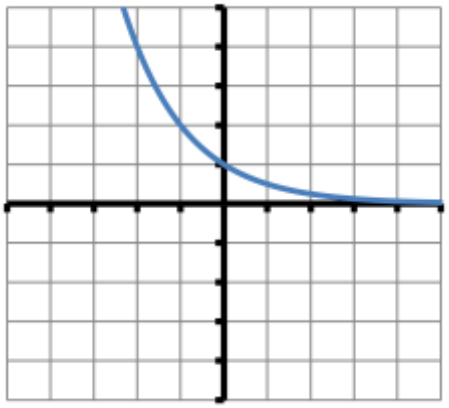
D.



E.



42. Given below is the graph of which of the following functions? *(Lesson 35)*
(Assume each tick mark represents one unit on the graph)



A. $f(x) = \left(\frac{1}{2}\right)^x$

B. $g(x) = 2^x$

C. $h(x) = -2^x$

D. $j(x) = -\left(\frac{1}{2}\right)^x$

E. $k(x) = 1 - 2^x$

43. Solve $\frac{(x-1)^2(3-x)}{x+2} > 0$ and express the solutions in interval notation. *(Lesson 28)*

A. $(-2, 3]$

B. $(-2, 1\,] \cup [1, 3)$

C. $(-\infty, -2) \cup (3, \infty)$

D. $(-2, 3)$

E. $(-2, 1) \cup (1, 3)$

44. Solve the system of equations $\begin{cases} x^2 + y^2 = 25 \\ y = x^2 - 5 \end{cases}$ and determine which of the following statements is/are true regarding the solution(s). *(Lesson 31)*

I.	One solution is an x-intercept.
II.	There are three solutions.
III.	All solutions lie above the x-axis.

A. I only

B. II only

C. I and III only

D. II and III only

E. I, II, and III

45. A truck enters a freeway traveling 40 mph. One hour later a car enters the same freeway traveling 55 mph. After how many miles will the car overtake the truck? *(Lesson 8 or Lesson 33)*

A. $146\frac{2}{3}$ miles

B. $201\frac{2}{3}$ miles

C. 120 miles

D. $106\frac{2}{3}$ miles

E. None of the above

46. Solve for x: $3^{x-5} = 4$. *(Lesson 40)*

A. $x = \log 4 + 5\log 3$

B. $x = 5 + \log\left(\frac{4}{3}\right)$

C. $x = 5 + \frac{\log 4}{\log 3}$

D. $x = 5 + \log 4$

E. $x = \frac{5+\log 4}{\log 3}$

47. Solve for x: *(Lesson 39)*

$$\log_3 \sqrt{2x+3} = 2$$

A. $x = \frac{5}{2}$

B. $x = \frac{3}{2}$

C. $x = 39$

D. $x = 17$

E. $x = 3$

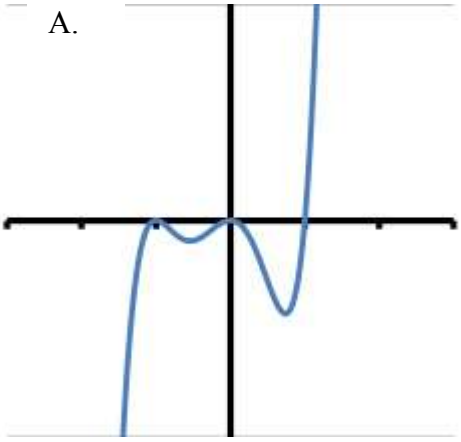
48. Let $y = f(x)$ be a function with domain $D = [-7, 8]$ and range $R = [-12, 9]$. Determine which of the following statements is/are true? *(Lessons 22, 23)*

I.	The range of $y = \frac{1}{2}f(-x) + 3$ is $[-8, 7]$
II.	The domain of $y = -f(2x) - 2$ is $[-14, 16]$
III.	The range of $y = \frac{2}{3}f(x - 4) - 1$ is $[-9, 5]$
IV.	The domain of $y = -f\left(-\frac{3}{2}x\right)$ is $\left[-\frac{21}{2}, 12\right]$

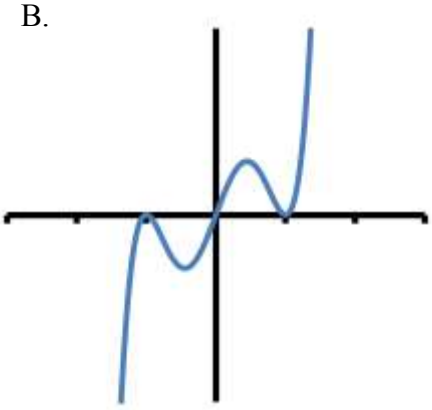
A. I and III only
B. II and IV only
C. I only
D. I, II, and III only
E. III only

49. Which of the following is the graph of the function $f(x) = x^2(x - 1)(x + 1)^2$? (Assume each tick mark represents one unit on the graph) *(Lesson 29)*

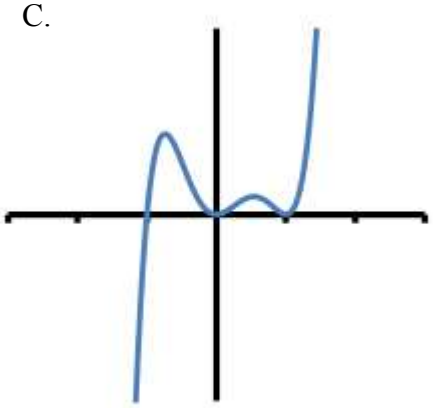
A.



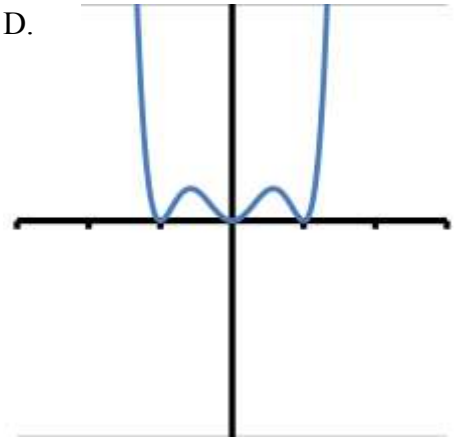
B.



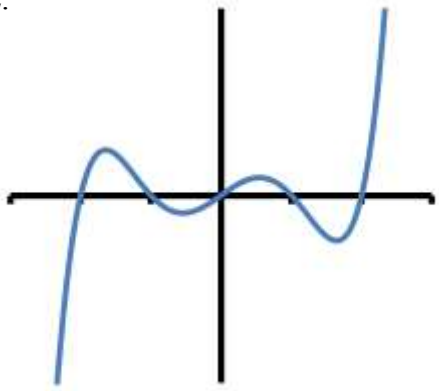
C.



D.



E.



50. Which of the following statements is/are true regarding the graph of $f(x) = 2 + 2^x$? *(Lesson 35)*

I.	$f(x) = 0$, when $x = -1$
II.	$f(0) = 2$
III.	The domain of f is $(2, \infty)$

A. I only
B. II only
C. III only
D. I and III only
E. None of the above

51. Which of the following systems has no solution? *(Lesson 32)*

A. $\begin{cases} 2x + 3y = 8 \\ 3x - 2y = 4 \end{cases}$
B. $\begin{cases} 3x + 4y = 5 \\ 6x + 4y = 10 \end{cases}$
C. $\begin{cases} 2x - 3y = 4 \\ -4x + 6y = 3 \end{cases}$
D. $\begin{cases} x - 4y = 6 \\ 2x - 4y = 6 \end{cases}$
E. $\begin{cases} 3x - 2y = 4 \\ 6x + 4y = 8 \end{cases}$

52. Which of the following statements is/are true of the function $f(x) = \log_2 x$? *(Lessons 36, 37)* (hint: sketch the graph of the function)

I.	f has a zero at $x = 1$
II.	f has a y-intercept at $(0, 1)$
III.	The domain of f is $(-\infty, \infty)$

A. I only
B. I and II only
C. I and III only
D. II and III only
E. I, II, and III

53. The value of a rare book is increasing **linearly**. It was worth \$54 in 1981 and \$62 in 1983. Which of the following **linear equations** represents the value (v) of the book t years after 1980? *(Lesson 19)*

A. $v = 50 + 4t$

B. $v = 48 + 3t$

C. $v = 50 + 3t$

D. $v = 51 + 4t$

E. None of the above

54. If $f(x) = -x^2 + x + 2$, find $\frac{f(x+h)-f(x)}{h}$. *(Lessons 20, 21)*

A. $-2x - h$

B. $-h^2$

C. $-2x - h^2 + h$

D. $-h + 1$

E. $-2x - h + 1$

55. Perform the indicated operations and simplify: *(Lesson 5)*

$$\frac{x}{x+1} - \frac{1}{x-1}$$

A. $\frac{x-1}{2}$

B. 1

C. $\frac{x-1}{x+1}$

D. $\frac{x^2-2x-1}{x^2-1}$

E. $\frac{1}{x+1}$

56. If $\log_x 2 = 5$, solve for x. Write your answer correct to four decimal places. *(Lesson 39)*

A. 2.2361
B. 1.4142
C. 0.6990
D. 1.1487
E. 0.3010

57. Solve the inequality: *(Lesson 15)*

$$2|-11-7x|-2 \geq 10$$

A. $\left[-\frac{17}{7}, -\frac{5}{7}\right]$
B. $\left(-\infty, -\frac{17}{7}\right] \cup \left[-\frac{5}{7}, \infty\right)$
C. $\left[\frac{5}{7}, \frac{17}{7}\right]$
D. $(-3, 5); (-1, -3)$
E. $(5, 21);\ (-1, -5)$

58. Given the formula $N = n \cdot 2^{\frac{t}{a}}$, solve for a. *(Lesson 37)*

A. $a = t \cdot \log_2\left(\frac{N}{n}\right)$
B. $a = \frac{n \cdot 2^t}{N}$
C. $a = 2t$
D. $a = \frac{\log\left(\frac{N}{n}\right)}{t \cdot \log 2}$
E. $a = \frac{\log\left(2^t\right)}{\log\left(\frac{N}{n}\right)}$

59. Solve for x and choose the answer that best describes the solution(s). *(Lesson 14)*

$$x = 4 + \sqrt{4x - 19}$$

A. There is one solution. It is negative.

B. There are two solutions. Both are positive.

C. There is one solution. It is positive.

D. There are two solutions. One is positive and one is negative.

E. There is no solution for x.

60. Suppose y is directly proportional to the cube root of x and inversely proportional to the square of z. Find the constant of proportionality if $y = 6$ when $x = 8$ and $z = 4$. *(Lesson 30)*

A. 24

B. $\frac{3}{16}$

C. 6

D. $\frac{3}{128}$

E. 48

61. $x - 1$ is a factor which of the following polynomials? *(Lesson 4)*

A. $10x^2 + 13x - 3$

B. $x^2 - 5x - 6$

C. $3x^2 + 5x - 2$

D. There is more than one possible answer

E. None of the above

62. Give the equation of the line in slope-intercept form which is parallel to the line $2x - 3y = 7$ and contains the point $(4, -1)$. *(Lesson 18)*

A. $y = \frac{3}{2}x - 7$

B. $y = -\frac{2}{3}x + \frac{5}{2}$

C. $y = \frac{2}{3}x - \frac{11}{3}$

D. $y = \frac{2}{3}x + \frac{14}{3}$

E. None of the above

63. Which of the following equations is/are true? *(Lesson 36)*

I.	$\log_5 1 = \frac{1}{5}$
II.	$\log_{11} 11^2 = 2$
III.	$\ln e = 1$

A. I and II only

B. II and III only

C. I and III only

D. I, II, and III

E. None of the equations are true

64. Solve for p: *(Lesson 7)*

$$\frac{4}{2p-3} + \frac{10}{4p^2-9} = \frac{1}{2p+3}$$

A. $p = -\frac{3}{2}$

B. $p = \frac{5}{6}$

C. There is no solution

D. $p = -\frac{25}{6}$

E. None of the above

65. The population, $P(t)$, of a certain town t years after 1970 is given by $P(t) = 100{,}000e^{0.022t}$. During what year will the population reach 140,000? *(Lesson 37)*

A. 1980
B. 1983
C. 1985
D. 1990
E. 1993

66. Given $f(x) = \log_3\left(\frac{7-x}{2}\right)$, which of the following is/are true? *(Lessons 36, 34)*

I.	The domain of f is $(-\infty, 7]$
II.	$f(-5) = 2$
III.	$f^{-1}(x) = 7 - 2(3^x)$

A. I only
B. I and II only
C. II and III only
D. I and III only
E. III only

67. Simplify; do not include negative exponents in your final answer. *(Lesson 6)*

$$\frac{x - x^{-2}}{1 - x^{-2}}$$

A. x
B. $\frac{x}{x+1}$
C. $x - 1$
D. $\frac{x^2+x+1}{x+1}$
E. $x + 1$

68. Express as one logarithm: *(Lesson 38)*

$$\log\left(\frac{x^2}{y^3}\right) - \log(xy) - 4\log\sqrt{y}$$

A. $\log\left(\frac{x}{y^2}\right)$

B. $\log\left(\frac{x}{y^6}\right)$

C. $\log x^3$

D. $\log\left(\frac{x}{y^8}\right)$

E. $-4\log\left(\frac{x^2}{y^3} - xy - \sqrt{y}\right)$

69. Solve $\frac{(4-x)^2}{x^2} \geq 0$ and express the solutions in interval notation. *(Lesson 28)*

A. $(-\infty, \infty)$

B. $(-\infty, 4) \cup (4, \infty)$

C. $(-\infty, 0) \cup (0, \infty)$

D. $(-\infty, 0] \cup [4, \infty)$

E. $(0, \infty)$

70. An aquarium in the shape of a rectangular box is to have a height of 1.5 feet and a volume of 6 cubic feet. Let x denote the length of the base and y the width of the base. Express y as a function of x. *(Lesson 21)*

A. $y = 1.5x$

B. $y = \frac{4}{x}$

C. $y = x^2$

D. $y = \frac{6}{x}$

E. $y = 9x$

71. Solve the system of equations, then indicate the number of times the graphs intersect. *(Lesson 31)*

$$\begin{cases} x^2 + y^2 = 25 \\ 3x + 4y = 25 \end{cases}$$

A. 0

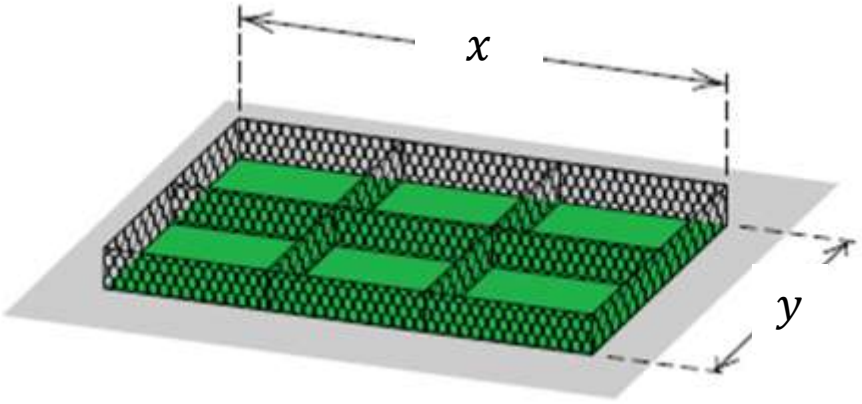
B. 1

C. 2

D. 3

E. 4

72. Eight hundred feet of chain-link fence is to be used to construct six animal cages, as shown in the figure. Find the dimensions that maximize the enclosed area. *(Lesson 26)*



A. $x = \frac{3}{800}; y = \frac{639{,}991}{3200}$

B. $x = 200; y = 200$

C. $x = \frac{400}{3}; y = 100$

D. $x = 100; y = 125$

E. $x = \frac{800}{3}; y = 200$

73. A certain city charges \$0.00361 per gallon of water used, up to 5,000 gallons, and \$0.00417 per gallon of water used for more than 5,000 gallons. Find a piecewise-defined function B that specifies the total bill for water usage of x gallons. *(Lesson 24)*

A. $B(x) = \begin{cases} 0.00361, & if\ x \le 5{,}000 \\ 0.00417, & if\ x > 5{,}000 \end{cases}$

B. $B(x) = \begin{cases} 0.00361x, & if\ x \le 5{,}000 \\ 0.00417x, & if\ x > 5{,}000 \end{cases}$

C. $B(x) = \begin{cases} 0.00361x, & if\ x \le 5{,}000 \\ 0.00778x, & if\ x > 5{,}000 \end{cases}$

D. $B(x) = \begin{cases} 0.00361x, & if\ x \le 5{,}000 \\ 0.00417x - 2.8, & if\ x > 5{,}000 \end{cases}$

E. $B(x) = \begin{cases} 0.00361x, & if\ x \le 5{,}000 \\ 0.00417x + 18.05, & if\ x > 5{,}000 \end{cases}$

74. Divide and simplify. *(Lesson 5)*

$$\frac{x^2-2x}{2x^2+5x-3} \div \frac{x^2-5x+6}{x^2-9}$$

A. $\frac{x(x+2)(x-6)}{2x-3(x-3)^2}$

B. $\frac{x}{2x-1}$

C. $\frac{x(x+2)(x-6)}{2x-3}$

D. $\frac{x(x-2)^2}{(2x-1)(x+3)^2}$

E. None of the above

75. To fill an order for 150 office desks, a furniture distributor must ship the desks from two warehouses. The shipping cost per desk is \$48 from the western warehouse and \$70 from the eastern warehouse. If the total shipping charge is \$8,410, how many desks were shipped from the eastern warehouse? *(Lesson 8 or Lesson 33)*

A. 55

B. 80

C. 70

D. 95

E. 100

76. If $x = 0$, which of the following functions is/are undefined? *(Lessons 20, 36)*

$$f(x) = \frac{1}{x}$$

$$g(x) = \sqrt{x}$$

$$h(x) = \log x$$

$$k(x) = \frac{x}{2}$$

A. f and g only

B. f and h only

C. g and h only

D. g and k only

E. h and k only

77. Parents of a newborn baby are given a gift of $10,000 and will choose between two options to invest for their child's college fund. Option 1 is to invest the gift in a fund that pays an average annual interest rate of 11% compounded quarterly; option 2 is to invest the gift in a fund that pays an average annual interest rate of 10.75% compounded continuously. Calculate the value of each investment using the formulas $A = Pe^{rt}$ and $A = P\left(1 + \frac{r}{n}\right)^{nt}$. Assume the investments have terms of 18 years and round your answers to the nearest dollar. *(Lesson 35)*

A. Option 1 = $70,517
Option 2 = $69,240

B. Option 1 = $67,494
Option 2 = $72,427

C. Option 1 = $72,427
Option 2 = $69,240

D. Option 1 = $67,494
Option 2 = $69,240

E. Option 1 = $69,240
Option 2 = $70,517

78. Solve $P + N = \frac{C+2}{C}$ for C. *(Lesson 7)*

A. $C = \frac{2}{P+N}$

B. $C = \frac{PN}{2}$

C. $C = \frac{2}{PN-1}$

D. $C = \frac{P+N}{2}$

E. $C = \frac{2}{P+N-1}$

79. Express the number in the form $\frac{a}{b}$, where a and b are integers: *(Lessons 1, 2)*

$$-2^2 + \left(\frac{1}{2}\right)^0 + 16^{-\frac{3}{4}}$$

A. -11

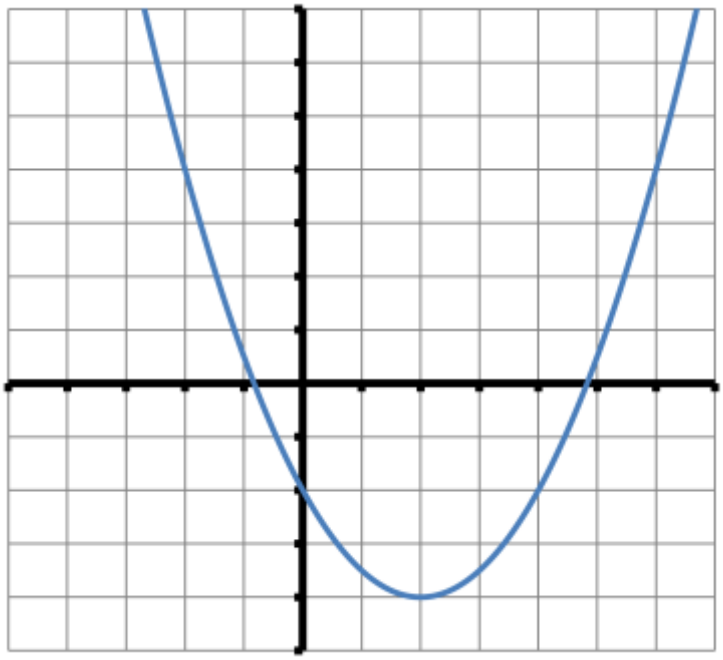
B. $-\frac{31}{8}$

C. $\frac{33}{8}$

D. $\frac{41}{8}$

E. $-\frac{23}{8}$

80. Find the function whose graph is given below. *(Lessons 25, 26)*
(Assume each tick mark represents one unit on the graph)



A. $f(x) = \frac{1}{2}x^2 + 2x - 2$

B. $f(x) = -x^2 + 4x - 2$

C. $f(x) = x^2 - 4x - 2$

D. $f(x) - \frac{1}{2}x^2 - 2x + 2$

E. $f(x) = \frac{1}{2}x^2 - 2x - 2$

ANSWERS

1. E	2. A	3. A	4. C
5. D	6. D	7. D	8. C
9. A	10. E	11. E	12. B
13. B	14. E	15. A	16. A
17. B	18. B	19. E	20. C
21. B	22. B	23. B	24. A
25. A	26. A	27. D	28. D
29. D	30. C	31. D	32. B
33. A	34. B	35. E	36. D
37. A	38. C	39. B	40. D
41. E	42. A	43. E	44. B
45. A	46. C	47. C	48. E
49. A	50. E	51. C	52. A
53. A	54. E	55. D	56. D
57. B	58. E	59. B	60. E
61. E	62. C	63. B	64. D
65. C	66. E	67. D	68. B
69. C	70. B	71. B	72. C
73. D	74. B	75. A	76. B
77. A	78. E	79. E	80. E