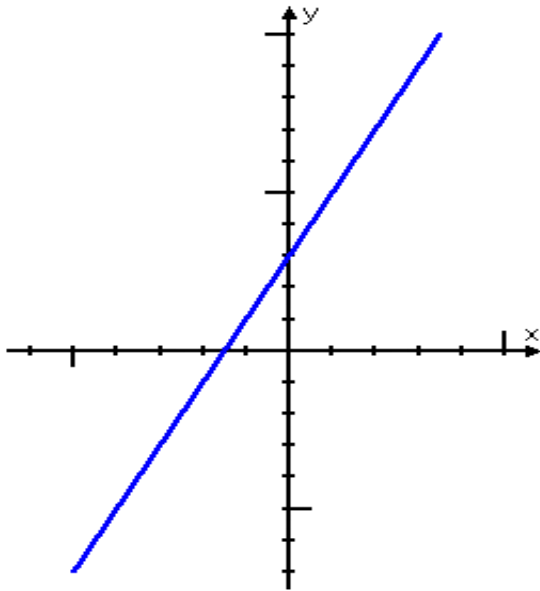


1. Choose the equation that best fits the graph provided:

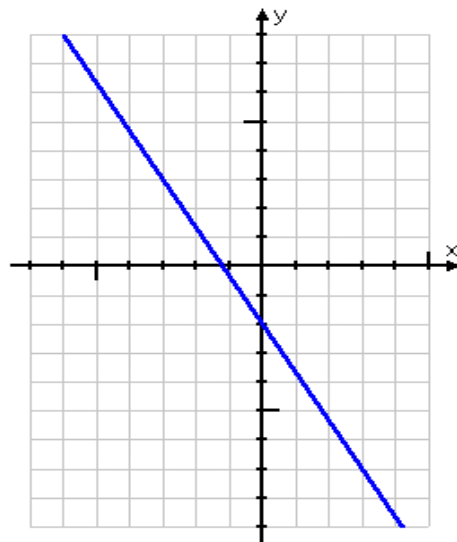


- a. $y - 3x = 2$
- b. $y - 2x = 3$
- c. $y + 2x = 3$
- d. $y + 3x = -2$

2. Give the slope of the line pictured in #1:

- a. 2
- b. 3
- c. -2
- d. -3

3. Choose the best equation for the graph below:

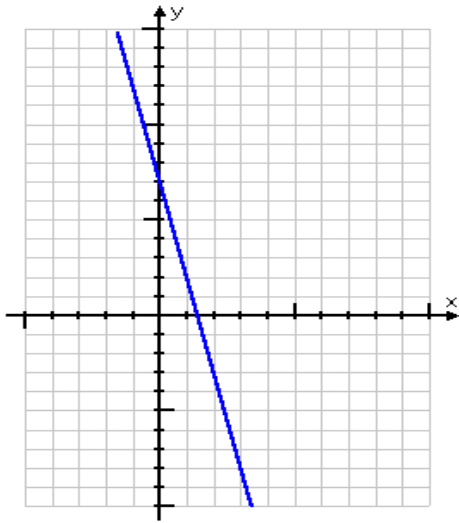


- a. $16x - 9y = 18$
- b. $9y - 16x = -18$
- c. $16x + 9y = -18$
- d. $16x + 9y = 18$

4. Which slope best describes the line in #3?

- a. $-16/9$
- b. $9/16$
- c. $-9/16$
- d. $16/9$

5. Choose the best equation for the graph below:

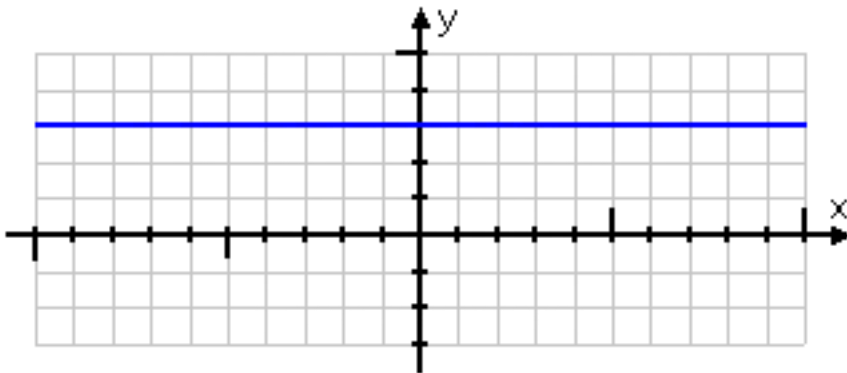


- a. $28x - 5y = 35$
- b. $28x + 5y = -35$
- c. $5x + 28y = 35$
- d. $28x + 5y = 35$

6. The Y intercept of the line above is:

- a. 7
- b. -7
- c. 1.25

7. Choose the best equation for the line graph below:



- a. $x = 3$
- b. $y = 3$
- c. $y = x + 3$
- d. $y = 3x$

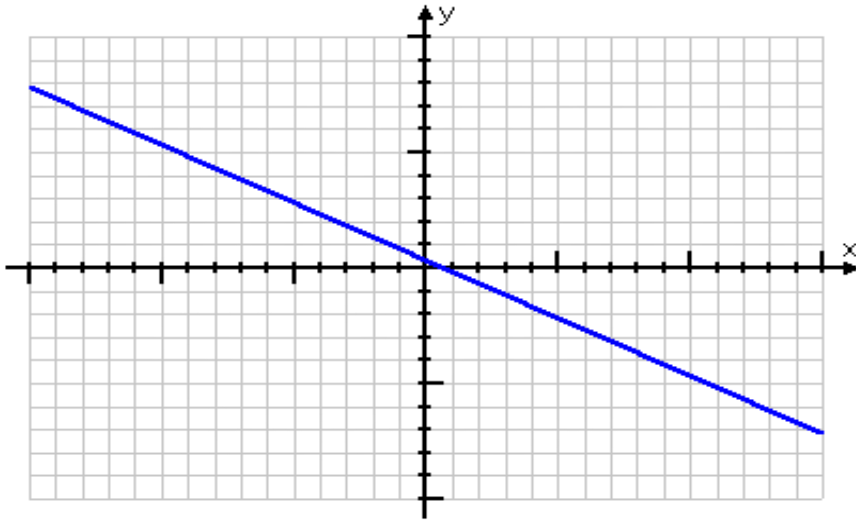
8. Find the slope of the line in #7:

- a. slope = 1
- b. undefined slope
- c. zero slope

9. What is the X intercept of the line above:

- a. 0
- b. 3
- c. there is no X intercept

10. Choose the best equation for the graph below:

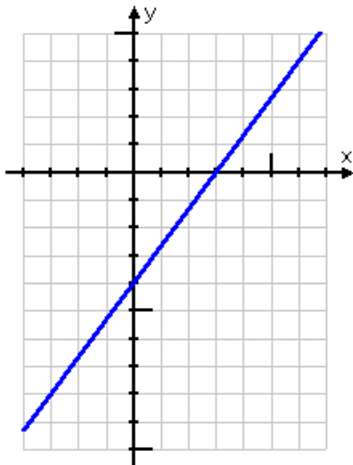


- a. $3x - 6y = 2$
- b. $3x - 6y = -2$
- c. $3x + 6y = 2$
- d. $3x + 6y = -2$

11. The slope of the line above is:

- a. $1/2$
- b. $-1/2$
- c. 2
- d. -2

12. Choose the best equation for the line below:

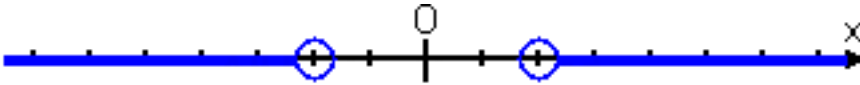


- a. $4x + 3y = 12$
- b. $4x + 3y = -12$
- c. $4x - 3y = -12$
- d. $4x - 3y = 12$

13. If a line was drawn on the graph above through the point $(0,0)$ with a slope of $-\frac{3}{4}$, how would the graph be related to the original graph shown?

- a. It would be parallel to the line above.
- b. It would intersect the line above in the first quadrant
- c. It would be perpendicular to the line above.

14. Choose the best inequality for the graph below:

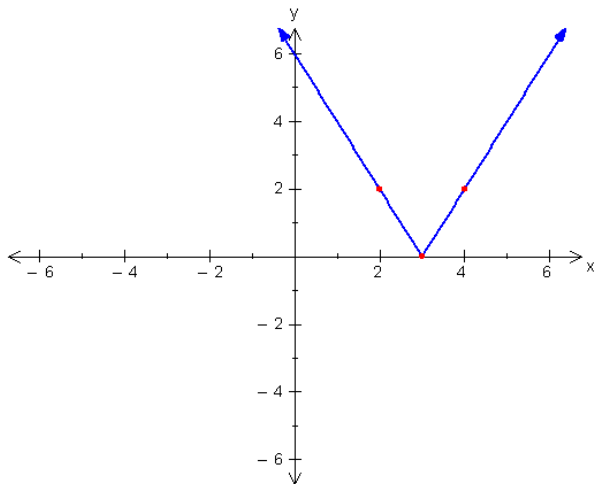


- a. $|x| > 2$
- b. $|x| < 2$
- c. $|x+2| = 0$
- d. $|x-2| = 0$

15. Describe the graph on question 14 using interval notation:

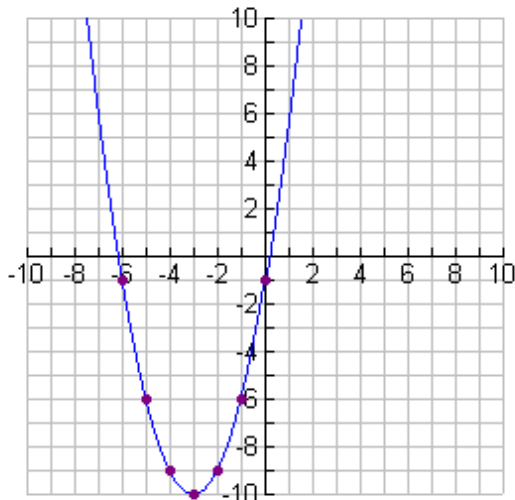
- a. $(-\infty, -2] \cup [2, \infty)$
- b. $[-\infty, -2] \cup [2, \infty]$
- c. $(-\infty, -2) \cap (2, \infty)$
- d. $(-\infty, -2) \cup (2, \infty)$

16. Choose the best equation for the graph below:



- a. $y = |x-3|$
- b. $y = |x+3|$
- c. $y = 2|x-3|$
- d. $y = 2|x+3|$

17. Choose the best equation for the graph below:



a. $y = x^2 + 6x - 1$

b. $y = x^2 + 6x + 1$

c. $y = x^2 - 6x + 1$

d. $y = x^2 - 6x - 1$

18. Find the two zeros of the parabola above to the thousandth place:

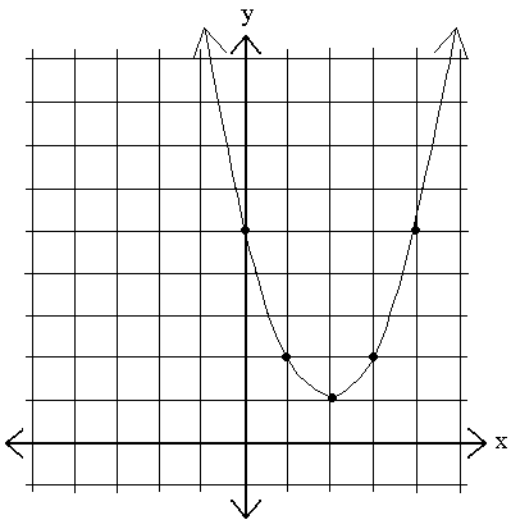
a. $-6.213, 0.213$

b. $-6.162, 0.162$

c. $-6.339, 0.339$

d. $-6.401, 0.401$

19. Find the best equation for the parabola below:



a. $y = (x+2)^2 + 1$

b. $y = (x+2)^2 - 1$

c. $y = (x-2)^2 - 1$

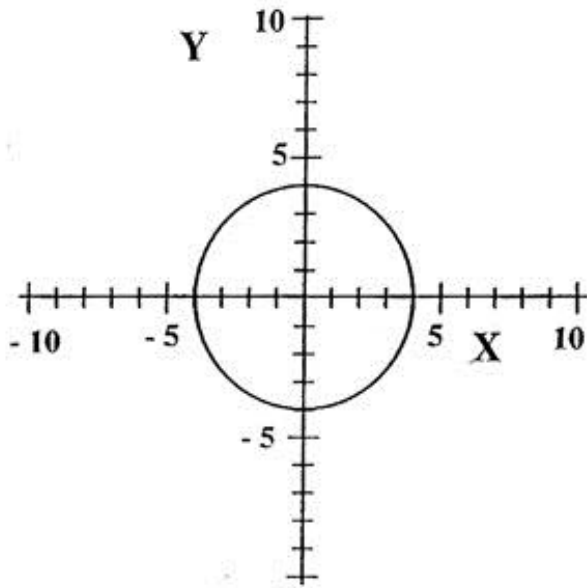
d. $y = (x-2)^2 + 1$

20. Choose the best inequality to describe the graph below:



- a. $y > -x + 1$
- b. $y < -x + 1$
- c. $y \leq -x + 1$
- d. $y \geq -x + 1$

21. Choose the best equation for the graph below:

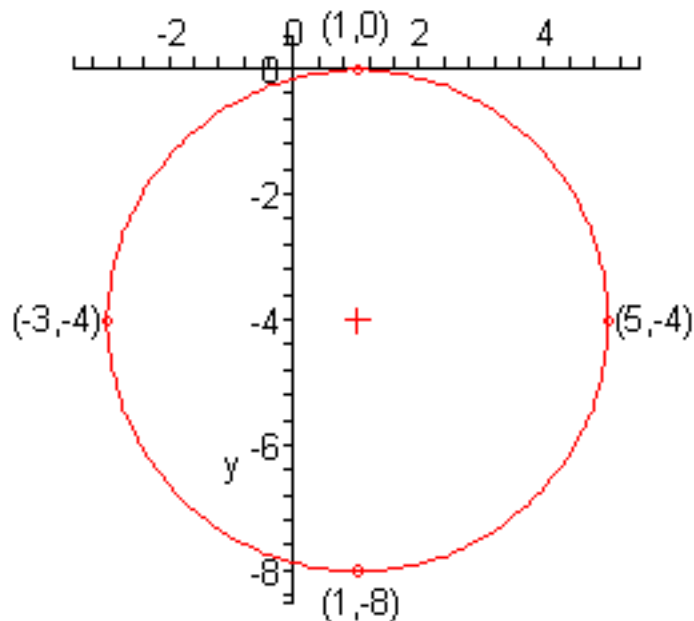


- a. $x^2 + y^2 = 5$
- b. $(x+5)^2 + (y+5)^2 = 1$
- c. $x + y = 25$
- d. $x^2 + y^2 = 25$

22. Find the center of the following circle: $x^2 + y^2 - 3x + 10y - 1 = 0$

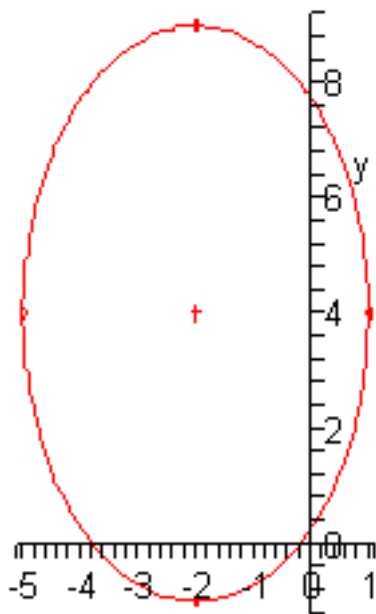
- a. center = $(3/2, 5)$
- b. center = $(-3/2, -5)$
- c. center = $(3/2, -5)$
- d. center = $(-3/2, 5)$

23. Choose the equation that best fits the graph below:



- a. $(x-1)^2 + (y+4)^2 = 4$
- b. $(x+1)^2 + (y-4)^2 = 4$
- c. $(x-1)^2 + (y+4)^2 = 16$
- d. $(x+1)^2 + (y-4)^2 = 16$

24. Choose the best equation for the ellipse below:

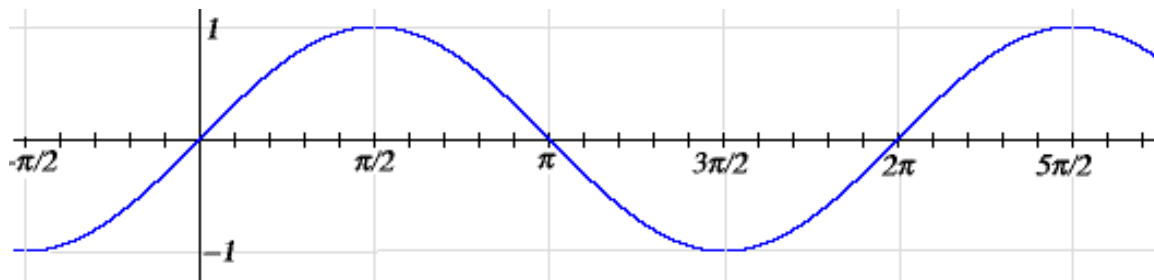


- a. $\frac{(x-2)^2}{9} - \frac{(y+4)^2}{25} = 1$
- b. $\frac{(x+2)^2}{9} + \frac{(y-4)^2}{25} = 1$
- c. $\frac{(x-2)^2}{25} + \frac{(y+4)^2}{9} = 1$
- d. $\frac{(x+2)^2}{25} - \frac{(y-4)^2}{9} = 1$

25. Which of the equations in question 24 is a hyperbola with the center at $(-2, 4)$?

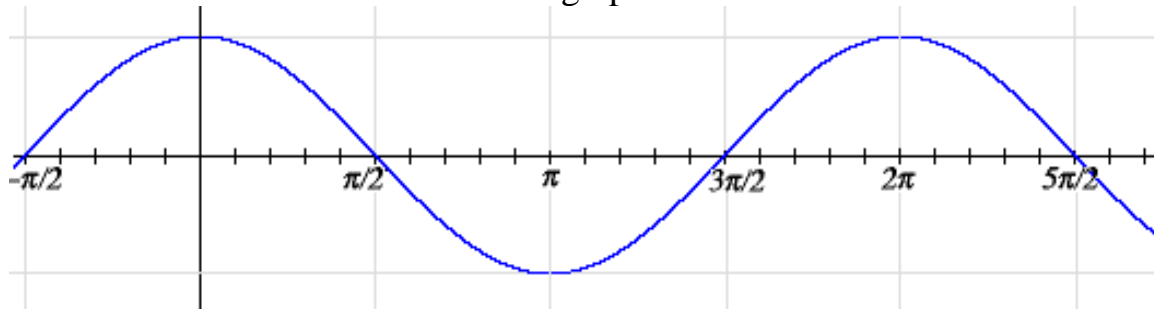
[Same choices as #24]

26. Choose the best function for the graph below:



- a. $y = \sin t$ b. $y = \cos t$
c. $y = \tan t$ d. $y = \cot t$

27. Choose the best function for the graph below:



- a. $y = \sin t$ b. $y = \cos t$
c. $y = \tan t$ d. $y = \cot t$

For questions 28-30, consider a sinusoid with a maximum at the point (2, 5) and a minimum at the point (4, -9).

28. What is the amplitude of the sinusoid?

- A) 2 B) 4 C) 7 D) 14

29. What is the period of the sinusoid?

- A) 2 B) 4 C) 6 D) 8

30. What is the vertical translation of the sinusoid?

- A) -9 B) -2 C) 2 D) 5

For questions 31-34, consider a rational function of the form $y = \frac{ax+b}{cx+d}$. (Assume that a, b, c, d are all non-zero.)

31. Suppose $c = 2$, and the rational function has a horizontal asymptote at $y = 7$. Calculate the value of a.

- A) $7/2$ B) 7 C) 9 D) 14

32. Suppose $c = 2$, and the rational function has a vertical asymptote at $x = 5$. Calculate the value of d.

- A) -10 B) -5 C) 5 D) 10

33. Find the x-intercept.

- A) b/a B) $-b/a$ C) d/c D) $-d/c$

34. Find the y-intercept.

- A) a/c B) b/d C) a/d D) b/c

35. Which of the following statements correctly describes a difference between $f(x) = \frac{x^2 + 3x}{x}$ and $g(x) = x + 3$?

- A) They are the same graph. There is no difference.
B) $f(x)$ is a parabola, whereas $g(x)$ is a line.
C) Both graph as lines, but $f(x)$ has a hole at the point (0, 0).
D) Both graph as lines, but $f(x)$ has a hole at the point (0, 3).

36. Which of the following statements correctly describes the function $f(x) = \csc(2x)$?

- A) $f(x)$ has vertical asymptotes every 2 units
B) $f(x)$ has a period of π
C) $f(x)$ has infinitely many x-intercepts
D) All of the above statements are true.

37. Which of the following functions has a horizontal asymptote at $y = 1$?

A) $f(x) = e^{x+1}$ B) $f(x) = \frac{1-x}{x+5}$ C) $f(x) = \frac{1}{1+e^{-x}}$ D) $f(x) = \tan^{-1} x$

38. Which of the following functions has the same end behavior on its left and right?

A) $f(x) = e^{x+1}$ B) $f(x) = \frac{1-x}{x+5}$ C) $f(x) = \frac{1}{1+e^{-x}}$ D) $f(x) = \tan^{-1} x$

39. Which of the following functions is increasing over the interval $(-\infty, \infty)$?

A) $f(x) = \sqrt{x}$ B) $f(x) = x^2$ C) $f(x) = \frac{1}{x}$ D) $f(x) = \sqrt[3]{x-1}$

40. Suppose $f(x) = x^2$ and $g(x) = \sqrt{x+4}$. Find the domain of $g(f(x))$.

A) $(-\infty, \infty)$ B) $[-4, \infty)$ C) $(-4, \infty)$ D) $[4, \infty)$

41. Suppose $f(x) = x^2$ and $g(x) = \sqrt{x+4}$. Find the domain of $f(g(x))$.

A) $(-\infty, \infty)$ B) $[-4, \infty)$ C) $(-4, \infty)$ D) $[4, \infty)$

Match the following polar curves to their descriptions.

42. _____ Circle A) $r = \sin(4\theta)$

43. _____ Limacon B) $r = 2 + 2\cos(2\theta)$

44. _____ Rose Petal C) $r = 1$

45. _____ Spiral D) $r = \theta$