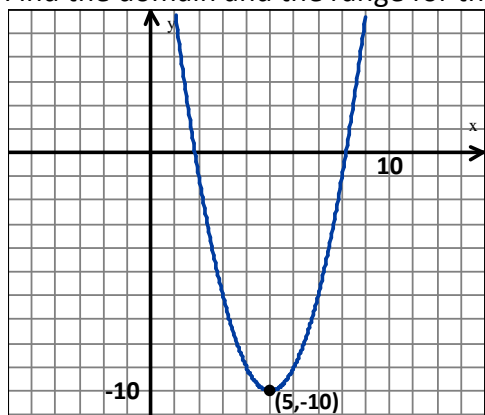


## Math 120 Final Review: Multiple Choice Version 1

Find the domain of the following functions:

1.  $f(x) = \sqrt{19 - x}$ 
  - a.  $(-\infty, 19]$
  - b.  $[\sqrt{19}, \infty)$
  - c.  $(-\infty, 19] \cup [19, \infty)$
  - d. All real numbers
  
2.  $f(x) = \frac{\sqrt{x+5}}{(x+8)(x-9)}$ 
  - a.  $(-\infty, -8) \cup (-8, -5) \cup (-5, 9) \cup (9, \infty)$
  - b.  $[-5, 9) \cup (9, \infty)$
  - c.  $(0, \infty)$
  - d. All real numbers
  
3.  $f(x) = \frac{x}{x-7}$ 
  - a. All real numbers
  - b.  $\{x|x > 0\}$
  - c.  $\{x|x \neq -7\}$
  - d.  $\{x|x \neq 7\}$
  
4.  $f(x) = \ln(-6 - x)$ 
  - a.  $(-6, \infty)$
  - b.  $(6, \infty)$
  - c.  $(-\infty, -6)$
  - d.  $(-\infty, 6)$

5. Find the domain and the range for the following function



- a. D:  $[-10, \infty)$ , R:  $(-\infty, \infty)$
  - b. D:  $[2, 8]$ , R:  $[-10, 0]$
  - c. D:  $(-\infty, 2) \cup (8, \infty)$ , R:  $(2, 8)$
  - d. D:  $(-\infty, \infty)$ , R:  $[-10, \infty)$
6. Find an equation of variation for the given situation:  $y$  varies jointly as  $x$  and the square of  $z$  and inversely as  $w$ , and  $y = \frac{27}{2}$  when  $x = 2$ ,  $z = 3$ , and  $w = 8$ .
- a.  $y = \frac{18xz^2}{w}$
  - b.  $y = \frac{6xz^2}{w}$
  - c.  $y = \frac{6xz}{w}$
  - d.  $y = \frac{18xz}{w}$

Solve the following exponential and logarithmic applications:

7. Let  $Q$  represent a mass of plutonium 241 ( $^{241}\text{Pu}$ ) (in grams), whose half-life is 14.4 years. The quantity of plutonium 241 present after  $t$  years is given by  $Q = 100 \left(\frac{1}{2}\right)^{t/14.4}$ . Determine the quantity present after 10 years.
  - a. 0.0068 g
  - b. 61.79 g
  - c. 47.84 g
  - d. -23.18 g

8. You deposit \$7550 in an account that pays 7.25% interest, compounded continuously. How long to the nearest year will it take for the money to triple?
- a. 3 years  
b. 28 years  
c. 15 years  
d. 41 years
9. The antler spread  $a$  (in inches) and shoulder height  $h$  (in inches) of an adult male American elk are related by the model  $h = 116 \log(a + 40) - 176$ . Approximate the shoulder height of a male American elk with an antler spread of 55 inches.
- a. 53.4 inches  
b. 58 inches  
c. 1.54 inches  
d. 405.4 inches
10. The speed of the wind  $S$  (in miles per hour) near the center of a tornado and the distance  $d$  (in miles) the tornado travels are related by the model  $S = 93 \log d + 65$ . On March 18, 1925, a large tornado struck portions of Missouri, Illinois, and Indiana with a wind speed at the center of about 283 miles per hour. Approximate the distance traveled by this tornado.
- a. 293 miles  
b. 220.8 miles  
c. 61.8 miles  
d. 236.4 miles

**Evaluate the following functions as indicated:**

11. Find  $f(k - 1)$  when  $f(x) = 5x^2 + 4x - 5$ .
- a.  $-6k^2 + 5k - 4$   
b.  $5k^2 - 6k + 4$   
c.  $5k^2 - 6k - 4$   
d.  $5k^2 - 21k + 4$
12. Find  $g(-6)$  when  $g(x) = \frac{x+3}{x-1}$
- a.  $\frac{3}{5}$   
b.  $\frac{3}{7}$   
c.  $-\frac{3}{7}$   
d.  $\frac{9}{7}$

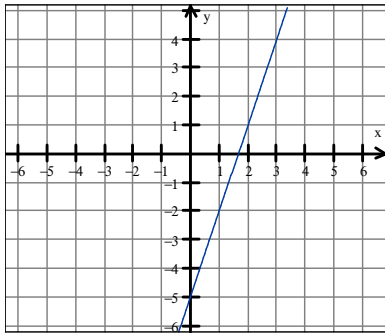
**Find an equation of the line satisfying the following conditions:**

13. Point:  $(3, 2)$ ;  $m = -\frac{5}{6}$
- a.  $y = -\frac{5}{6}x + \frac{9}{2}$   
b.  $y = -\frac{5}{6}x - \frac{9}{2}$   
c.  $y = -\frac{6}{5}x + \frac{9}{2}$   
d.  $y = -\frac{5}{6}x + \frac{2}{9}$
14. y-intercept:  $(0, -18)$ ;  $m = 4.7$
- a.  $y = -18x + 4.7$   
b.  $y = 4.7x - 18$   
c.  $y = 18x - 4.7$   
d.  $y = -4.7x - 18$
15. Through Point:  $(1, -5)$ , & perpendicular to  $7x + 8y = 47$
- a.  $y = -\frac{8}{7}x - \frac{27}{7}$   
b.  $y = -\frac{7}{8}x - \frac{33}{8}$   
c.  $y = -\frac{7}{8}x - \frac{47}{8}$   
d.  $y = \frac{8}{7}x - \frac{43}{7}$

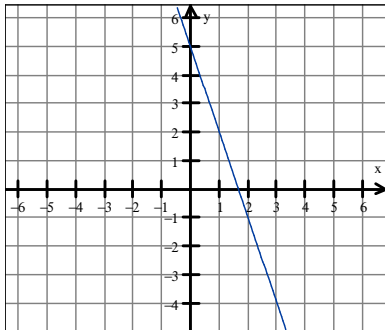
Match the functions or equations to their graphs:

16.  $f(x) = -3x - 5$

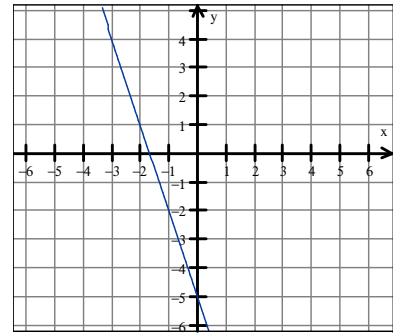
a.



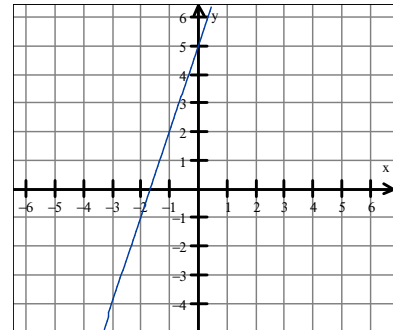
b.



c.

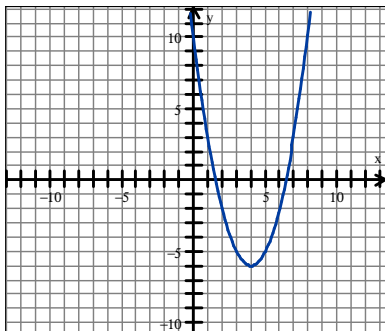


d.

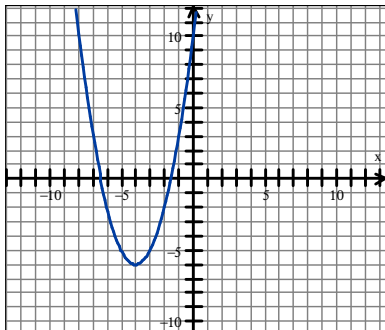


17.  $g(x) = (x - 4)^2 - 6$

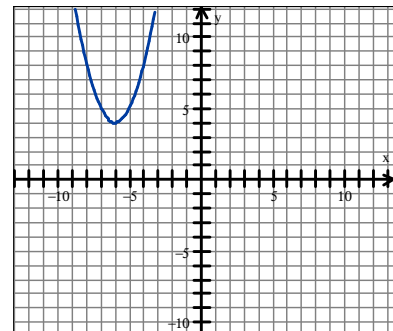
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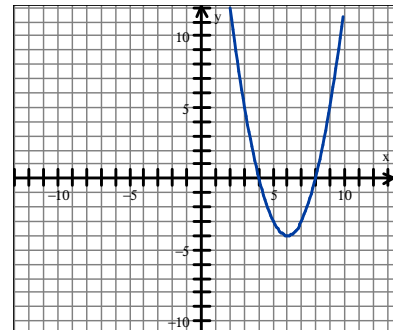
b.



c.

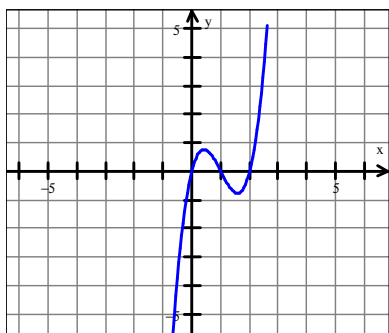


d.

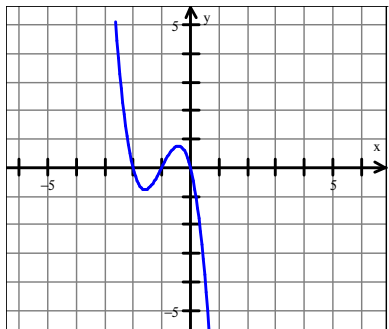


18.  $h(x) = 2x(x + 1)(x + 2)$

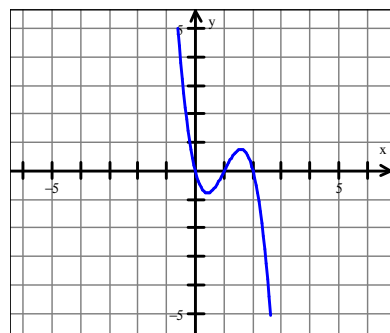
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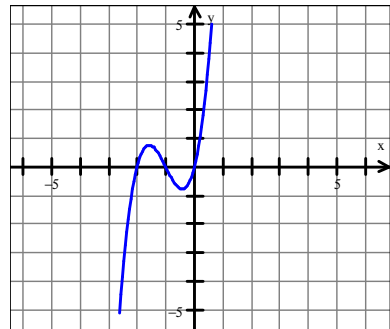
b.



c.

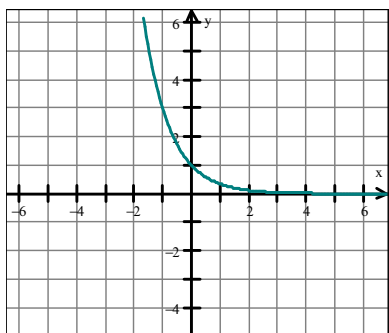


d.

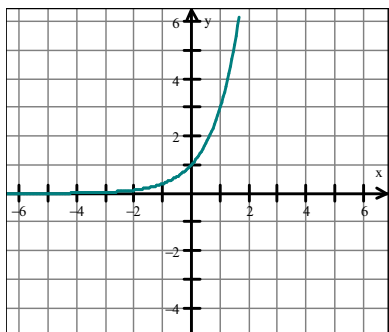


19.  $p(x) = 3^x$

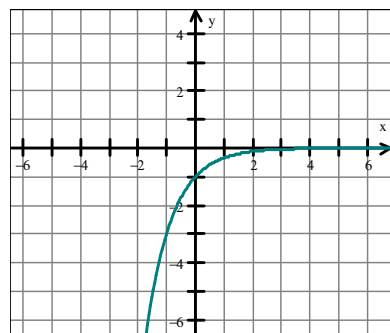
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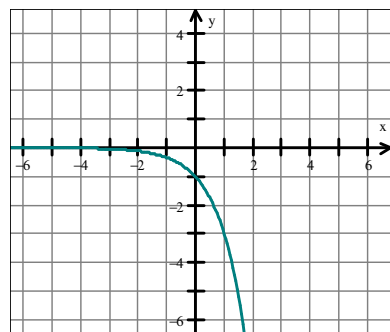
b.



c.

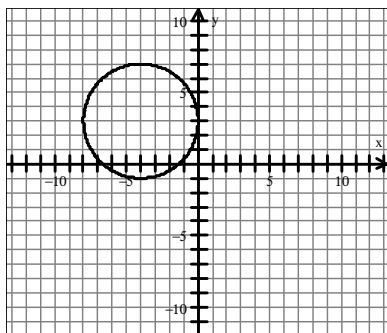


d.

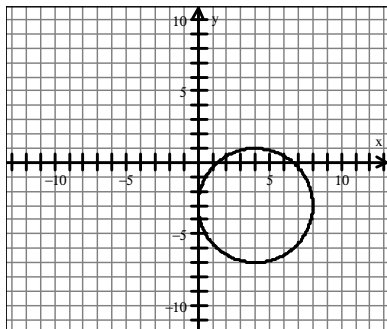


20.  $(x + 4)^2 + (y + 3)^2 = 16$

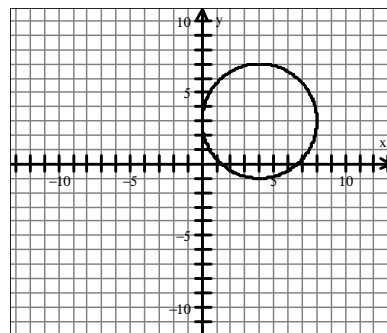
a.



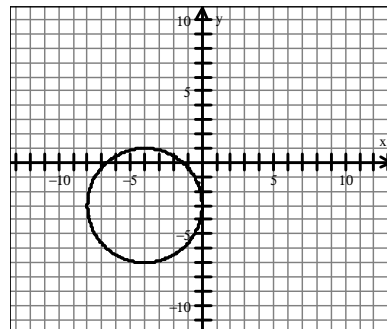
b.



c.

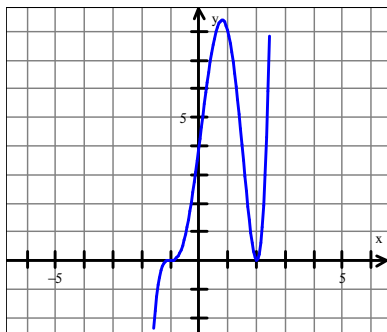


d.

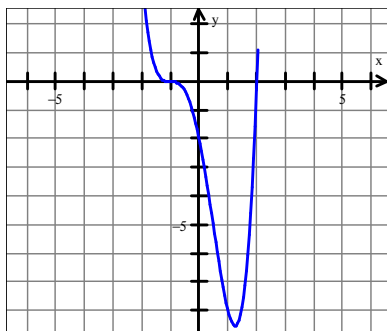


21.  $G(x) = (x + 1)(x - 2)^2$

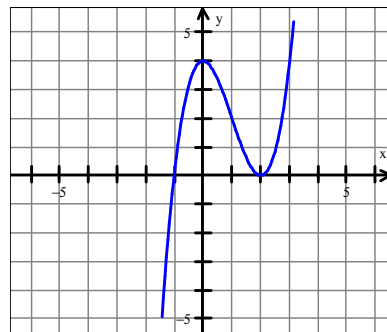
a.



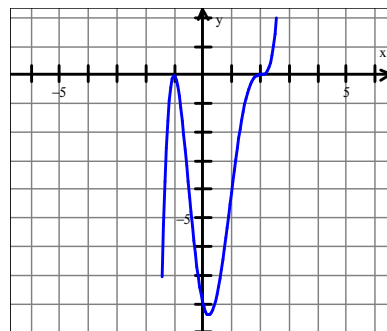
b.



c.



d.



Solve the following equations:

22.  $|7m + 4| + 9 = 15$

- a.  $\frac{2}{7}, -\frac{10}{7}$
- b.  $-\frac{2}{7}, \frac{10}{7}$

- c.  $\frac{2}{7}$
- d. No solution

23.  $\sqrt{4x - 3} = 2x - 3$

- a. 1, 3  
b. 3

- c. -3  
d. No solution

24.  $2x^2 + 6x = -3$

- a.  $\frac{-3 \pm \sqrt{3}}{2}$   
b.  $\frac{-3 \pm \sqrt{3}}{4}$

- c.  $\frac{-3 \pm \sqrt{15}}{2}$   
d.  $\frac{-6 \pm \sqrt{3}}{2}$

25.  $\frac{x}{2x+2} = \frac{-2x}{4x+4} + \frac{2x-3}{x+1}$

- a.  $x = \frac{3}{2}$   
b.  $x = 3$

- c.  $x = -\frac{12}{5}$   
d.  $x = -3$

26.  $2^{(12-2x)} = 16$

- a.  $x = 2$   
b.  $x = 10$

- c.  $x = -6 + \frac{\log 16}{\log 2}$   
d.  $x = 4$

27.  $\left(\frac{1}{3}\right)^x = 18$

- a.  $x = \ln \frac{1}{6}$   
b.  $x = \ln 6$

- c.  $x = \frac{\ln 18}{\ln 3}$   
d.  $x = -\frac{\ln 18}{\ln 3}$

28.  $\ln 2x + \ln 9x = \ln 19$

- a.  $x = 1$   
b.  $x = 0$

- c.  $x = \left(\frac{19}{18}\right)^{1/2}$   
d.  $x = \frac{e^{19}}{18}$

29. Write the quadratic function in standard form,  $f(x) = a(x - h)^2 + k$ . Identify the vertex:

$f(x) = x^2 + 5x + 2$

- a.  $f(x) = (x + 5)^2 - 23; (5, 23)$   
b.  $f(x) = (x + 5)^2 - 23; (-5, 23)$

- c.  $f(x) = \left(x + \frac{5}{2}\right)^2 - \frac{17}{4}; \left(-\frac{5}{2}, -\frac{17}{4}\right)$   
d.  $f(x) = \left(x + \frac{5}{2}\right)^2 - \frac{17}{4}; \left(\frac{5}{2}, -\frac{17}{4}\right)$

30. How can the graph of  $f(x) = (x - 2)^2 - 5$  be obtained from the graph of  $y = x^2$ ?

- a. Shift the graph 2 units left and 5 units down.  
b. Shift the graph 5 units right and 2 units down.  
c. Shift the graph 2 units left and 5 units up.  
d. Shift the graph 2 units right and 5 units down.

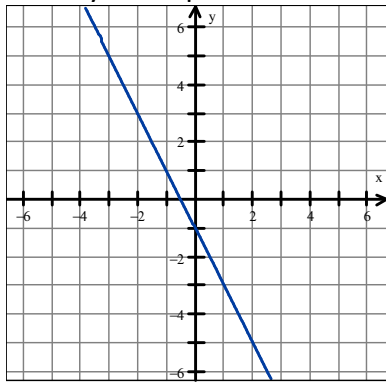
31. Write a quadratic function the has  $x$ -intercepts,  $(-4, 0)$  &  $(2, 0)$  and opens downward.

- a.  $f(x) = -(x - 4)(x + 2)$   
b.  $f(x) = (x + 4)(x - 2)$   
c.  $f(x) = -(x + 4)(x - 2)$   
d.  $f(x) = (x - 4)(x + 2)$

32. Graph the quadratic function,  $f(x) = 2x^2 - 7x + 5$  and determine the interval(s) for which  $f(x) \geq 0$ .

- a.  $(-\infty, 1] \cup \left[\frac{5}{2}, \infty\right)$   
b.  $\left(1, \frac{5}{2}\right)$   
c.  $(-\infty, 1) \cup \left(\frac{5}{2}, \infty\right)$   
d.  $\left[1, \frac{5}{2}\right]$

33. Identify the equation which matches the following graph.



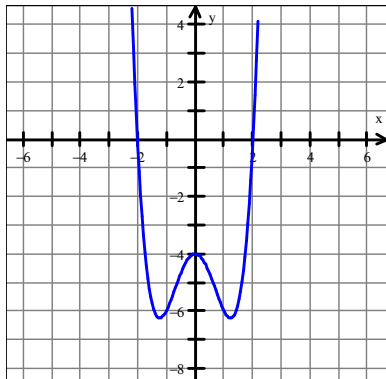
- a.  $y = 2x - 1$  c.  $y = -2x - 1$   
 b.  $x^2 + y^2 = 1$  d.  $y = x^2 - 1$

34. Solve the following inequality and write solution in interval notation:  $x^2 + 9x + 14 \geq 0$

- a.  $(-\infty, -7] \cup [-2, \infty)$  c.  $[-2, \infty)$   
 b.  $(-\infty, -7]$  d.  $[-7, -2]$

Determine whether the function is odd, even, or neither.

35.



- a. Even b. Odd c. Neither

36. If a function  $f$  is even, then for every point  $(x, y)$  on the graph of  $f$  there exists another point on the graph in the form:

- a.  $(-x, -y)$  b.  $(x, -y)$  c.  $(-x, y)$

37. Which of the following equations is **not** a function of  $y$  with respect to  $x$ ?

- a.  $2x + 3y = 6$  c.  $x^2 + y^2 = 16$   
 b.  $x^2 - y = 6x - 5$  d.  $y = 4x^3 - 5x^2 + 3x - 7$

38. Find the inverse function for the following function:  $f(x) = \frac{x}{x+1}$

- a.  $f^{-1}(x) = \frac{x}{x-1}$  c.  $f^{-1}(x) = -x - 1$   
 b.  $f^{-1}(x) = xy + x$  d.  $f^{-1}(x) = -\frac{x}{x-1}$

39. What principal should be deposited at 8.375% compounded monthly to ensure the account will be worth \$20,000 in 10 years?

- a. \$10,884.35 c. \$5,141.21  
 b. \$8,681.04 d. \$6,097.12

40. Find the point(s) of intersection for the following system of equations:  $\begin{cases} y - 2x = 5 \\ x^2 + y^2 = 85 \end{cases}$

- a.  $(-6, -7)$  &  $(2, 9)$
  - b.  $(6, -7)$  &  $(-2, 9)$
  - c. No Solution
  - d.  $(3.1, 11.2)$  &  $(-7.1, -9.2)$
41. If the function,  $y = R \cdot 2^t$ , is used to model the growth in revenue of a business, then  $y$  represents:
- a. The initial amount of revenue.
  - b. The time in years
  - c. The amount of revenue after  $t$  years.
  - d. None of the above

**Predict the end behavior of the graph of  $f$ :**

42.  $f(x) = 4x - \frac{1}{3}x^3$

- a. Up on both sides
- b. Down on both sides
- c. Down left & up right
- d. Up left & down right

**Divide the first polynomial by the second and state the quotient and the remainder.**

43.  $2x^5 - x^4 + 3x^2 - x + 5$ ,  $x - 1$

- a. Quotient:  $2x^4 + x^3 + 4x^2 + 3x$ ; Remainder: 8
- b. Quotient:  $2x^4 + x^3 - x^2 + 2x + 1$ ; Remainder: 6
- c. Quotient:  $2x^4 - 3x^3 - x$ ; Remainder: 6
- d. Quotient:  $2x^4 + x^3 + x^2 + 4x + 3$ ; Remainder: 8

**Use the rational zero test to find all the rational zeros of  $f(x)$ .**

44.  $f(x) = 2x^3 + 7x^2 - 17x - 10$

- a. Zeros:  $-5, 2, -1$
- b. Zeros:  $-5, 2, -\frac{1}{2}$
- c. Zeros:  $5, -2, \frac{1}{2}$
- d. Zeros:  $5, -2, 1$

45. Perform the indicated operations with the following complex numbers and write answers in standard form:

$(2 + 9i)(5 + 8i)$

- a.  $-62 - 61i$
- b.  $82 + 29i$
- c.  $72i^2 + 61i + 10$
- d.  $-62 + 61i$

46. Write the following equation in exponential form:  $\log_7 49 = 2$

- a.  $49^2 = 7$
- b.  $2^7 = 49$
- c.  $7^2 = 49$
- d.  $\sqrt{49} = 7$

47. Evaluate the logarithm:  $\ln e^5$ .

- a.  $5 \ln e$
- b. 1
- c.  $e^5$
- d. 5

48. Expand the logarithmic expression:  $\log_b \frac{m^5 p^3}{n^2 b^7}$

- a.  $5 \log_b m + 3 \log_b p - 2 \log_b n - 7$
- b.  $5 \log_b m + 3 \log_b p - 2 \log_b n + 7$
- c.  $\log_b m^5 + \log_b p^3 + \log_b n^2 - \log_b b^7$
- d.  $m^5 p^3 - n^2 b^7$

**The augmented matrix is in row-echelon form and represents a system of linear equations. Solve the system using backward substitution:**

49.  $\left[ \begin{array}{ccc|c} 1 & 0 & 6 & 8 \\ 0 & 1 & -2 & -9 \\ 0 & 0 & 0 & 0 \end{array} \right]$

- a.  $(8 - z, -9 + z, z) \mid z \text{ is a real number}$
- b.  $(8 - 6z, -9 + 2z, z) \mid z \text{ is a real number}$
- c.  $(8, -9, z) \mid z \text{ is a real number}$
- d.  $(8 + 6z, -9 - 2z, z) \mid z \text{ is a real number}$

50. What is the solution to  $ax^2 + bx + c = 0$ ?

- a.  $x = \frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$
- b.  $x = -b \pm \frac{\sqrt{b^2 - 4ac}}{2a}$
- c.  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- d.  $x = \frac{b \pm \sqrt{b^2 - 4ac}}{2a}$



## Math 120 Final Review: Multiple Choice Version 1 Key

1. A
2. B
3. D
4. C
5. D
6. B
7. B
8. C
9. A
10. B
11. C
12. B
13. A
14. B
15. D
16. C
17. A
18. D
19. B
20. D
21. C
22. A
23. B
24. A
25. B
26. D
27. D
28. C
29. C
30. D
31. C
32. A
33. C
34. A
35. A
36. C
37. C
38. D
39. B
40. A
41. C
42. D
43. D
44. B
45. D
46. C
47. D
48. A
49. B
50. C