

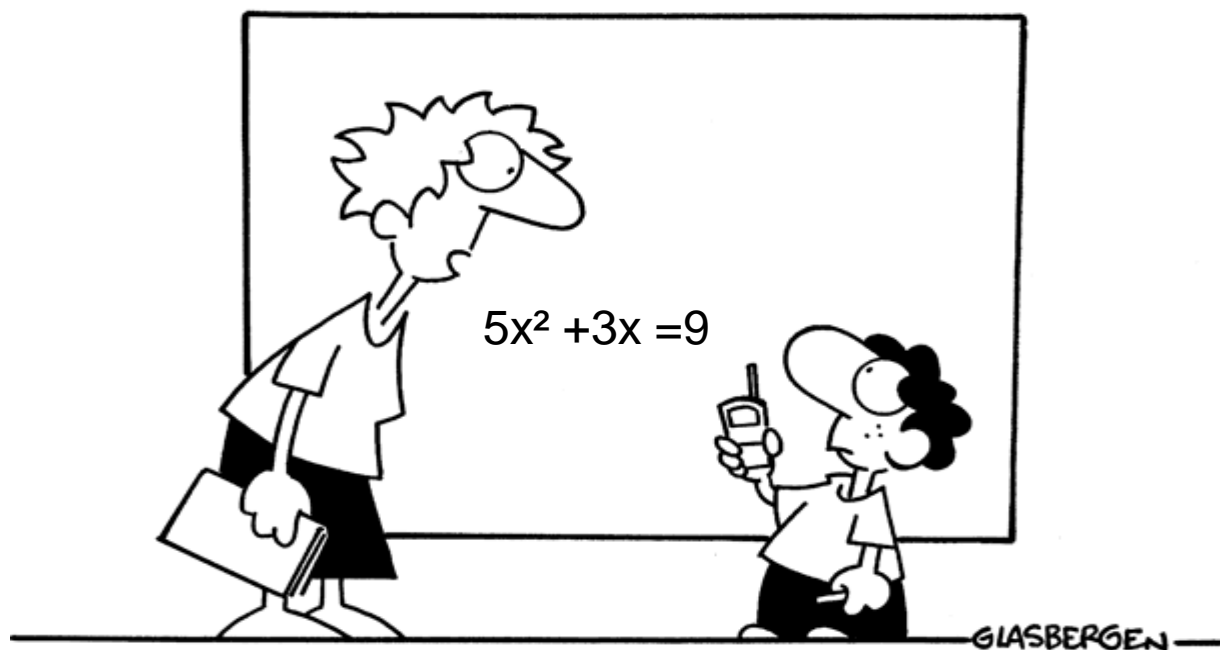
# Pre-Calculus 0155

## Summer Assignment

Name \_\_\_\_\_

- This assignment will be due the first day of class.
- Late assignments will have ten points deducted for each day late.
- Show ALL work for ALL problems. Credit will not be given for answers missing the supporting work.
- Have a great summer and I look forward to seeing you in the fall.

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**"You have to solve this problem by yourself. You can't call tech support."**

Factor the following expressions:

1.  $x^2 - 49$ 
  - a.  $(x+7)(x-7)$
  - b.  $(x+\sqrt{7})(x-\sqrt{7})$
  - c.  $(x-7)(x-7)$
  - d.  $(7+x)(7-x)$
  
2.  $3x^2 + 11x - 4$ 
  - a.  $(x+4)(x-1)$
  - b.  $(3x+3)(3x+4)$
  - c.  $(3x-1)(x+4)$
  - d.  $(3x+12)(3x-1)$
  
3.  $x^2 - 9x - 36$ 
  - a.  $(x-6)^2$
  - b.  $(x-9)(x+4)$
  - c.  $(x-12)(x+3)$
  - d.  $(x+6)^2$
  
4. Which of the following is one of the steps in the factoring process of  $3x^3 - 12x^2 - 15x$ ?
  - a.  $3x(x^2 - 4x - 5)$
  - b.  $x(x^2 - 4x - 5)$
  - c.  $3x(x^2 - 4x - 15)$
  - d.  $-x(3x^2 - 12x - 15)$
  
5. Factor  $x^4 + 13x^2 + 36$ 
  - a.  $(x+9)(x+4)$
  - b.  $(x^2+9)(x^2+4)$
  - c.  $(x+3)(x-3)(x+2)(x-2)$
  - d.  $(x+\sqrt{3})(x-\sqrt{3})(x+\sqrt{2})(x-\sqrt{2})$
  
6. Which of the following is a correct step in factoring  $3x^3 + 4x^2 - 27x - 36$ ?
  - a.  $3x(x^2 + 4x) + 9(3x + 4)$
  - b.  $x^2(3x^2 + 4x) + 3(3x^2 + 4x)$
  - c.  $3x(3x^2 + 4x) - 9(3x^2 + 4x)$

d.  $x^2(3x+4)-9(3x+4)$

Solve the following equations:

7.  $5x^2 - 13 = 32$

a.  $\frac{\pm 5\sqrt{19}}{5}$

b.  $\pm \sqrt{\frac{19}{5}}$

c.  $\pm 3$

d.  $\pm \sqrt{405}$

8.  $-4x^2 - x + 1 = 0$

a.  $\frac{-1 \pm \sqrt{17}}{4}$

b.  $\frac{4 \pm \sqrt{17}}{8}$

c.  $\frac{-1 \pm \sqrt{17}}{8}$

d.  $\frac{4 \pm \sqrt{17}}{4}$

9.  $x^3 - 27 = 0$

a. 3

b. -3

c.  $\pm 3$

d. 0

10.  $\sqrt{x+5} = 7$

a. 2

b. 44

c.  $\pm 7$

d.  $\pm 44$

11. Solve for x.  $8(\frac{1}{4}x - 3)^{3/2} = 1$

- a. 11
  - b.  $\pm 11$
  - c. 13
  - d.  $\pm 13$
12.  $\frac{1}{x-2} + \frac{x}{x+2} = \frac{5}{x^2-4}$
- a.  $(1 \pm \sqrt{7})/2$
  - b.  $(1 \pm \sqrt{13})/2$
  - c.  $(1 \pm \sqrt{11})/2$
  - d. no solution
13.  $-x + \sqrt{x-3} = -5$
- a.  $x = -4, -7$
  - b.  $x = 4, 7$
  - c.  $x = \pm 4, \pm 7$
  - d. no solution
14. Solve the inequality  $|3x+1| \geq 16$
- a.  $\frac{-17}{3} \leq x \leq 5$
  - b.  $x \leq \frac{17}{3}$  and  $x \geq 5$
  - c.  $x \geq 5$  or  $x \leq \frac{17}{3}$
  - d.  $x \leq \frac{-17}{3}$  or  $x \geq 5$
15. Find the product of  $4(x+7)(x-5)$ .
- a.  $4(x^2+2x-35)$
  - b.  $(4x+28)(4x-20)$
  - c.  $x^2+2x-35$
  - d.  $(4x+7)(x-5)$
16. Find the product of  $(5x-1)^2$ .
- a.  $5x^2-10x+1$
  - b.  $25x^2-10x+1$
  - c.  $25x^2-20x-1$
  - d.  $25x^2-20x+1$

17. Simplify  $\frac{x^2-9}{x+6} \times \frac{2x+12}{x^2+5x+6}$

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

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

c.  $\frac{x}{(2x-3)}$

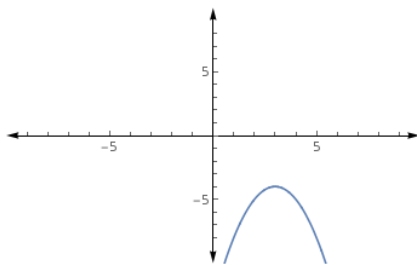
d.  $\frac{x+2}{x+2}$

18. Tell whether the lines are parallel, perpendicular, or neither.  
Line 1 (3,4), (1,6) and Line 2: (-1, 0),(3,5)

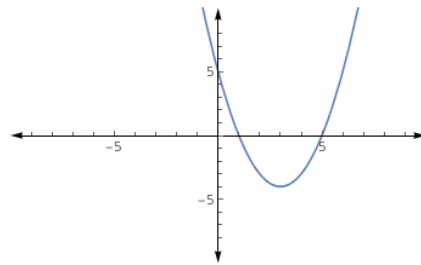
- a. slope of Line 1 is  $\frac{6-4}{1-3}$  and slope of Line 2 is  $\frac{5-0}{3-1}$ , so the lines are perpendicular.
- b. slope of Line 1 is  $\frac{3-1}{4-6}$  and slope of Line 2 is  $\frac{5-0}{3+1}$ , so the lines are parallel.
- c. slope of Line 1 is  $\frac{6-4}{1-3}$  and slope of Line 2 is  $\frac{5-0}{3+1}$ , so the lines are neither parallel nor perpendicular.
- d. slope of Line 1 is  $\frac{3-1}{4-6}$  and slope of Line 2 is  $\frac{-1-3}{0-5}$ , so the lines are parallel.

19. Graph the following:  $y = -(x+3)^2 - 4$

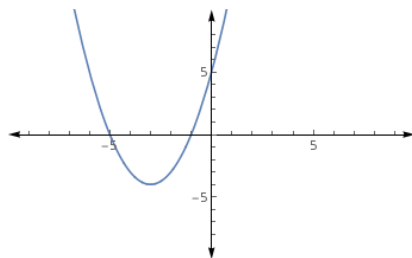
a)



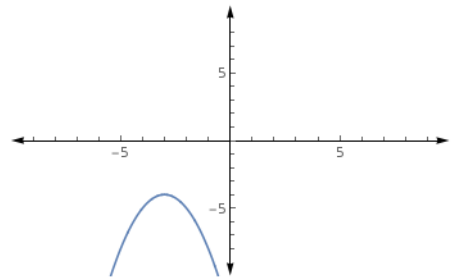
b)



c)



d)



20.  $f(x) = \begin{cases} 3x+2 & x < 1 \\ x+4 & x \geq 1 \end{cases}$

Evaluate the above function for  $f(2)$

- a. 8
- b. 8,6
- c. 6
- d. 14

21. Use long division to divide  $\frac{2x^3 - 3x^2 - 5x + 6}{2x + 3}$

- a.  $x^2 - 3x + 2$
- b.  $x^2 - \frac{5}{2}x - \frac{3}{2}$
- c.  $x^2 - \frac{5}{2}x - \frac{1.5}{2x+3}$
- d.  $x^2 + 3x + 2$

22. Use synthetic division to divide  $\frac{3x^4 - 11x^3 - 27x^2 + 36x - 5}{x - 5}$

- a.  $3x^3 + 4x^2 - 7x + 1 + \frac{10}{x-5}$
- b.  $3x^3 - 26x^2 + 103x - 479 - \frac{2400}{x-5}$
- c.  $3x^3 + 4x^2 - 7x + 1$
- d.  $3x^3 + 4x^2 - 7x + 10$

23. Solve the absolute inequality for its compound solution  $|x+1| \geq 4$

- a.  $x \geq 3 \text{ and } x \leq -5$
- b.  $x \geq 3 \text{ or } x \leq -5$
- c.  $x \leq 3 \text{ or } x \leq 5$
- d.  $x \leq 3 \text{ and } x \geq -3$

24. Simplify the expression using the properties of exponents  $(x^2y^5)^3$

- a.  $x^5y^8$
- b.  $3x^6y^{15}$
- c.  $3x^6y^8$
- d.  $x^6y^{15}$

25. Multiply  $(2+3i)(6-5i)$

- a.  $27+28i$
- b.  $3+8i$

- c.  $27 + 8i$   
d.  $3 + 28i$
26. What is the "conjugate" of  $(-7 + 4i)$   
a.  $(-7 + 4i)$   
b.  $(-7 - 4i)$   
c.  $(7 - 4i)$   
d.  $(7 + 4i)$
27. Subtract  $(3 + 4i) - (6 - 2i)$   
a.  $9 + 6i$   
b.  $-3 + 6i$   
c.  $-3 + 2i$   
d.  $3 + 28i$
28. Find the distance between the two points  $(3, 5)$  and  $(-2, -1)$   
a.  $2\sqrt{13}$   
b.  $2\sqrt{5}$   
c.  $\sqrt{41}$   
d.  $\sqrt{61}$
29. Find the midpoint between the two points  $(-6, -2)$  and  $(5, -1)$   
a.  $(\frac{-1}{2}, \frac{-3}{2})$   
b.  $(\frac{-11}{2}, \frac{-3}{2})$   
c.  $(\frac{-1}{2}, -1)$   
d.  $(\frac{-11}{2}, -1)$
30. Solve  $3(2x - (7x - 1)) = 5x + 13$   
a.  $2$   
b.  $-2$   
c.  $-\frac{4}{5}$   
d.  $-\frac{1}{2}$

31. Simplify using the properties of exponents  $(-3x^9y^3)^{-7}$

- a.  $\frac{1}{-3x^63y^{21}}$
- b.  $\frac{-3}{x^63y^{21}}$
- c.  $\frac{-3x^2}{y^4}$
- d.  $\frac{1}{(-3)^7x^63y^{21}}$

32. Add  $\frac{3x+4}{x-2} + \frac{6x-7}{x-2}$

- a.  $\frac{3(x-1)}{x-2}$
- b.  $\frac{3(x+1)}{x-2}$
- c.  $\frac{3(x-1)}{2x-4}$
- d.  $\frac{3(x+1)}{2x-4}$

33. Add  $\frac{x-3}{x+5} + \frac{6x-2}{x-2}$

- a.  $\frac{7x-5}{(x+5)(x-2)}$
- b.  $\frac{7x^2+23x+16}{(x+5)(x-2)}$
- c.  $\frac{7x^2+33x-4}{(x+5)(x-2)}$
- d.  $\frac{7x^2+23x-4}{(x+5)(x-2)}$

34. Evaluate without the use of a calculator  $16^{\frac{3}{4}}$

- a. 64
- b. 16
- c. 24
- d. 8



35. Simplify the radical expression

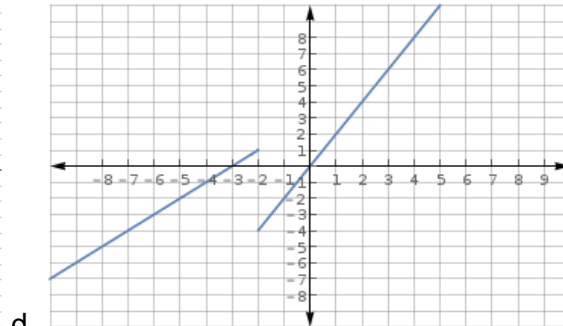
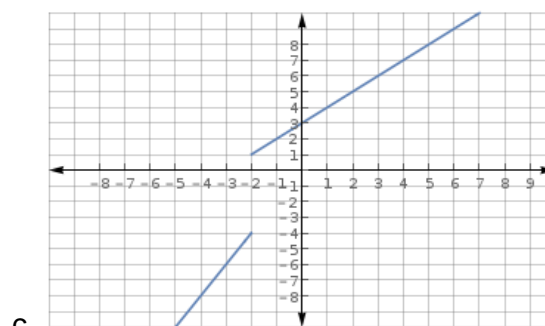
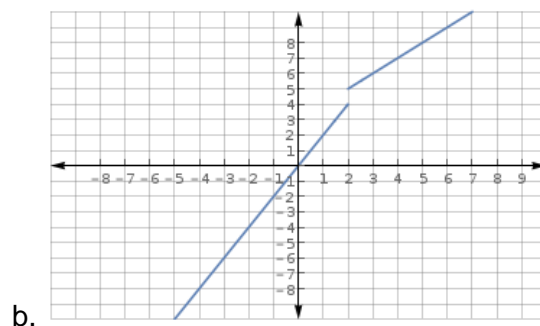
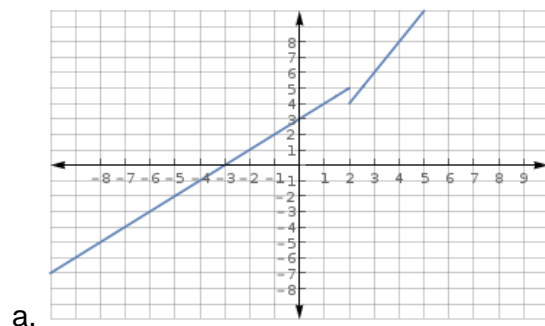
$$\sqrt[3]{27x^4y^{14}}$$

- a.  $3xy^4\sqrt[3]{xy^2}$
- b.  $9x^3y^2\sqrt[3]{xy^4}$
- c.  $3x^3y^2\sqrt[3]{xy^4}$
- d.  $9xy^4\sqrt[3]{xy^2}$

36. Add  $5\sqrt{12} + 3\sqrt{18}$

- a.  $10\sqrt{3} + 9\sqrt{2}$
- b.  $7\sqrt{3} + 6\sqrt{2}$
- c.  $10\sqrt{3} + 6\sqrt{3}$
- d.  $8\sqrt{30}$

37.  $f(x) = \begin{cases} x+3 & x > 2 \\ 2x & x < 2 \end{cases}$



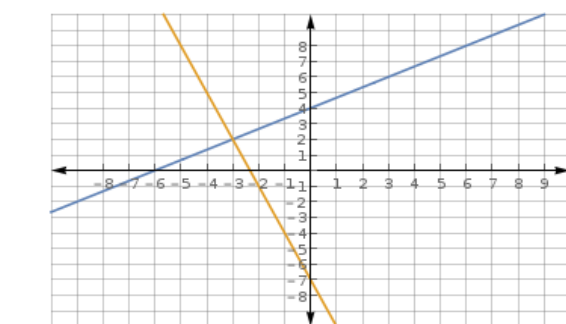
38. Solve for all solutions to the absolute value equation

$$|3x - 1| = 5$$

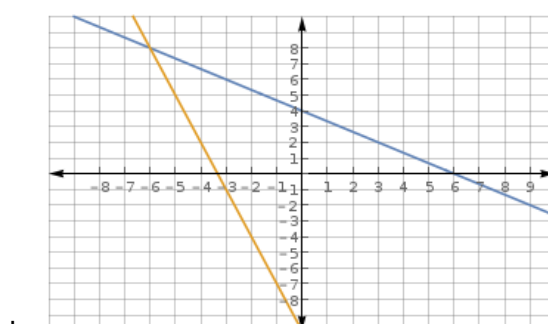
- a.  $2$
- b.  $-2$  and  $\frac{4}{3}$
- c.  $2$  and  $\frac{4}{3}$
- d.  $-\frac{4}{3}$

39. Solve the system using the graphing technique

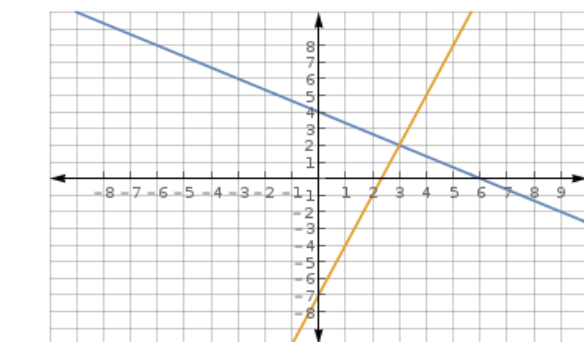
$$\begin{cases} y = \frac{2}{3}x + 4 \\ 6x + 2y = -14 \end{cases}$$



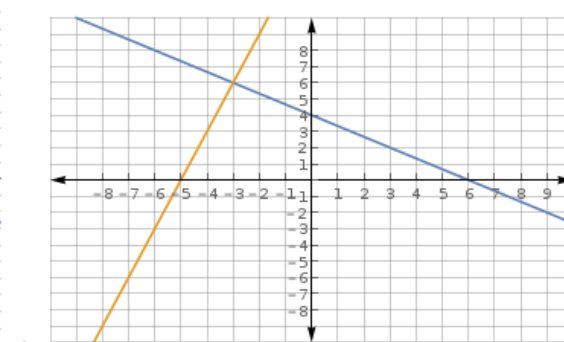
*solution* $(-3, 2)$



*solution* $(-6, 8)$



*solution* $(3, 2)$



*solution* $(-3, 6)$

40. Solve the system

$$\begin{cases} x + 2y = 5 \\ -2x + 3y = -3 \end{cases}$$

- a.  $(3, 1)$
- b.  $(3, -1)$
- c.  $(7, -1)$
- d.  $(-3, 4)$

41. The trade in value "V" of a Honda Accord can be expressed by the equation  $V = 25000 - .25m$  where m = the mileage. How many miles does an Accord have on it if it has a trade in value of \$11,500.

- a. 22,125
- b. 54,000
- c. 3,375
- d. 25,000

42. I worked 30 hours last week and made a total of \$262 at my two part time jobs. I make \$9 per hour at the Stop and Shop Deli and \$8 per hour at Gi-Gi's fruit and veggie stand. Write an equation to model how I made the exact total of \$262 in a 30 hour work week.

- a.  $9x + 8(30 - x) = 262$
- b.  $9x + 8(x - 30) = 262$
- c.  $9(x + 30) + 8x = 262$
- d.  $9(30 + x) + 8x = 262$

43. Solve the equation in problem #42 to find out how many hours I worked at each job.

- a. 14 at Stop and Shop Deli and 16 at Gi-Gi's
- b. 16 at Stop and Shop Deli and 14 at Gi-Gi's
- c. 15 at Both Stop and Shop Deli and Gi-Gi's
- d. 12 at Stop and Shop Deli and 18 at Gi-Gi's

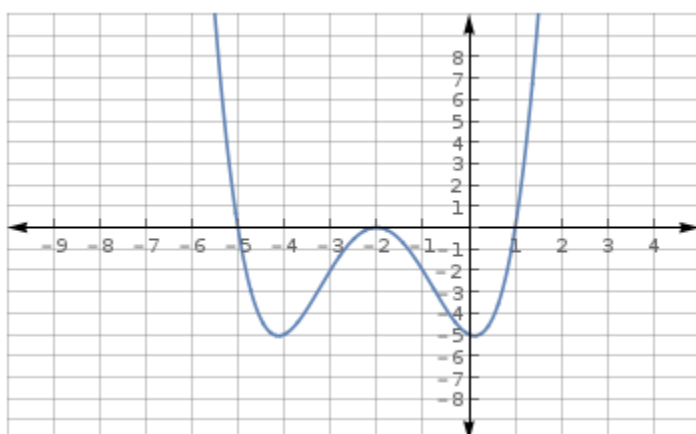
44. Solve  $3(x + 2)^2 = 12$

- a. 0, 2
- b. 0
- c. 0, -4
- d. 2, -2

45. Explain how the slopes between two perpendicular lines are related to each other.

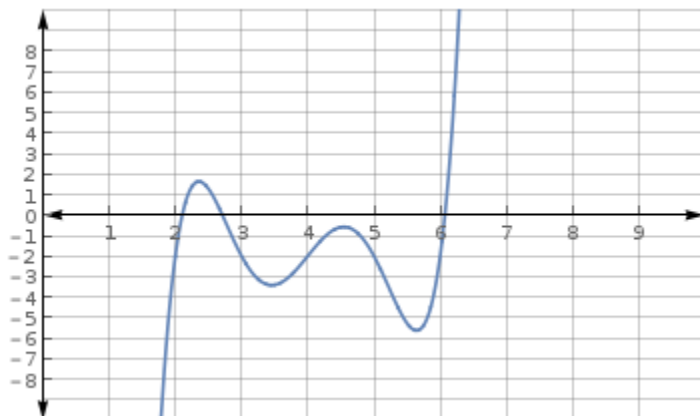
- a. they aren't related at all
- b. they are the same
- c. they are the reciprocals of each other
- d. they are the opposite signs and reciprocals of each other

46. Which function matches with the polynomial given below:



- a.  $f(x) = \frac{1}{4}(x-1)(x+2)^2(x+5)$
- b.  $f(x) = \frac{1}{4}(x-1)(x+2)(x+5)$
- c.  $f(x) = \frac{1}{4}(x+1)(x-2)^2(x-5)$
- d.  $f(x) = \frac{1}{4}(x+1)(x-2)(x-5)$

47. What is the smallest possible value of the degree for the polynomial below



- a. 3
- b. 4
- c. 5
- d. 6

48. Find the equation of the parabola that has vertex  $(-2,3)$  and passes through the point  $(1,1)$ .

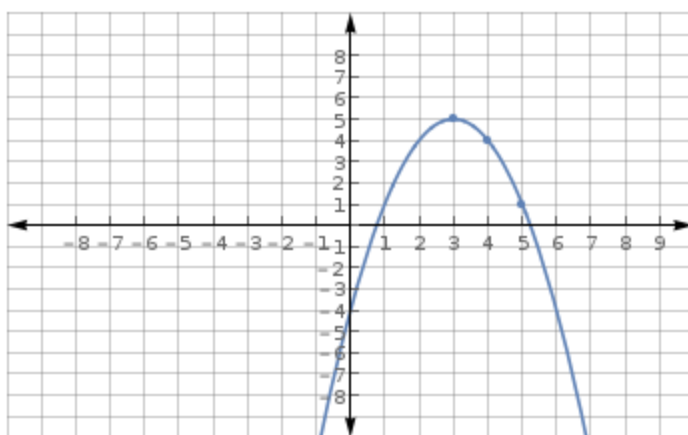
a.  $y = -\frac{2}{9}(x+2)^2 + 3$

b.  $y = -\frac{2}{9}(x+2)^2 - 3$

c.  $y = -\frac{9}{2}(x+2)^2 + 3$

d.  $y = -\frac{9}{2}(x+2)^2 - 3$

49. Identify the vertex form of the parabola below, then convert to standard form



a.  $y = -(x+3)^2 + 5$  then  $y = -x^2 + 6x - 4$

b.  $y = -(x-3)^2 + 5$  then  $y = -x^2 + 6x - 4$

c.  $y = -(x-3)^2 + 5$  then  $y = -x^2 - 6x - 4$

d.  $y = -(x+3)^2 + 5$  then  $y = -x^2 - 6x - 4$

50. Write an equation in vertex form for the function  $f(x) = x^2$  if it is shifted to the left three, up 8, and then stretched by a factor of 4.

a.  $f(x) = \frac{1}{4}(x+3)^2 + 8$

b.  $f(x) = \frac{1}{4}(x-3)^2 - 8$

c.  $f(x) = 4(x-3)^2 - 8$

d.  $f(x) = 4(x+3)^2 + 8$