MAC 1147 Final Exam Review

Name:_____

You can skip questions from canceled topics.

Find the remainder when f(x) is divided by (x - k)

1) $f(x) = x^2 + 7x + 9$; $k = 6$ 1) _____

A) 69 B) -15 C) 3 D) 87

Solve the problem.

2) A rocket is shot straight up in the air from the ground at a rate of 49 feet per second. The rocket is tracked by a range finder that is 499 feet from the launch pad. Let d represent the distance from the rocket to the range finder and t represent the time, in seconds, since "blastoff". Express d as a function of t. 2) _____

A) $d(t) = 499^2 + (49t)^2$ B) $d(t) = \sqrt{49^2 + (499t)^2}$

C) $d(t) = 499 + 49t^2$ D) $d(t) = \sqrt{499^2 + (49t)^2}$

3) The price p and x, the quantity of a certain product sold, obey the demand equation 3) _____

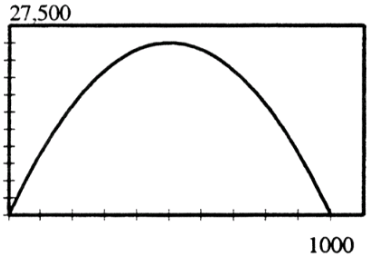
$p = -\frac{1}{10}x + 100, \{x \mid 0 \le x \le 1000\}$

a) Express the revenue R as a function of x.
b) What is the revenue if 450 units are sold?
c) Graph the revenue function using a graphing utility.
d) What quantity x maximizes revenue? What is the maximum revenue?
e) What price should the company charge to maximize revenue?

A) a. $R(x) = -\frac{1}{10}x^2 + 100x$

b. R(450) = $24,750.00

c.



d. 500; $25,000.00

e. $50.00

Find the value for the function.

4) Find f(-1) when $f(x) = \frac{x^2 - 4}{x - 3}$. 4) _____

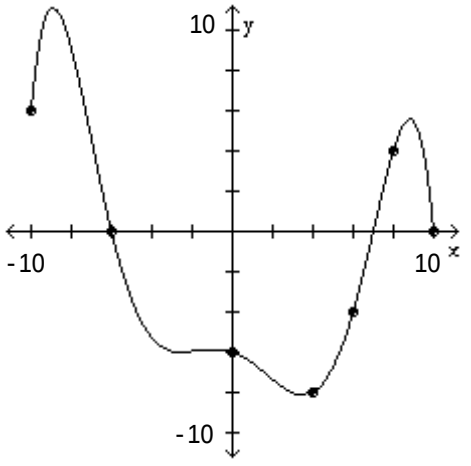
A) $-\frac{5}{4}$ B) $-\frac{5}{2}$ C) $\frac{3}{4}$ D) $-\frac{1}{4}$

5) Find -f(x) when $f(x) = -3x^2 + 2x - 4$. 5) _____

A) $3x^2 - 2x - 4$ B) $-3x^2 - 2x - 4$ C) $3x^2 - 2x + 4$ D) $-3x^2 - 2x + 4$

The graph of a function f is given. Use the graph to answer the question.

6) Is f(6) positive or negative? 6) _____



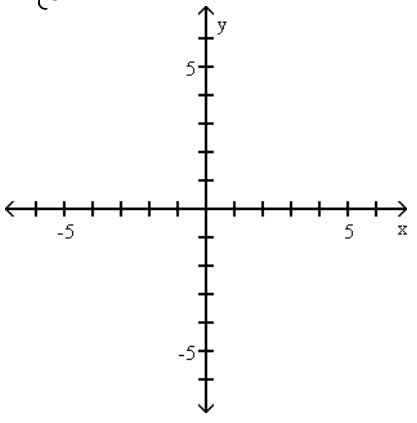
A) positive

B) negative

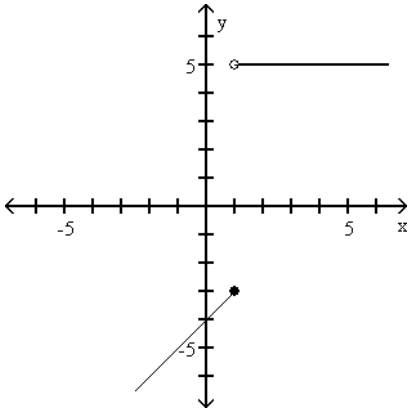
Graph the function.

7) 7) _____

$$f(x) = \begin{cases} x - 4 & \text{if } x < 1 \\ 5 & \text{if } x \geq 1 \end{cases}$$



A)



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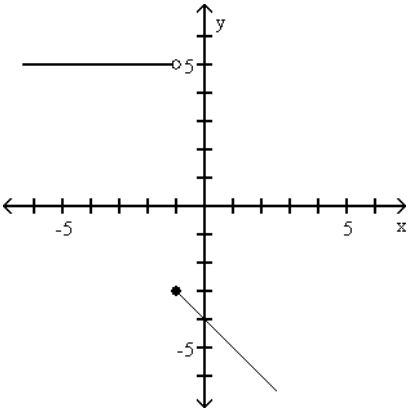

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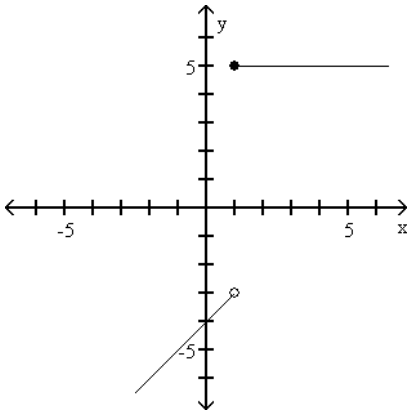

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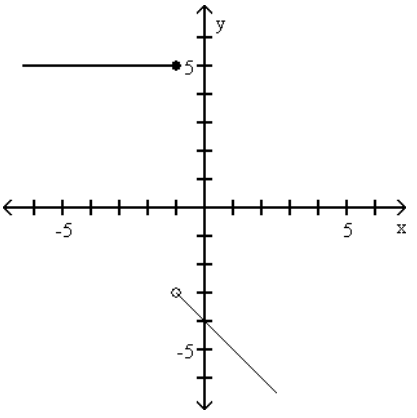
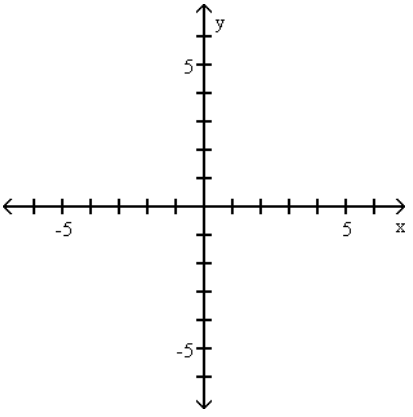
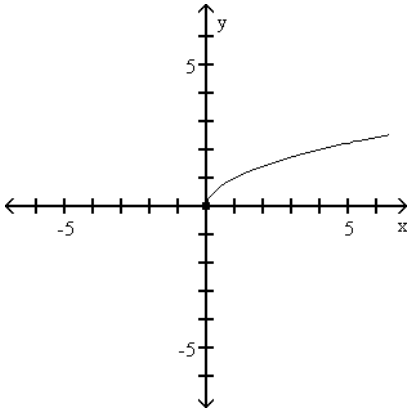


8) $f(x) = \sqrt{x}$ 8) _____



A)



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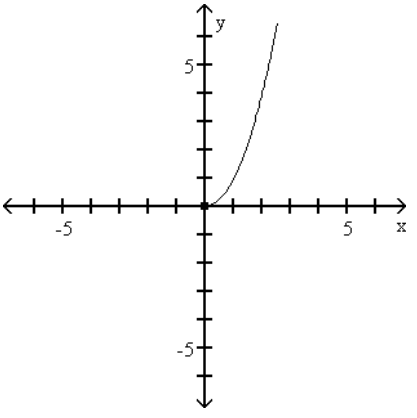

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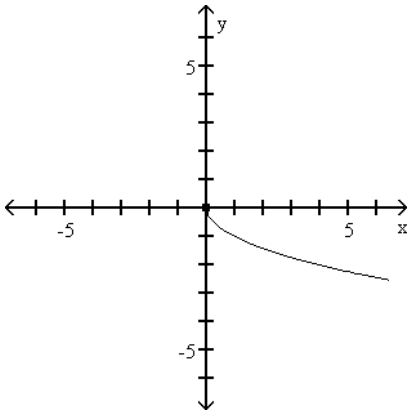

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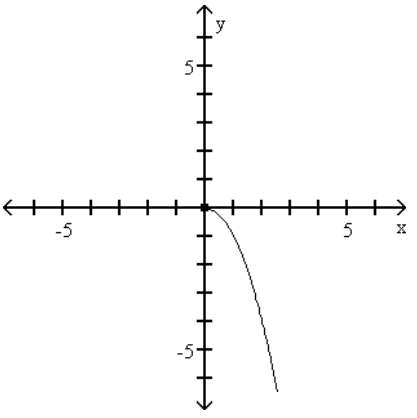
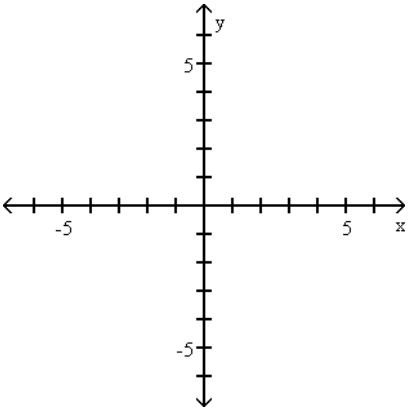
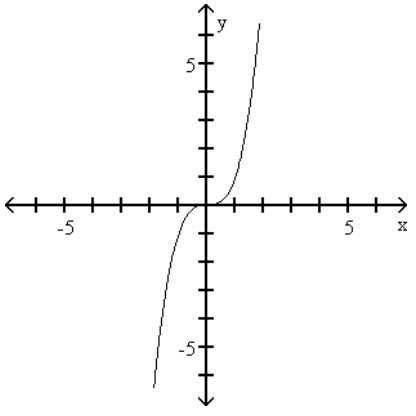


9) $f(x) = x^2$

9) _____



A)



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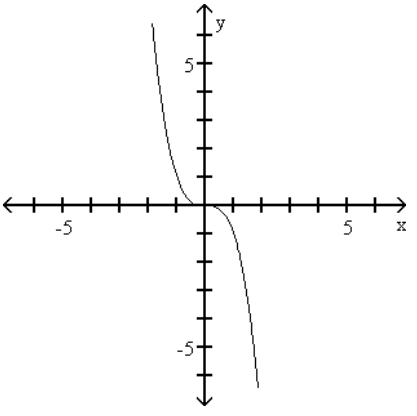

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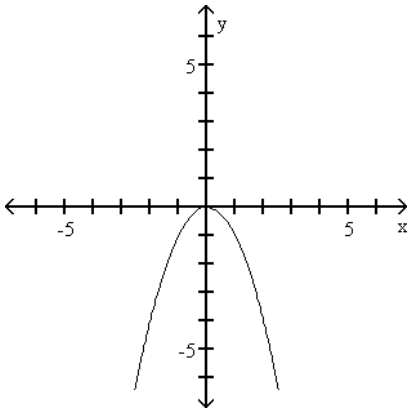

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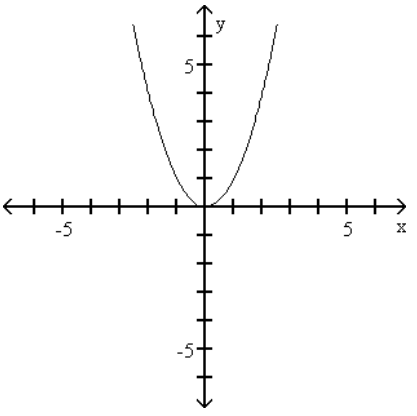


Determine whether the equation defines y as a function of x.

10) $x^2 - 4y^2 = 1$ 10) _____

A) function B) not a function

Solve the problem.

11) The profits (in millions) for a company for 8 years was as follows: 11) _____

Year, *x*	Profits
1993, 1	1.1
1994, 2	1.7
1995, 3	2.0
1996, 4	1.4
1997, 5	1.3
1998, 6	1.5
1999, 7	1.8
2000, 8	2.1

Find the cubic function of best fit to the data.

A) $y = 0.03x^3 - 0.34x^2 + 1.31x + 0.18$

12) A company that produces radios has costs given by the function $C(x) = 25x + 25{,}000$, where x is the number of radios manufactured and C(x) is measured in dollars. The average cost to manufacture each radio is given by 12) _____

$$\overline{C}(x) = \frac{25x + 25{,}000}{x}.$$

Find $\overline{C}(100)$. (Round to the nearest dollar, if necessary.)

A) \$255 B) \$52 C) \$50 D) \$275

List the potential rational zeros of the polynomial function. Do not find the zeros.

13) $f(x) = 11x^3 - x^2 + 2$ 13) _____

A) $\pm\frac{1}{11}, \pm\frac{2}{11}, \pm 1, \pm 2, \pm 11$ B) $\pm\frac{1}{2}, \pm\frac{11}{2}, \pm 1, \pm 11$

C) $\pm\frac{1}{11}, \pm\frac{1}{2}, \pm 1, \pm 2, \pm 11$ D) $\pm\frac{1}{11}, \pm\frac{2}{11}, \pm 1, \pm 2$

Solve the inequality. Express the solution using interval notation.

14) $\frac{x^2(x - 10)(x + 3)}{(x - 6)(x + 9)} \geq 0$ 14) _____

A) $(-9, -3]$ or $(6, 10]$
B) $(-\infty, -9)$ or $[-3, 0)$ or $(0, 6)$ or $[10, \infty)$
C) $(-\infty, -9)$ or $[-3, 6)$ or $[10, \infty)$
D) $(-\infty, -9)$ or $[10, \infty)$

15) $\frac{x - 3}{x + 1} < 0$ 15) _____

A) $(-1, 3)$
B) $(3, \infty)$
C) $(-\infty, -1)$ or $(3, \infty)$
D) $(-\infty, -1)$

Find the intercepts of the function f(x).

16) $f(x) = x^2(x - 5)(x - 3)$ 16) _____

A) x-intercepts: 0, -5, -3; y-intercept: 15
B) x-intercepts: 0, 5, 3; y-intercept: 0
C) x-intercepts: 0, 5, 3; y-intercept: 15
D) x-intercepts: 0, -5, -3; y-intercept: 0

Give the equation of the horizontal asymptote, if any, of the function.

17) $F(x) = \frac{9x^2 + 5}{9x^2 - 5}$ 17) _____

A) $y = 1$ B) $y = 9$ C) $y = 5$ D) none

Find the indicated intercept(s) of the graph of the function.

18) x-intercepts of $f(x) = \frac{5}{x^2 - x - 30}$ 18) _____

A) $(-5, 0), (6, 0)$ B) $(-6, 0), (5, 0)$ C) $(5, 0)$ D) none

19) x-intercepts of $f(x) = \frac{2x}{x^2 - 25}$ 19) _____

A) $(2, 0)$ B) $(25, 0)$ C) $(-5, 0), (5, 0)$ D) $(0, 0)$

State whether the function is a polynomial function or not. If it is, give its degree. If it is not, tell why not.

20) $f(x) = \frac{5}{2} - \frac{1}{4}x$ 20) _____

A) No; x has a fractional coefficient
B) Yes; degree 4
C) Yes; degree 1
D) Yes; degree 0

Solve the inequality.

21) $\frac{(8 - x)^3(4x - 3)}{x^3 + 27} < 0$ 21) _____

A) $(\frac{3}{4}, 3), (8, \infty)$ B) $(-8, \frac{3}{4}), (3, \infty)$ C) $(-3, \frac{3}{4}), (8, \infty)$ D) $(-3, 8), (\frac{3}{4}, \infty)$

Find the vertical asymptotes of the rational function.

22) $R(x) = \frac{x + 2}{x^2 - 64}$ 22) _____

A) $x = 64, x = -2$
B) $x = 0, x = 64$
C) $x = -8, x = 8, x = -2$
D) $x = -8, x = 8$

Solve using Cramer's Rule.

23) $4x + 2y = 48$
$2x = -5y + 48$ 23) _____

A) (-9, -6) B) (9, 6) C) (6, 9) D) (-6, 9)

Write an equation for the ellipse.

24) Foci (±9, 0) and x-intercepts (±15, 0) 24) _____

A) $\frac{x^2}{15} + \frac{y^2}{12} = 1$ B) $\frac{x^2}{12} + \frac{y^2}{15} = 1$ C) $\frac{x^2}{144} + \frac{y^2}{225} = 1$ D) $\frac{x^2}{225} + \frac{y^2}{144} = 1$

Give the maximum number of zeros the polynomial function may have. Use Descarte's Rule of Signs to determine how many positive and how many negative zeros it may have.

25) $f(x) = x^6 - x^5 - x^4 - 5x^3 + 2x^2 + 2x + 3$ 25) _____

A) 6; 3 or 1 positive zeros; 3 or 1 negative zeros
B) 6; 2 or 0 positive zeros; 2, or 0 negative zeros
C) 6; 4, 2, or 0 positive zeros; 2 or 0 negative zeros
D) 6; 2 or 0 positive zeros; 4, 2, or 0 negative zeros

Find the equation of the parabola determined by the given information.

26) Vertex at the origin, focus at $(0, \frac{1}{9})$ 26) _____

A) $x = \frac{9}{4}y^2$ B) $y = \frac{9}{4}x^2$ C) $y = 36x^2$ D) $y = \frac{4}{9}x^2$

Find the x- and y-intercepts of f.

27) $f(x) = x^2(x - 1)(x - 2)$ 27) _____

A) x-intercepts: 0, 1, 2; y-intercept: 2
B) x-intercepts: 0, 1, 2; y-intercept: 0
C) x-intercepts: 0, -1, -2; y-intercept: 2
D) x-intercepts: 0, -1, -2; y-intercept: 0

Find all zeros of the function and write the polynomial as a product of linear factors.

28) $f(x) = 3x^4 - 4x^3 + 28x^2 - 36x + 9$ 28) _____

A) $f(x) = (3x + 1)(x + 1)(x + 3)(x - 3)$
B) $f(x) = (3x - 1)(x - 1)(x + 3i)(x - 3i)$
C) $f(x) = (3x - 1)(x - 1)(x + 3)(x - 3)$
D) $f(x) = (3x + 1)(x + 1)(x + 3i)(x - 3i)$

29) $f(x) = x^3 + 11x^2 + 36x + 26$ 29) _____

A) $f(x) = (x + 1)(x + 5 + i\sqrt{2})(x - 1 - i\sqrt{2})$
B) $f(x) = (x - 1)(x + 5 + i\sqrt{2})(x + 5 - i\sqrt{2})$
C) $f(x) = (x + 1)(x + 5 + i)(x - 5 - i)$
D) $f(x) = (x + 1)(x + 5 + i)(x + 5 - i)$

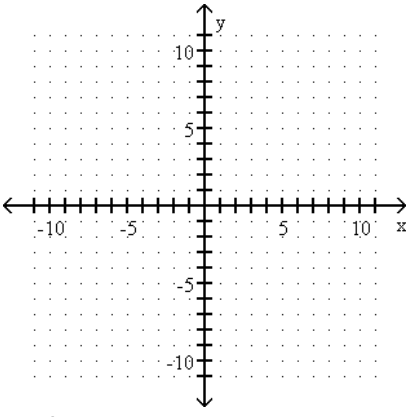
Use the given zero to find the remaining zeros of the function.

30) $f(x) = x^4 - 45x^2 - 196$; zero: $-2i$ 30) _____

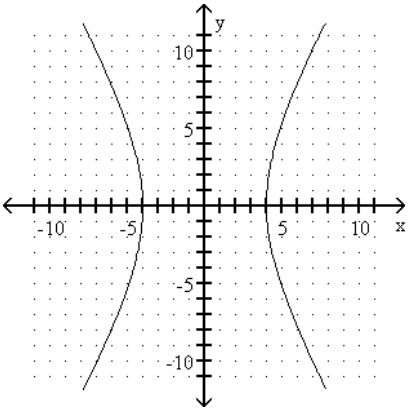
A) 2i, 14i, -14i B) 2i, 7i, -7i C) 2i, 7, -7 D) 2i, 14, -14

Graph the hyperbola.

31) $\frac{x^2}{16} - \frac{y^2}{49} = 1$ 31) _____



A)



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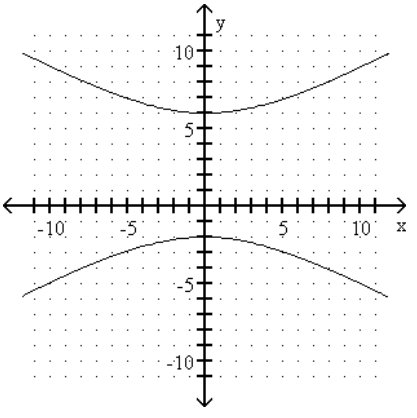


Solve the problem.

32) $f(x) = \log_3(x + 3)$ and $g(x) = \log_3(2x - 1)$. 32) _____

Solve $f(x) = g(x)$.

A) {4}, $(4, \log_3(7))$ B) {4}, $(4, \log_3(3))$ C) {4}, $(4, \log_3(4))$ D) No solution.

33) The logistic growth model $P(t) = \frac{1000}{1 + 19e^{-0.343t}}$ represents the population of a bacterium in a 33) _____

culture tube after t hours. When will the amount of bacteria be 680?

A) 1.63 hr B) 7.46 hr C) 4.95 hr D) 10.78 hr

34) An airline charter service charges a fare per person of $200 plus $30 for each unsold seat. The airplane holds 200 passengers. Let x represent the number of unsold seats and write an expression for the total revenue R for a charter flight. 34) _____

A) $R(x) = x(200 + 30x)$ or $200x + 30x^2$

B) $R(x) = (200 - x)(200 + 30x)$ or $40{,}000 + 6000x - 30x^2$

C) $R(x) = (200 - x)(200 + 30x)$ or $40{,}000 + 5800x - 30x^2$

D) $R(x) = 200(200 + 30x)$ or $40{,}000 + 6000x$

35) A grocery store normally sells 8 jars of caviar per week. Use the Poisson Distribution $P(x) = \frac{8^x e^{-8}}{x!}$ 35) _____

to find the probability (to three decimals) of selling 7 jars in a week.
$(x! = x \cdot (x - 1) \cdot (x - 2) \cdot \ldots \cdot (3)(2)(1))$.

A) 0.279 B) 0.14 C) 14.357 D) 0.977

36) The logistic growth model $P(t) = \frac{1540}{1 + 37.5e^{-0.314t}}$ represents the population of a bacterium in a 36) _____

culture tube after t hours. What was the initial amount of bacteria in the population?

A) 39 B) 40 C) 45 D) 41

37) $f(x) = \log_3(x + 4)$ and $g(x) = \log_3(x - 3)$. 37) _____

Solve $g(x) = 219$. What point is on the graph of g?

A) {216}, (6, 213) B) {216}, (6, 219) C) {6}, (6, 213) D) {6}, (6, 219)

38) A thermometer reading 11°C is brought into a room with a constant temperature of 30°C. If the thermometer reads 18°C after 4 minutes, what will it read after being in the room for 6 minutes? Assume the cooling follows Newton's Law of Cooling: 38) _____

$U = T + (U_0 - T)e^{kt}$.

(Round your answer to two decimal places.)

A) 5.93°C B) 28.79°C C) 39.54°C D) 20.46°C

39) $f(x) = \log_2(x - 4)$ and $g(x) = \log_2(5x + 2)$. 39) _____

Solve $f(x) + g(x) = 6$.

A) {-64} B) {-6} C) {64} D) {6}

40) Suppose that $f(x) = 2^x$. If $f(x) = \frac{1}{16}$, what is x? 40) _____

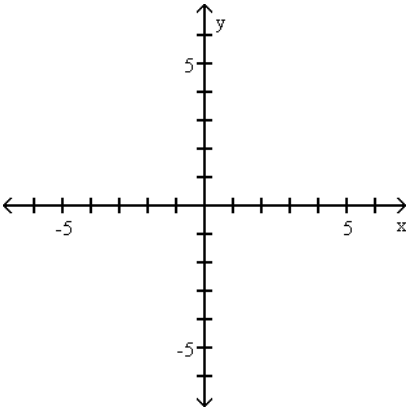
A) 2 B) -4 C) 4 D) -2

41) Suppose that $8000 is invested at an interest rate of 5.7% per year, compounded continuously. What is the balance after 4 years? 41) _____

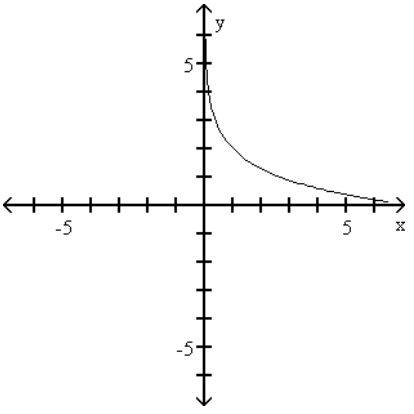
A) $9824.00 B) $10,148.68 C) $8456.00 D) $10,048.68

Graph the function.

42) $f(x) = 2 - \ln x$ 42) _____



A)



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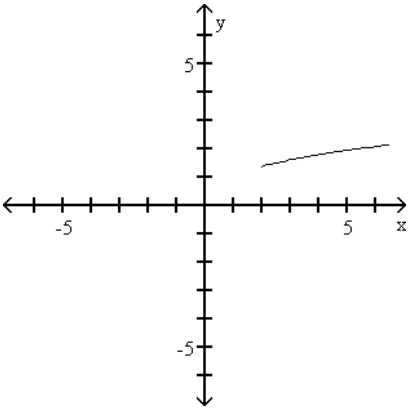

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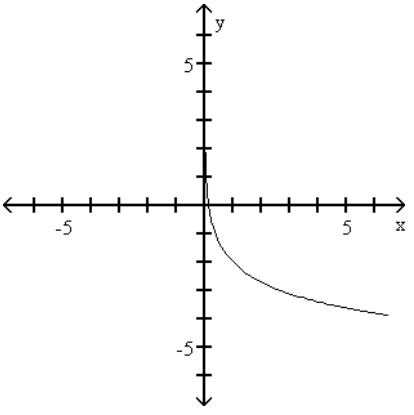

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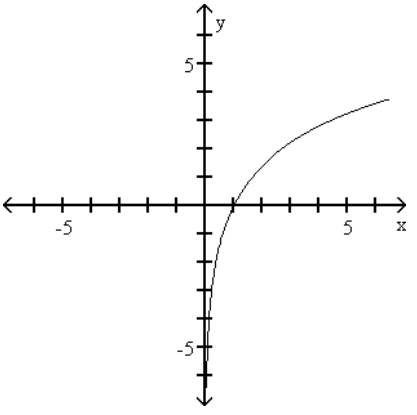
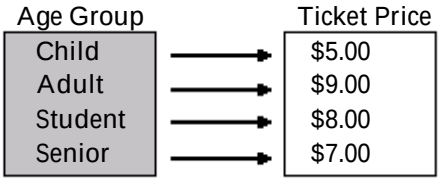
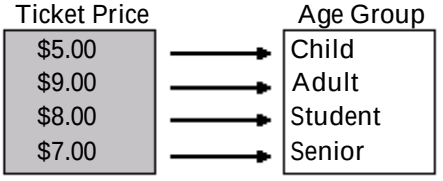


Find the inverse of the function and state its domain and range .

43) 43) _____

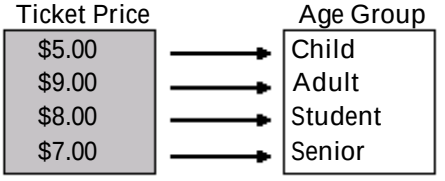


A)



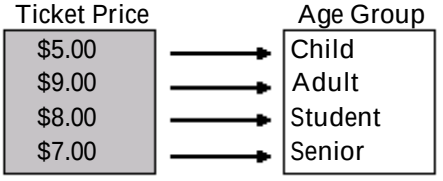
D: {Child, Adult, Student, Senior}
R: {5.00, 9.00, 8.00, 7.00}

B)



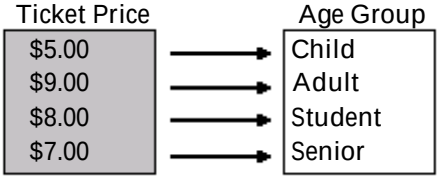
D: {5.00, 7.00}
R: {Child, Senior}

C)



D: {7.00}
R: {Senior}

D)



D: {5.00, 9.00, 8.00, 7.00}
R: {Child, Adult, Student, Senior}

The loudness L(x), measured in decibels, of a sound of intensity x, measured in watts per square meter, is defined as $L(x) = 10\log\left(\frac{x}{I_0}\right)$, where $I_0 = 10^{-12}$ watt per square meter is the least intense sound that a human ear can detect.

Determine the loudness, in decibels, of the sound.

44) At a rock concert by The Who, the music registered a loudness level of 120 decibels. The human threshold of pain due to sound averages 130 decibels. Compute the ratio of the intensities associated with these two loudness level to determine by how much the intensity of a sound that crosses the human threshold of pain exceeds that of this particular rock concert. 44) _____

A) The intensity of a sound that crosses the human threshold of pain is 100 times as intense as this rock concert.

B) The intensity of a sound that crosses the human threshold of pain is 1000 times as intense as this rock concert.

C) The intensity of a sound that crosses the human threshold of pain is 10 times as intense as this rock concert.

D) The intensity of a sound that crosses the human threshold of pain is 0.1 times as intense as this rock concert.

Use a calculator to evaluate the expression. Round your answer to three decimal places

45) $\frac{\log 6 + \log 9}{\ln 2 - \ln 7}$ 45) _____

A) -3.184 B) 0.656 C) 0.141 D) -1.383

Approximate the value using a calculator. Express answer rounded to three decimal places.

46) $4.5^{1.4}$ 46) _____

A) 869.874 B) 8.213 C) 4.545 D) 6.300

Use the properties of logarithms to find the exact value of the expression. Do not use a calculator.

47) $\log_4 24 - \log_4 6$ 47) _____

A) 24 B) 1 C) 4 D) 6

48) $\log_{304} 16 + \log_{304} 19$ 48) _____

A) 19 B) 1 C) 16 D) 304

Find the present value. Round to the nearest cent.

49) To get \$10,000 after 3 years at 6% compounded monthly 49) _____

A) \$9419.05 B) \$8356.45 C) \$10,616.78 D) \$3333.33

Express as a single logarithm.

50) $\ln \frac{x^2 + 2x - 24}{x - 3} - \ln \frac{x^2 + 3x - 18}{x + 6} + \ln (x^2 - 8x + 16), \quad x > 0$ 50) _____

A) $\ln \frac{(x - 4)^3(x + 6)}{(x - 3)^2}$ B) $\ln \frac{(x - 4)^3}{(x - 3)^2(x + 6)}$

C) $\ln \frac{3(x - 4)(x + 6)}{2(x - 3)}$ D) $\ln \frac{3(x - 4)}{2(x - 3)(x + 6)}$

Find the effective rate of interest.

51) $4\frac{3}{4}\%$ compounded quarterly 51) _____

A) 4.84% B) 4.75% C) 5.75% D) 4.42%

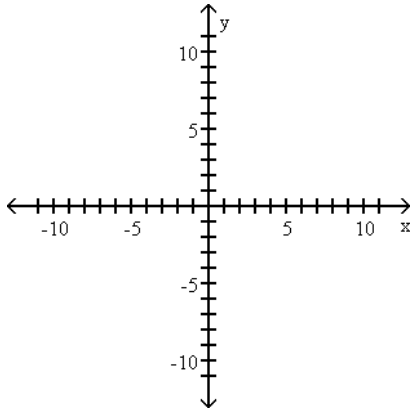
Decide whether the composite functions, $f \circ g$ and $g \circ f$, are equal to x.

52) $f(x) = \sqrt{x + 1}$, $g(x) = x^2$ 52) _____

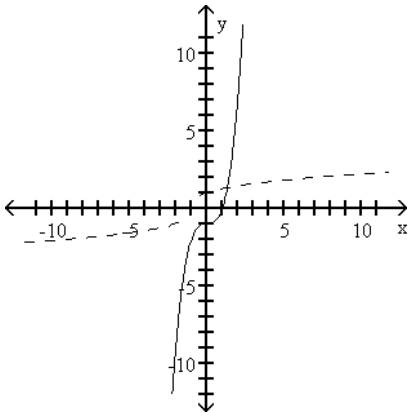
A) Yes, yes B) Yes, no C) No, no D) No, yes

Graph the function as a solid line or curve and its inverse as a dashed line or curve on the same axes.

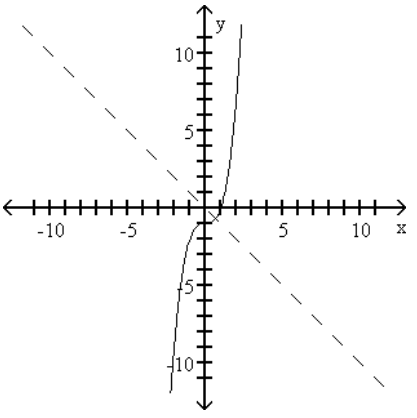
53) $f(x) = x^3 + 1$ 53) _____



A)



B)



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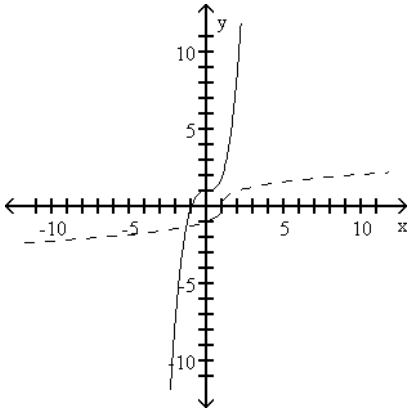
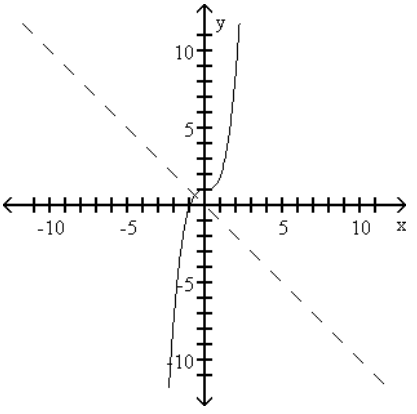


D)



Decide whether or not the functions are inverses of each other.

54) $f(x) = \frac{1 + x}{x}$, $g(x) = \frac{1}{x - 1}$ 54) _____

A) Yes B) No

Find functions f and g so that $f \circ g = H$.

55) $H(x) = |2x + 8|$ 55) _____

A) $f(x) = x$; $g(x) = 2x + 8$ B) $f(x) = |-x|$; $g(x) = 2x - 8$

C) $f(x) = -|x|$; $g(x) = 2x + 8$ D) $f(x) = |x|$; $g(x) = 2x + 8$

Write the augmented matrix for the system of equations.

56) $6x + 5z = 32$
$7y + 7z = 49$
$2x + 7y + 3z = 71$ 56) _____

A)

$$\left[\begin{array}{ccc|c} 6 & 0 & 5 & 32 \\ 0 & 7 & 7 & 49 \\ 2 & 7 & 3 & 71 \end{array}\right]$$

B)

$$\left[\begin{array}{ccc|c} 6 & 0 & 5 & 32 \\ 0 & 7 & 7 & 49 \\ 2 & 7 & 3 & 71 \end{array}\right]$$

Solve the problem.

57) To approximate the speed of a river, a circular paddle wheel with radius 0.5 feet is lowered into the water. If the current causes the wheel to rotate at a speed of 15 revolutions per minute, what is the speed of the current? If necessary, round to two decimal places. 57) _____

A) 47.12 mph B) 0.27 mph C) 0.09 mph D) 0.54 mph

58) If $f(\theta) = \sin\theta$ and $f(a) = \frac{1}{3}$, find the exact value of $f(a) + f(a + 2\pi) + f(a + 4\pi)$. 58) _____

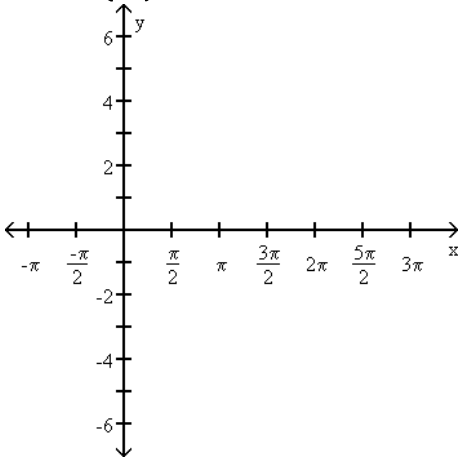
A) $\frac{1}{3}$ B) 1 C) $1 + 6\pi$ D) 3

59) Find the average rate of change of $f(x) = \tan x$ from 0 to $\frac{\pi}{4}$. 59) _____

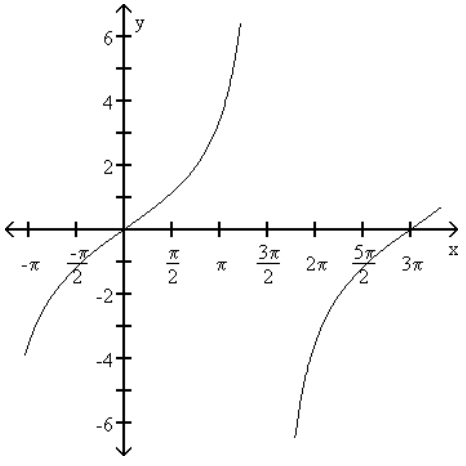
A) 0 B) 1 C) $\frac{4}{\pi}$ D) $\frac{\pi}{4}$

Graph the function.

60) $y = 3\tan\left(\frac{1}{2}x\right)$ 60) _____



A)



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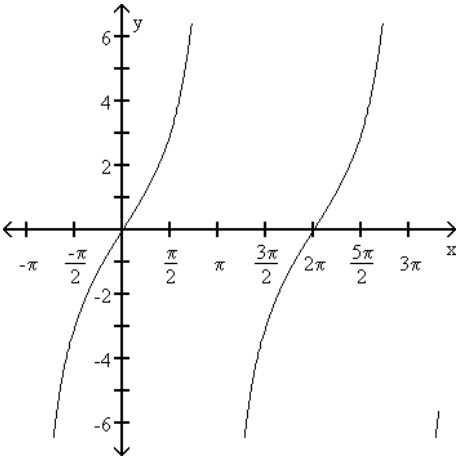

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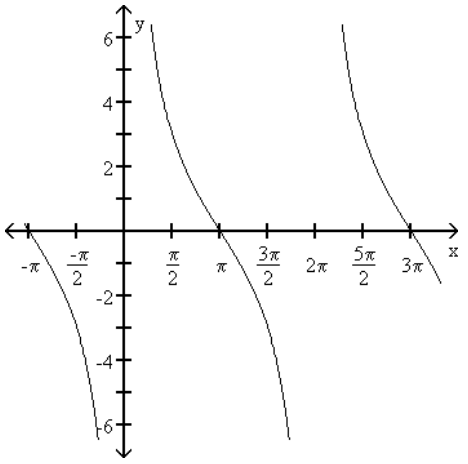

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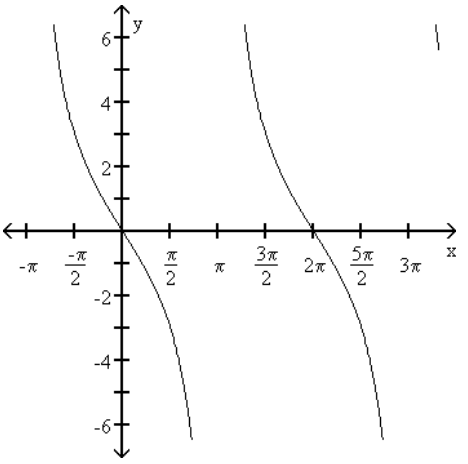
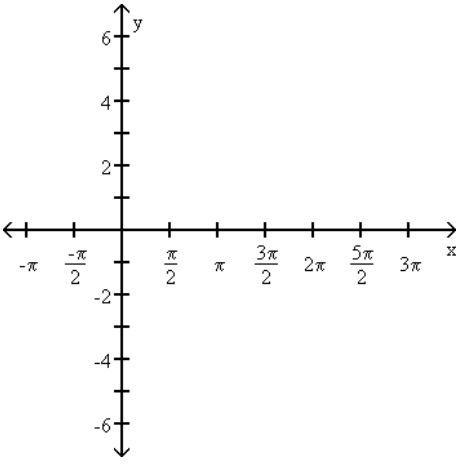
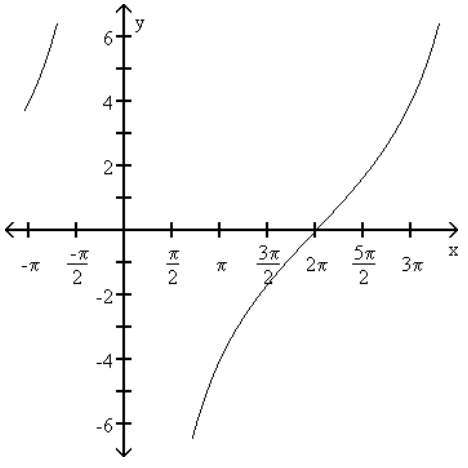


61) y = -4 cot(4x)

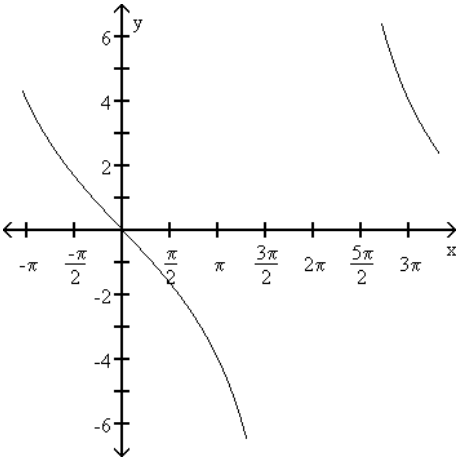
61) _____



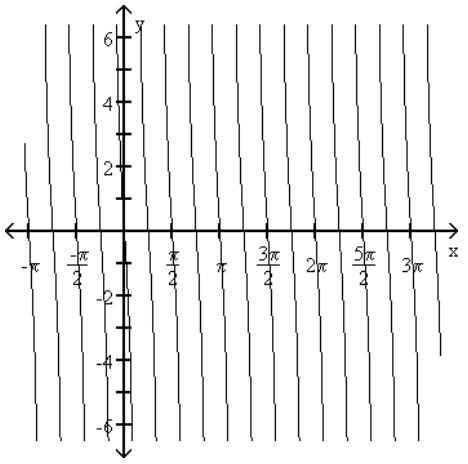
A)



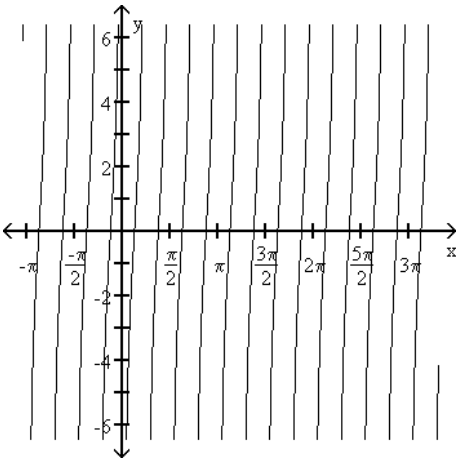
B)



C)

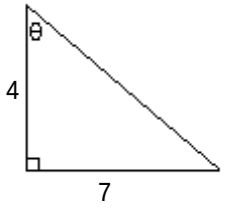


D)



Find the value of the indicated trigonometric function of the angle θ in the figure. Give an exact answer with a rational denominator.

62) 62) _____



Find sec θ.

A) $\sec\theta = \frac{7\sqrt{65}}{65}$ B) $\sec\theta = \frac{4\sqrt{65}}{65}$ C) $\sec\theta = \frac{\sqrt{65}}{4}$ D) $\sec\theta = \frac{4\sqrt{65}}{7}$

A point on the terminal side of angle θ is given. Find the exact value of the indicated trigonometric function.

63) (3, 4) Find csc θ. 63) _____

A) $\frac{3}{4}$ B) $\frac{4}{3}$ C) $\frac{5}{3}$ D) $\frac{5}{4}$

Use a calculator to find the approximate value of the expression. Round the answer to two decimal places.

64) tan 37° 64) _____

A) 0.80 B) -0.84 C) 0.60 D) 0.75

65) $\cos\frac{3\pi}{7}$ 65) _____

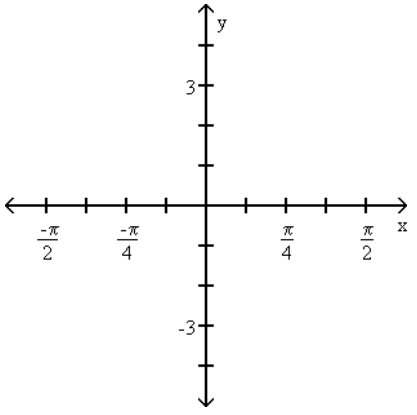
A) 0.22 B) 0.29 C) 1.00 D) 1.07

66) sin 87° 66) _____

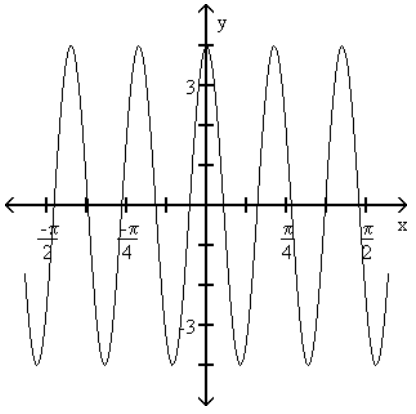
A) 0.87 B) 1.00 C) -0.82 D) -0.95

Use transformations to graph the function.

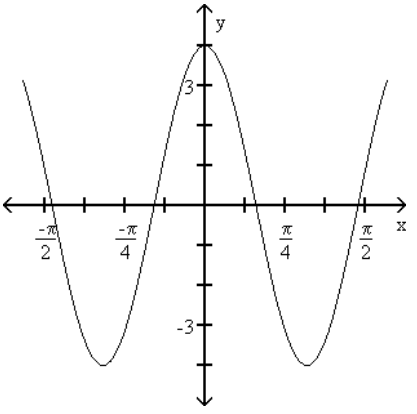
67) $y = 4 \cos 3\pi x$ 67) _____



A)



B)



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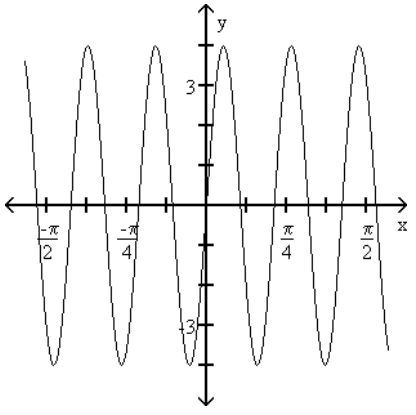
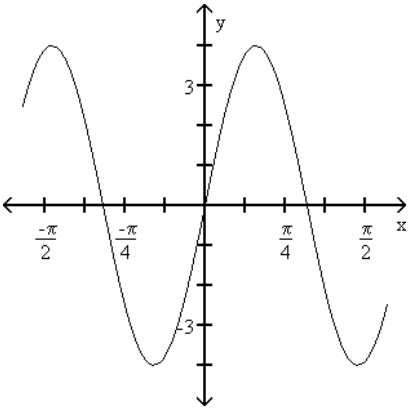
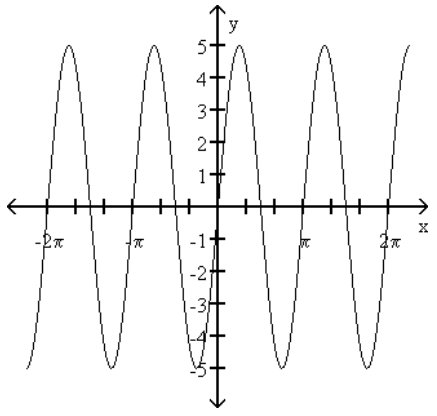


D)

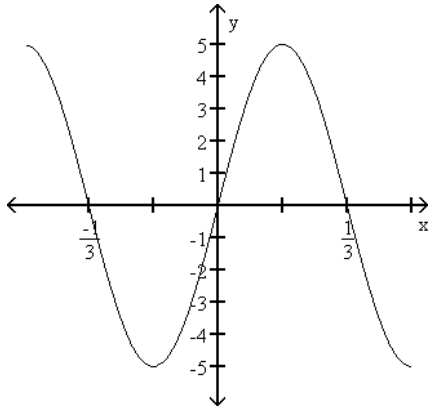


Find an equation for the graph.

68) 

68) _____

A) y = 5 sin (2x) B) $y = 2 \sin\left(\frac{1}{5}x\right)$ C) $y = 5 \sin\left(\frac{1}{2}x\right)$ D) y = 2 sin (5x)

69) 

69) _____

A) y = 5 sin (3πx) B) $y = 3 \sin\left(\frac{\pi}{5}x\right)$ C) y = 3 sin (5πx) D) $y = 5 \sin\left(\frac{\pi}{3}x\right)$

Find the reference angle of the given angle.

70) -361°

70) _____

A) 89° B) 91° C) 1° D) 179°

The point P on the unit circle that corresponds to a real number t is given. Find the indicated trigonometric function.

71) $\left(-\frac{\sqrt{11}}{6}, \frac{5}{6}\right)$ Find cos t.

71) _____

A) $-\frac{\sqrt{11}}{5}$ B) $\frac{5}{6}$ C) $-\frac{\sqrt{11}}{6}$ D) $-\frac{6\sqrt{11}}{11}$

72) $\left(\frac{3}{8}, -\frac{\sqrt{55}}{8}\right)$ Find cos t.

72) _____

A) $\frac{\sqrt{55}}{8}$ B) $\frac{3}{8}$ C) $-\frac{3}{8}$ D) $-\frac{\sqrt{55}}{8}$

Use the definition or identities to find the exact value of the indicated trigonometric function of the acute angle θ.

73) $\csc\theta = \frac{2\sqrt{3}}{3}$ Find $\cos\theta$. 73) _____

A) $\frac{\sqrt{3}}{3}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) 2

74) $\tan\theta = 3$ Find $\sin\theta$. 74) _____

A) $\sqrt{10}$ B) $\frac{\sqrt{10}}{10}$ C) $\frac{3\sqrt{10}}{10}$ D) $\frac{\sqrt{10}}{3}$

Convert the angle to a decimal in degrees. Round the answer to two decimal places.

75) 182°11'59" 75) _____

A) 182.16° B) 182.20° C) 182.21° D) 182.26°

Name the quadrant in which the angle θ lies.

76) $\sin\theta > 0$, $\cos\theta > 0$ 76) _____

A) I B) II C) III D) IV

If A denotes the area of the sector of a circle of radius r formed by the central angle θ, find the missing quantity. If necessary, round the answer to two decimal places.

77) r = 20 inches, $\theta = \frac{\pi}{6}$ radians, A = ? 77) _____

A) 209.33 in^2 B) 10.47 in^2 C) 104.67 in^2 D) 5.23 in^2

Find the exact value of the indicated trigonometric function of θ.

78) $\sin\theta = \frac{1}{6}$, $\sec\theta < 0$ Find $\cos\theta$ and $\tan\theta$. 78) _____

A) $\cos\theta = -\frac{\sqrt{35}}{6}$, $\tan\theta = -\frac{\sqrt{35}}{35}$ B) $\cos\theta = -\frac{\sqrt{35}}{6}$, $\tan\theta = -\frac{\sqrt{35}}{35}$

Find the exact value. Do not use a calculator.

79) sec 45° 79) _____

A) $\sqrt{2}$ B) $\sqrt{2}$

Use the even-odd properties to find the exact value of the expression. Do not use a calculator.

80) $\sec\left(-\frac{\pi}{6}\right)$ 80) _____

A) $\frac{2\sqrt{3}}{3}$ B) -2

Solve the problem.

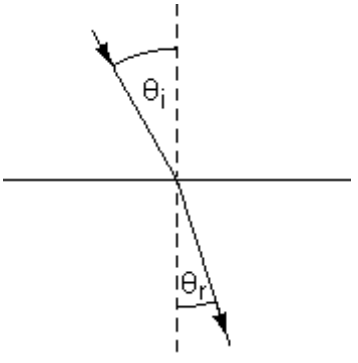
81) When light travels from one medium to another—from air to water, for instance—it changes direction. (This is why a pencil, partially submerged in water, looks as though it is bent.) The angle of incidence θ_i is the angle in the first medium; the angle of refraction θ_r is the second medium. (See illustration.) Each medium has an index of refraction—n_i and n_r, respectively—which can be found in tables. Snell's law relates these quantities in the formula 81) _____

$n_i \sin\theta_i = n_r \sin\theta_r$

Solving for θ_r, we obtain

$\theta_r = \sin^{-1}\left(\frac{n_i}{n_r}\sin\theta_i\right)$

Find θ_r for fused quartz ($n_i = 1.46$), ethyl alcohol ($n_r = 1.36$), and $\theta_i = 8.5°$.



A) $\theta_r = 9.13°$

Use the Half-angle Formulas to find the exact value of the trigonometric function.

82) cos 165° 82) _____

A) $-\frac{1}{2}\sqrt{2+\sqrt{3}}$ B) $\frac{1}{2}\sqrt{2+\sqrt{3}}$ C) $\frac{1}{2}\sqrt{2-\sqrt{3}}$ D) $-\frac{1}{2}\sqrt{2-\sqrt{3}}$

Find the exact value of the expression.

83) $\tan\left(\tan^{-1}\frac{3}{4}+\sin^{-1}\frac{1}{2}\right)$ 83) _____

A) $\frac{9+4\sqrt{3}}{12-3\sqrt{3}}$ B) $\frac{9+4\sqrt{3}}{12-3\sqrt{3}}$

84) $\csc\left(\cos^{-1}\frac{\sqrt{3}}{2}\right)$ 84) _____

A) $\frac{1}{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{2\sqrt{3}}{3}$ D) 2

85) $\cos\left(\tan^{-1}\frac{\sqrt{3}}{3}\right)$ 85) _____

A) $\frac{\sqrt{3}}{3}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) $\frac{\pi}{3}$

86) $\tan(\cos^{-1}1)$ 86) _____

A) $\frac{\sqrt{2}}{2}$ B) 0 C) -1 D) $\frac{\sqrt{3}}{2}$

87) $\sec^{-1}(-2)$ 87) _____

A) $\frac{2\pi}{3}$ B) $-\frac{2\pi}{3}$

Express the product as a sum containing only sines or cosines.

88) $\sin(5\theta)\sin(8\theta)$ 88) _____

A) $\frac{1}{2}[-\cos(3\theta)-\cos(13\theta)]$ B) $\frac{1}{2}[\cos(3\theta)-\cos(13\theta)]$

C) $\sin^2(40\theta^2)$ D) $\frac{1}{2}[\cos(13\theta)-\sin(3\theta)]$

89) $\cos(4\theta)\cos(3\theta)$ 89) _____

A) $\cos^2(12\theta^2)$ B) $\frac{1}{2}[\cos(7\theta) - \sin\theta]$

C) $\frac{1}{2}[\cos(7\theta) - \cos\theta]$ D) $\frac{1}{2}[\cos\theta + \cos(7\theta)]$

Find the inverse function f^{-1} of the function f.

90) $f(x) = 5\tan(2x)$ 90) _____

A) $f^{-1}(x) = \frac{1}{2}\tan^{-1}\left(\frac{x}{5}\right)$ B) $f^{-1}(x) = \frac{1}{5\tan(2x)}$

C) $f^{-1}(x) = 5\tan^{-1}(2x)$ D) $f^{-1}(x) = \frac{1}{5}\tan^{-1}\left(\frac{x}{2}\right)$

91) $f(x) = -\sin(x + 7) - 4$ 91) _____

A) $f^{-1}(x) = -\sin^{-1}(x - 4) + 7$ B) $f^{-1}(x) = -\sin^{-1}(x + 7) - 4$

C) $f^{-1}(x) = -\sin^{-1}(x + 4) - 7$ D) $f^{-1}(x) = \sin^{-1}(x + 4) - 7$

Solve the equation on the interval $0 \le \theta < 2\pi$.

92) $\tan\frac{\theta}{2} = \frac{\sqrt{3}}{3}$ 92) _____

A) $\frac{2\pi}{3}$ B) $\frac{\pi}{3}, \frac{4\pi}{3}$ C) $\frac{\pi}{3}$ D) $\frac{\pi}{3}, \frac{7\pi}{3}$

Find the domain of the function f and of its inverse function f^{-1}.

93) $f(x) = 4 \sin(8x)$ 93) _____

A) Domain of f: $(-\infty, \infty)$
Domain of f^{-1}: $[4, 12]$

B) Domain of f: $(-\infty, \infty)$
Domain of f^{-1}: $[-8, 8]$

C) Domain of f: $(-\infty, \infty)$
Domain of f^{-1}: $[-4, 4]$

D) Domain of f: $\left[-\frac{1}{8}, \frac{1}{8}\right]$
Domain of f^{-1}: $(-\infty, \infty)$

Express the sum or difference as a product of sines and/or cosines.

94) $\sin\frac{9\theta}{2} + \sin\frac{5\theta}{2}$ 94) _____

A) $2 \sin\frac{7\theta}{2} \sin\theta$ B) $2 \sin(7\theta)$ C) $2 \sin\frac{7\theta}{2} \cos\theta$ D) $2 \cos(7\theta) \sin\theta$

Write the trigonometric expression as an algebraic expression containing u and v.

95) $\cos(\sin^{-1} u + \cos^{-1} v)$ 95) _____

A) $uv - (\sqrt{1 - u^2})(\sqrt{1 - v^2})$
B) $v\sqrt{1 - u^2} - u\sqrt{1 - v^2}$
C) $v\sqrt{1 - u^2} + u\sqrt{1 - v^2}$
D) $uv + (\sqrt{1 - u^2})(\sqrt{1 - v^2})$

Use a calculator to solve the equation on the interval $0 \le \theta < 2\pi$. Round the answer to two decimal places.

96) $\tan\theta = 3.6$ 96) _____

A) 1.30, 1.84 B) 1.30, 4.98 C) 1.30, 2.87 D) 1.30, 4.44

97) $\cos\theta = 0.85$ 97) _____

A) 0.55, 3.70 B) 0.55, 5.73 C) 0.55, 2.59 D) 0.55, 2.13

98) $\csc\theta = -3$ 98) _____

A) 0.34, 3.48 B) -1.91, 1.23 C) -1.91, 8.19 D) 5.94, 3.48

Use the information given about the angle θ, $0 \le \theta \le 2\pi$, to find the exact value of the indicated trigonometric function.

99) $\sin\theta = \frac{2\sqrt{6}}{7}$, $\tan\theta < 0$ Find $\sin(2\theta)$. 99) _____

A) $\frac{1}{49}$ B) $\frac{-20\sqrt{6}}{49}$ C) $\frac{20\sqrt{6}}{49}$ D) $-\frac{1}{49}$

Establish the identity.

100) $\sec u + \tan u = \dfrac{\cos u}{1 - \sin u}$ 100) _____

A) $\sec u + \tan u = \dfrac{1}{\cos u} + \dfrac{\sin u}{\cos u} = \dfrac{1 + \sin u}{\cos u} = \dfrac{1 + \sin u}{\cos u} \cdot \dfrac{1 - \sin u}{1 - \sin u} = \dfrac{1 - \sin^2 u}{\cos u(1 - \sin u)} =$

$\dfrac{\cos^2 u}{\cos u(1 - \sin u)} = \dfrac{\cos u}{1 - \sin u}$

Establish the identity (use Double-Angle or Half-Angle Formulas)

101) $\sec^2 \dfrac{u}{2} = \dfrac{2 \sec u}{\sec u + 1}$ 101) _____

A) $\sec^2 \dfrac{u}{2} = \dfrac{1}{\cos^2 \dfrac{u}{2}} = \dfrac{2}{1 + \cos u} = \dfrac{2 \sec u}{\sec u + 1}$

Establish the identity.

102) $\dfrac{1 - \sec \theta}{\tan \theta} + \dfrac{\tan \theta}{1 - \sec \theta} = -2 \csc \theta$ 102) _____

A) $\dfrac{1 - \sec \theta}{\tan \theta} + \dfrac{\tan \theta}{1 - \sec \theta} = \dfrac{(1 - \sec \theta)^2 + \tan^2 \theta}{\tan \theta(1 - \sec \theta)} = \dfrac{1 - 2 \sec \theta + \sec^2 \theta + \tan^2 \theta}{\tan \theta(1 - \sec \theta)} = \dfrac{2 \sec^2 \theta - 2 \sec \theta}{\tan \theta(1 - \sec \theta)}$

$= \dfrac{2\sec \theta(\sec \theta - 1)}{\tan \theta(1 - \sec \theta)} = -\dfrac{2\sec \theta}{\tan \theta} = -\dfrac{2}{\cos \theta} \cdot \dfrac{\cos \theta}{\sin \theta} = -\dfrac{2}{\sin \theta} = -2 \csc \theta$

103) $\tan\left(\dfrac{\pi}{2} + x\right) = -\cot x$ 103) _____

A) $\tan\left(\dfrac{\pi}{2} + x\right) = \dfrac{\sin((\pi/2) + x)}{\cos((\pi/2) + x)} = \dfrac{\sin(\pi/2)\cos x + \sin x \cos(\pi/2)}{\cos(\pi/2)\cos x - \sin(\pi/2)\sin x} = \dfrac{1 \cdot \cos x + \sin x \cdot 0}{0 \cdot \cos x - 1 \cdot \sin x} = -\cot x.$

104) $\cot(x + y)\cot(x - y) = \dfrac{1 - \tan^2 x \tan^2 y}{\tan^2 x - \tan^2 y}$ 104) _____

A) $\cot(x + y)\cot(x - y) = \dfrac{1 - \tan x \tan y}{\tan x + \tan y} \cdot \dfrac{1 + \tan x \tan y}{\tan x - \tan y} = \dfrac{1 - \tan^2 x \tan^2 y}{\tan^2 x - \tan^2 y}.$

105) $\dfrac{1 + \cos u}{1 - \cos u} - \dfrac{1 - \cos u}{1 + \cos u} = 4 \cot u \csc u$ 105) _____

A) $\dfrac{1 + \cos u}{1 - \cos u} - \dfrac{1 - \cos u}{1 + \cos u} = \dfrac{(1 + \cos u)^2 - (1 - \cos u)^2}{1 - \cos^2 u} =$

$\dfrac{1 + 2\cos u + \cos^2 u - (1 - 2\cos u + \cos^2 u)}{1 - \cos^2 u} = \dfrac{4 \cos u}{\sin^2 u} = \dfrac{4 \cos u}{\sin u} \cdot \dfrac{1}{\sin u} = 4 \cot u \csc u$

106) $\frac{\sin(\alpha - \beta)}{\sin \alpha \sin \beta} = \cot \beta - \cot \alpha$ 106) _____

A) $\frac{\sin(\alpha - \beta)}{\sin \alpha \sin \beta} = \frac{\sin \alpha \cos \beta - \cos \alpha \sin \beta}{\sin \alpha \sin \beta} = \frac{\sin \alpha \cos \beta}{\sin \alpha \sin \beta} - \frac{\cos \alpha \sin \beta}{\sin \alpha \sin \beta} = \frac{\cos \beta}{\sin \beta} - \frac{\cos \alpha}{\sin \alpha} = \cot \beta - \cot \alpha$

107) $\cos(3x) = \cos^3 x - 3 \sin^2 x \cos x$ 107) _____

A) $\cos(3x) = \cos(2x + x) = \cos(2x) \cos x - \sin(2x) \sin x = (\cos^2 x - \sin^2 x) \cos x - 2 \sin x \cos x \sin x = \cos^3 x - \sin^2 x \cos x - 2 \sin^2 x \cos x = \cos^3 x - 3 \sin^2 x \cos x.$

108) $\sin \theta[\sin \theta + \sin(5\theta)] = \cos(2\theta)[\cos(2\theta) - \cos(4\theta)]$ 108) _____

A) $\sin \theta[\sin \theta + \sin(5\theta)] = \sin \theta[2 \sin(3\theta) \cos(2\theta)] = 2 \cos(2\theta)[\sin \theta \sin(3\theta)] = 2 \cos(2\theta)\left[\frac{1}{2}(\cos(2\theta) - \cos(4\theta))\right] = \cos(2\theta)[\cos(2\theta) - \cos(4\theta)]$

B) $\frac{\cos(\alpha + \beta)}{\cos \alpha \sin \beta}$

C) $\frac{\sin(\alpha + \beta)}{\cos \alpha \sin \beta}$

D) $\frac{\sin(\alpha - \beta)}{\cos \alpha \sin \beta}$

109) $1 - \frac{\cos^2 u}{1 - \sin u} = - \sin u$ 109) _____

A) $1 - \frac{\cos^2 u}{1 - \sin u} = 1 - \frac{1 - \sin^2 u}{1 - \sin u} = 1 - \frac{(1 - \sin u)(1 + \sin u)}{1 - \sin u} = 1 - (1 + \sin u) = - \sin u$

Solve the problem.

110) A plane flying a straight course observes a mountain at a bearing of 32.5° to the right of its course. At that time the plane is 7 kilometers from the mountain. A short time later, the bearing to the mountain becomes 42.5°. How far is the plane from the mountain when the second bearing is taken (to the nearest tenth of a km)? 110) _____

A) 8.8 km B) 5.6 km C) 9.8 km D) 3.7 km

111) Two sailboats leave a harbor in the Bahamas at the same time. The first sails at 22 mph in a direction 340°. The second sails at 30 mph in a direction 200°. Assuming that both boats maintain speed and heading, after 4 hours, how far apart are the boats? 111) _____

A) 132.5 mi B) 147.4 mi C) 195.8 mi D) 152.8 mi

112) John (whose line of sight is 6 ft above horizontal) is trying to estimate the height of a tall oak tree. He first measures the angle of elevation from where he is standing as 35°. He walks 30 feet closer to the tree and finds that the angle of elevation has increased by 12°. Estimate the height of the tree rounded to the nearest whole number. 112) _____

A) 90 ft B) 86 ft C) 61 ft D) 67 ft

113) Two tracking stations are on the equator 140 miles apart. A weather balloon is located on a bearing of N 41°E from the western station and on a bearing of N 20°E from the eastern station. How far is the balloon from the western station? Round to the nearest mile. 113) _____

A) 342 mi B) 367 mi C) 333 mi D) 376 mi

114) From the edge of a 1000-foot cliff, the angles of depression to two cars in the valley below are 21° and 28°. How far apart are the cars? Round your answers to the nearest 0.1 ft. 114) _____

A) 724.4 ft B) 724.5 ft C) 713.4 ft D) 714.4 ft

115) A tree casts a shadow of 26 meters when the angle of elevation of the sun is 24°. Find the height of the tree to the nearest meter. 115) _____

A) 12 m B) 10 m C) 13 m D) 11 m

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.

116) B = 28°, b = 2, a = 27 116) _____

A) one triangle
A = 26°, C = 125°, c = 29

B) one triangle
A = 27°, C = 126°, c = 30.5

C) one triangle
A = 24°, C = 127°, c = 26

D) no triangle

117) B = 41°, a = 4, b = 3 117) _____

A) two triangles
$A_1 = 61°, C_1 = 78°, c_1 = 0.1;$
$A_2 = 119°, C_2 = 20°, c_2 = 0.1$

B) one triangle
A = 29°, C = 110°, c = 5.7

C) two triangles
$A_1 = 61°, C_1 = 78°, c_1 = 4.5;$
$A_2 = 119°, C_2 = 20°, c_2 = 1.6$

D) no triangle

Find the sum of the arithmetic series.

118) -16 - 11 - 6 - 1 + ... + 39 118) _____

A) 44 B) 138 C) 108 D) 118

Find an explicit rule for the nth term of the arithmetic sequence.

119) 8, 18, 28, 38, ... 119) _____

A) $a_n = 8 - 10(n-1)$ B) $a_n = 8 + 10(n)$

C) $a_n = 8 + 10(n-1)$ D) $a_n = 8 - 10(n)$

Expand the binomial.

120) $(4x + 1)^5$ 120) _____

A) $1024x^5 + 256x^4 + 64x^3 + 16x^2 + 4x + 1$ B) $1024x^5 + 1280x^4 + 640x^3 + 160x^2 + 20x + 1$

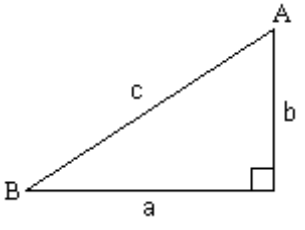
C) $(16x^2 + 8x + 1)^5$ D) $1024x^5 + 20x^4 + 160x^3 + 160x^2 + 20x + 1$

Find the sum of the geometric series.

121) $\frac{4}{3} + \frac{16}{3} + \frac{64}{3} + \frac{256}{3} + \frac{1024}{3}$ 121) _____

A) $\frac{272}{3}$ B) $\frac{1360}{3}$ C) $\frac{1364}{3}$ D) $\frac{1364}{15}$

Solve the right triangle using the information given. Round answers to two decimal places, if necessary.



122) a = 2, A = 40°; Find b, c, and B. 122) _____

A) b = 2.38
c = 4.11
B = 50°

B) b = 2.38
c = 3.11
B = 50°

C) b = 2.38
c = 3.11
B = 60°

D) b = 2.38
c = 4.11
B = 60°

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.

123) A = 85°, a = 6, b = 9 123) _____

A) one triangle
A = 43°, C = 52°, c = 15

B) one triangle
B = 42°, C = 53°, c = 17

C) one triangle
B = 44°, C = 51°, c = 19

D) no triangle

Solve the triangle.

124) a = 60, b = 12, C = 105° 124) _____

A) c = 64.16, A = 64.6°, B = 10.4°

B) c = 67.06, A = 66.6°, B = 8.4°

C) c = 69.96, A = 62.6°, B = 12.4°

D) no triangle

125) a = 19, b = 16, c = 11 125) _____

A) A = 35.3°, B = 57.3°, C = 87.4°

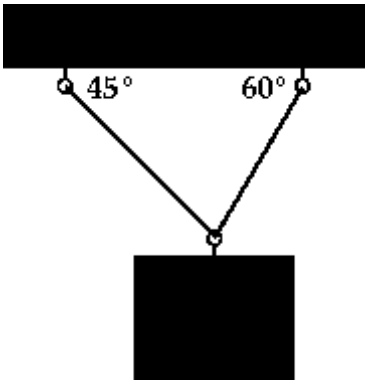
B) A = 57.3°, B = 87.4°, C = 35.3°

C) A = 87.4°, B = 57.3°, C = 35.3°

D) A = 87.4°, B = 35.3°, C = 57.3°

Solve the problem.

126) A box of supplies that weighs 1500 kilograms is suspended by two cables as shown in the figure. To two decimal places, what is the tension in the two cables? 126) _____



A) Tension in right cable: 723.54 kg; tension in left cable: 776.46 kg
B) Tension in right cable: 776.46 kg; tension in left cable: 1098.08 kg
C) Tension in right cable: 776.46 kg; tension in left cable: 723.54 kg
D) Tension in right cable: 1098.08 kg; tension in left cable: 776.46 kg

127) Two forces, F_1 of magnitude 60 newtons (N) and F_2 of magnitude 70 newtons, act on an object at angles of 40° and 130° (respectively) with the positive x-axis. Find the direction and magnitude of the resultant force; that is, find $F_1 + F_2$. Round the direction and magnitude to two decimal places. 127) _____

A) Direction: 89.40°; magnitude: 10.30 N
B) Direction: 89.40°; magnitude: 92.20 N
C) Direction: 80.60°; magnitude: 65.00 N
D) Direction: 80.60°; magnitude: 92.20 N

Write the vector v in the form ai + bj, given its magnitude $\|v\|$ and the angle α it makes with the positive x-axis.

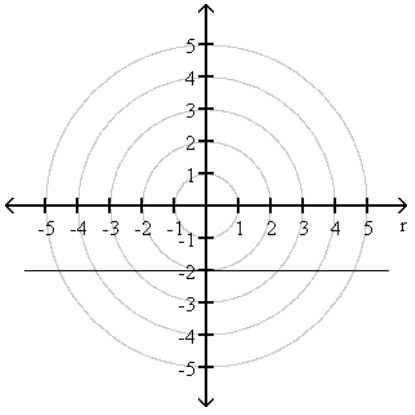
128) $\|v\| = 11$, $\alpha = 60°$ 128) _____

A) $v = \frac{\sqrt{2}}{2}i + \frac{\sqrt{2}}{2}j$
B) $v = -\frac{11}{2}i - \frac{11\sqrt{3}}{2}j$
C) $v = \frac{11}{2}i + \frac{11\sqrt{3}}{2}j$
D) $v = \frac{11\sqrt{3}}{2}i + \frac{11}{2}j$

129) $\|v\| = 12$, $\alpha = 90°$ 129) _____

A) v = 12i + 12j
B) v = 12j
C) v = 12i
D) v = 12i - 12j)

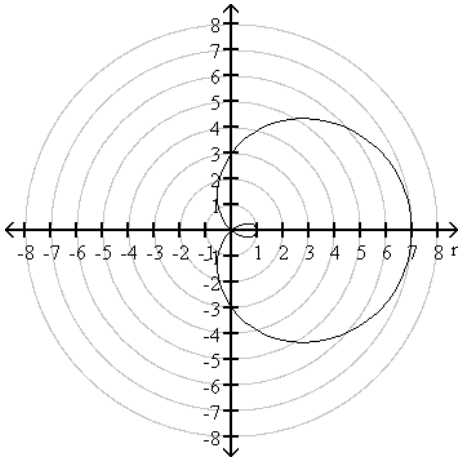
Match the graph to one of the polar equations.

130) 

130) _____

A) $r = -4 \sin \theta$ B) $r = -2$ C) $r = -4 \cos \theta$ D) $r \sin \theta = -2$

The polar equation of the graph is either $r = a + b \cos \theta$ or $r = a + b \sin \theta$, $a > 0$, $b > 0$. Match the graph to one of the equations.

131) 

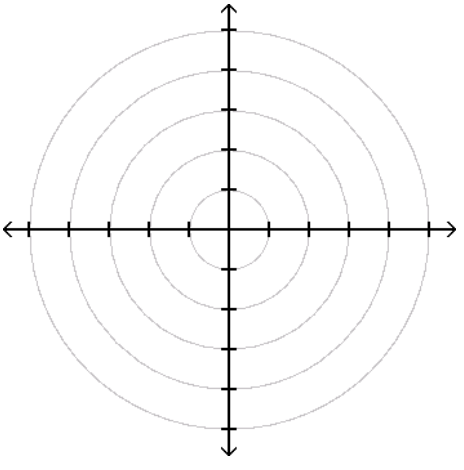
131) _____

A) $r = 3 + 4 \sin \theta$ B) $r = 4 + 3 \cos \theta$ C) $r = 3 + 4 \cos \theta$ D) $r = 4 + 3 \sin \theta$

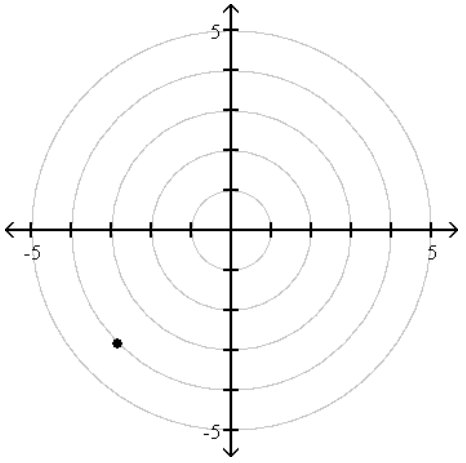
Plot the point given in polar coordinates.

132) (4, -135°)

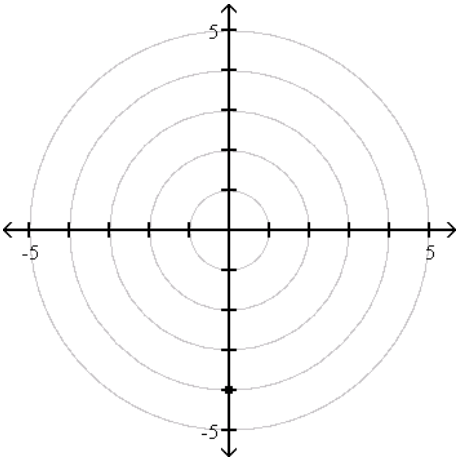
132) _____



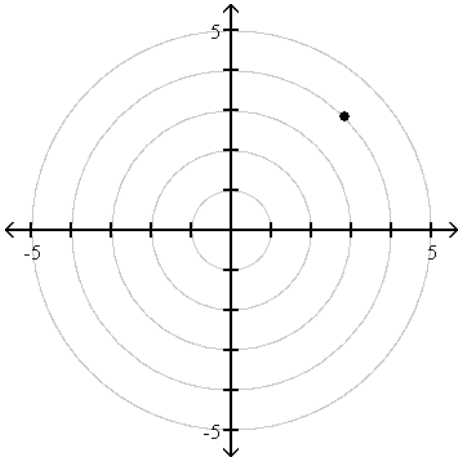
A)



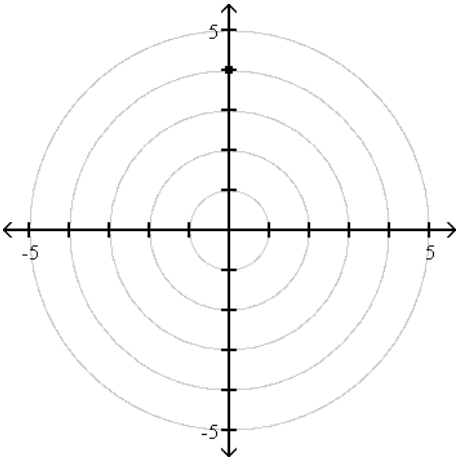
B)



C)

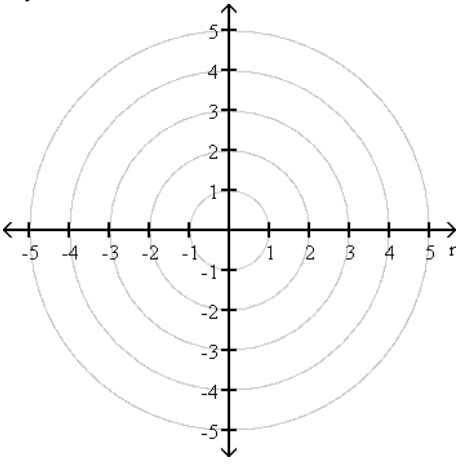


D)

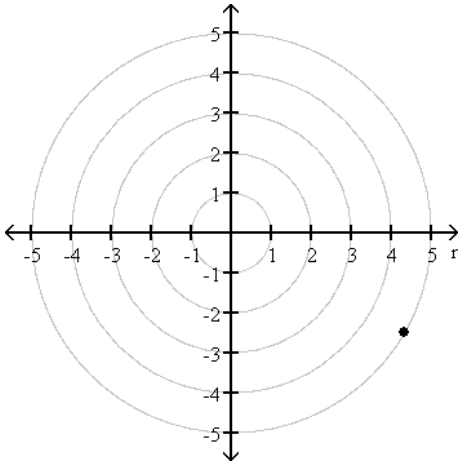


133) $\left(5, \frac{5\pi}{3}\right)$

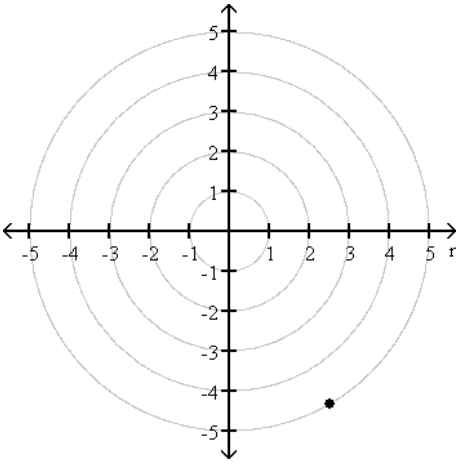
133) _____



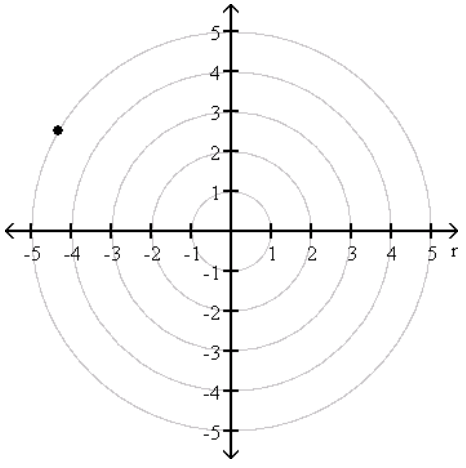
A)



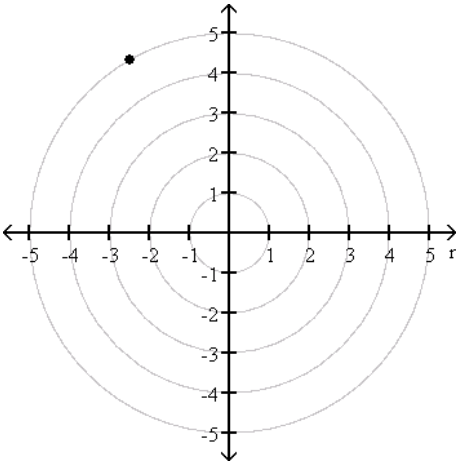
B)



C)



D)



The letters r and θ represent polar coordinates. Write the equation using rectangular coordinates (x, y).

134) $r = 10 \sin \theta$ 134) _____

A) $x^2 + y^2 = 10x$ B) $\sqrt{x^2 + y^2} = 10x$ C) $\sqrt{x^2 + y^2} = 10y$ D) $x^2 + y^2 = 10y$

Find the angle between v and w. Round your answer to one decimal place, if necessary.

135) $v = -5i + 7j, \quad w = -6i - 4j$ 135) _____

A) 20.7° B) 110.8° C) 88.2° D) 90.9°

The letters x and y represent rectangular coordinates. Write the equation using polar coordinates (r, θ).

136) $x^2 = 3y$ 136) _____

A) $r \sin^2 \theta = 3 \cos \theta$ B) $r \cos^2 \theta = 3 \sin \theta$

C) $3 \cos^2 \theta = r \sin \theta$ D) $3 \sin^2 \theta = r \cos \theta$

Test the equation for symmetry with respect to the specified axis, line, or pole.

137) $r = 2 \sin(3\theta)$; the line $\theta = \frac{\pi}{2}$ 137) _____

A) May or may not be symmetric with respect to the line $\theta = \frac{\pi}{2}$

B) Symmetric with respect to the line $\theta = \frac{\pi}{2}$

Find the indicated quantity.

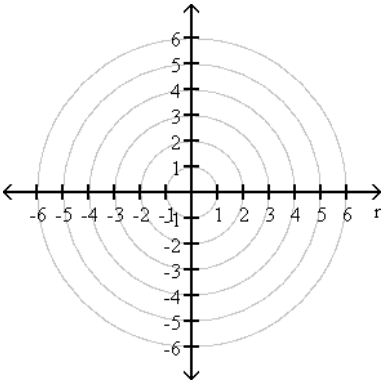
138) Find $u - v$ given $u = -10i - 2j$ and $v = 7i + 7j$. 138) _____

A) $-17i - 9j$ B) $-3i + 5j$ C) $-19i + 5j$ D) $-18i + 5j$

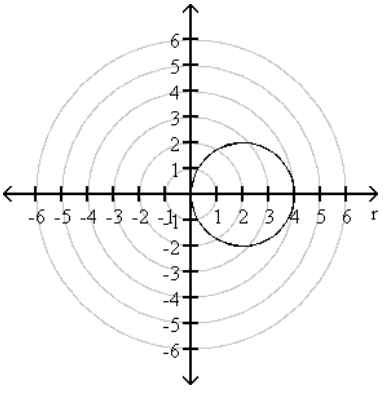
Transform the polar equation to an equation in rectangular coordinates. Then identify and graph the equation.

139) $r = 4 \sin \theta$ 139) _____

A)



B)



$x^2 + (y - 2)^2 = 4$; circle, radius 2, center at (0, 2) in rectangular coordinates

$(x - 2)^2 + y^2 = 4$; circle, radius 2, center at (2, 0) in rectangular coordinates

Solve the problem.

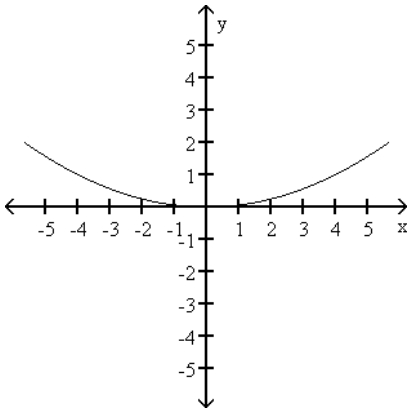
140) An experimental model for a suspension bridge is built in the shape of a parabolic arch. In one section, cable runs from the top of one tower down to the roadway, just touching it there, and up again to the top of a second tower. The towers stand 70 inches apart. At a point between the towers and 21 inches along the road from the base of one tower, the cable is 1.96 inches above the roadway. Find the height of the towers. 140) _____

A) 11.75 in. B) 12.75 in. C) 14.25 in. D) 12.25 in.

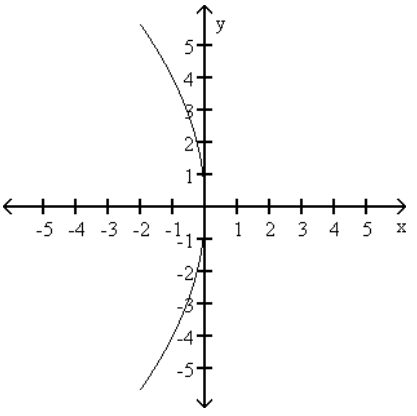
Match the equation to its graph.

141) $y^2 = 16x$ 141) _____

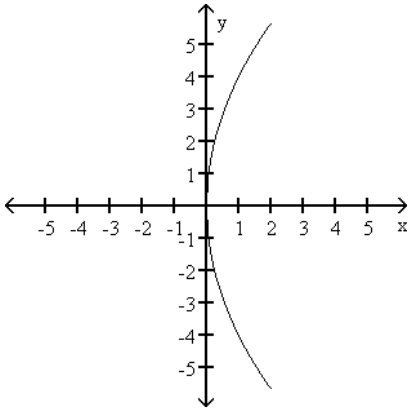
A)



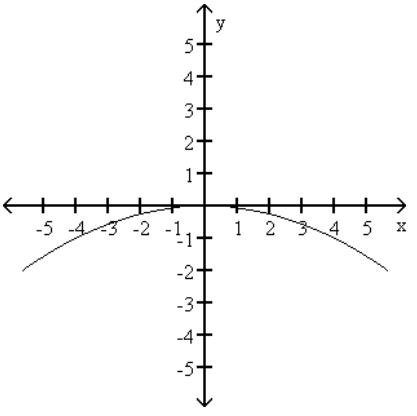
B)



C)



D)



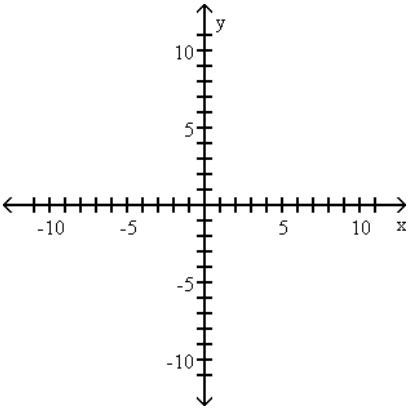
Find an equation for the ellipse.

142) Center at (0, 0); focus at (-4, 0); vertex at (6, 0) 142) _____

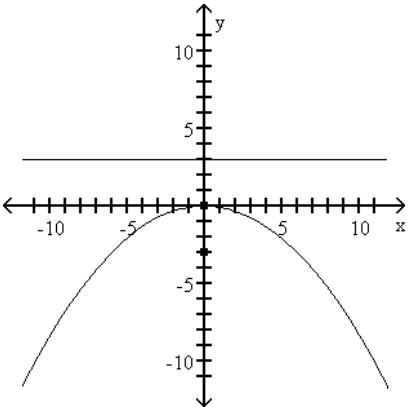
A) $\frac{x^2}{16} + \frac{y^2}{20} = 1$ B) $\frac{x^2}{36} + \frac{y^2}{20} = 1$ C) $\frac{x^2}{16} + \frac{y^2}{36} = 1$ D) $\frac{x^2}{20} + \frac{y^2}{36} = 1$

Find the vertex, focus, and directrix of the parabola. Graph the equation.

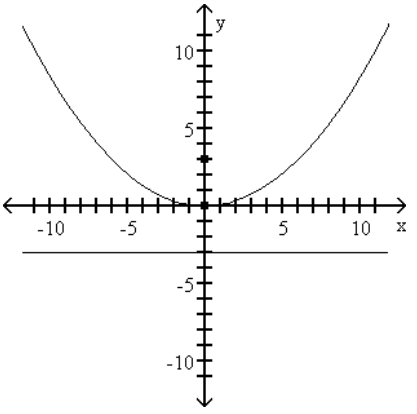
143) $y^2 = 12x$ 143) _____



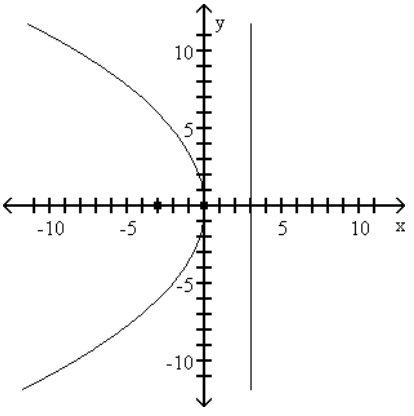
A) vertex: (0, 0)
focus: (0, 3)
directrix: y = -3



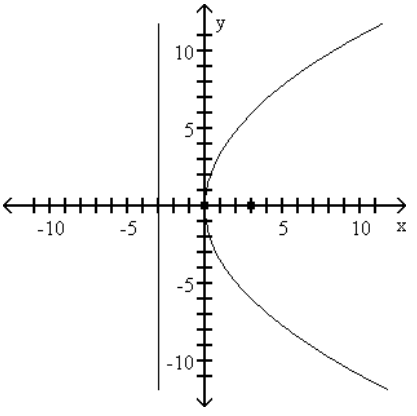
B) vertex: (0, 0)
focus: (0, 3)
directrix: y = -3



C) vertex: (0, 0)
focus: (-3, 0)
directrix: x = 3



D) vertex: (0, 0)
focus: (3, 0)
directrix: x = -3



Find the foci and vertices of the ellipse.

144) $25x^2 + 64y^2 = 1600$ 144) _____

A) foci at (-8, 0) and (8, 0)
vertices at (-64, 0), (64, 0)

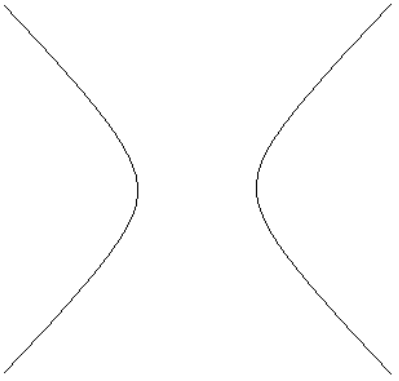
B) foci at (0, -5) and (0, 5)
vertices at (0, -25), (0, 25)

C) foci at $(0, -\sqrt{39})$ and $(0, \sqrt{39})$
vertices at (0, -8), (0, 8)

D) foci at $(-\sqrt{39}, 0)$ and $(\sqrt{39}, 0)$
vertices at (-8, 0), (8, 0)

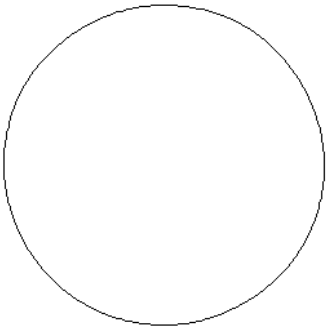
Name the conic.

145) 145) _____



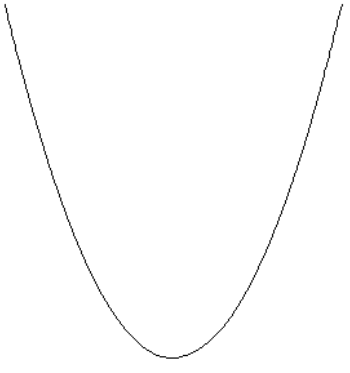
A) ellipse B) parabola C) hyperbola D) circle

146) 146) _____



A) circle B) hyperbola C) parabola D) ellipse

147) 147) _____

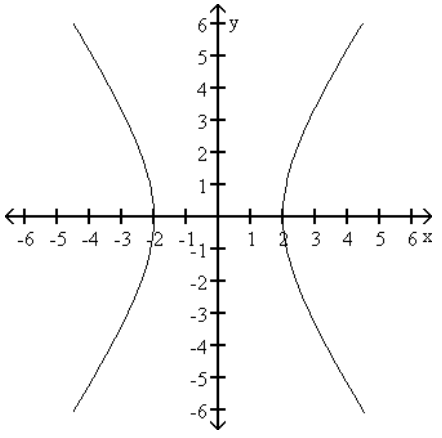


A) circle B) parabola C) ellipse D) hyperbola

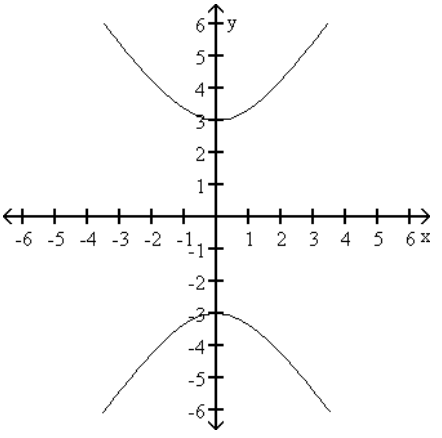
Match the equation to the graph.

148) $\frac{x^2}{4} - \frac{y^2}{9} = 1$ 148) _____

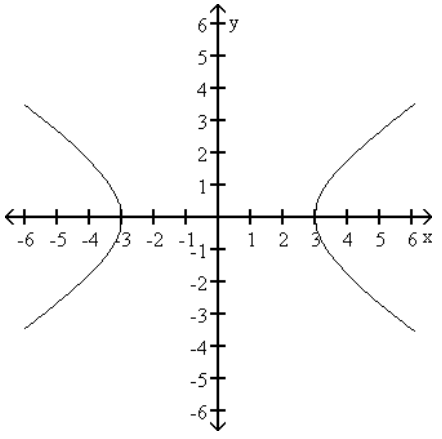
A)



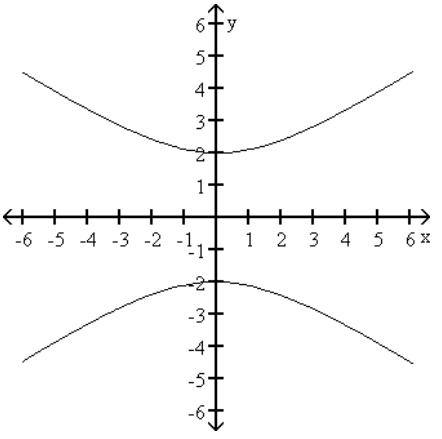
B)



C)

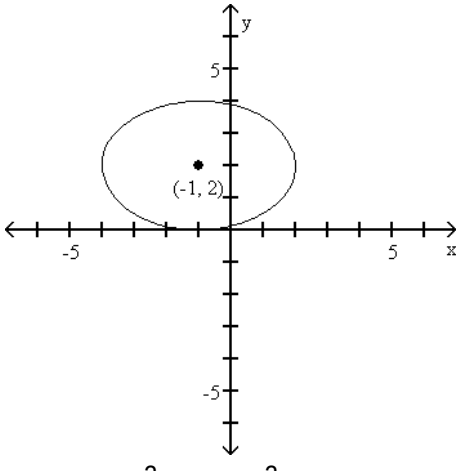


D)



Write an equation for the graph.

149) 149) _____



A) $\frac{(x + 1)^2}{9} + \frac{(y - 2)^2}{4} = 1$

B) $\frac{(x - 2)^2}{9} + \frac{(y + 1)^2}{4} = 1$

C) $\frac{(x + 1)^2}{4} + \frac{(y - 2)^2}{9} = 1$

D) $\frac{(x - 1)^2}{9} + \frac{(y + 2)^2}{4} = 1$

Find an equation for the hyperbola described.

150) Vertices at (±2, 0); foci at (±3, 0) 150) _____

A) $\frac{x^2}{4} - \frac{y^2}{5} = 1$ B) $\frac{x^2}{5} - \frac{y^2}{4} = 1$ C) $\frac{x^2}{9} - \frac{y^2}{4} = 1$ D) $\frac{x^2}{4} - \frac{y^2}{9} = 1$