

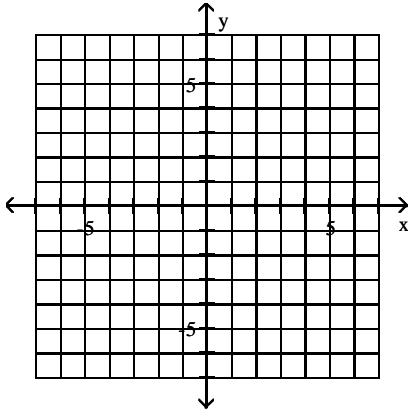
Precalculus Review

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

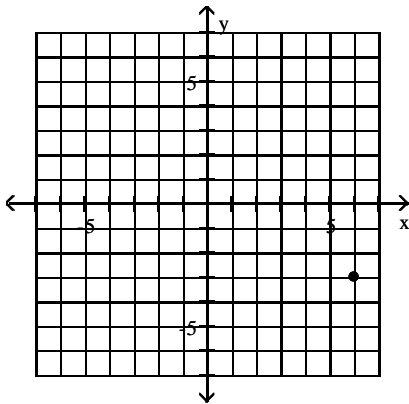
Plot the point in the xy -plane. Tell in which quadrant or on what axis the point lies.

1) $(6, 3)$

1) _____

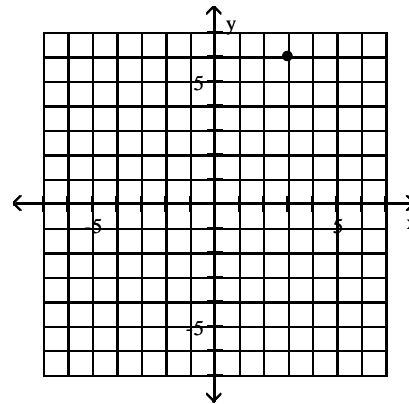


A)



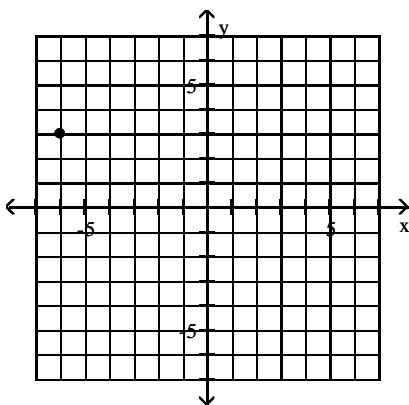
Quadrant IV

B)



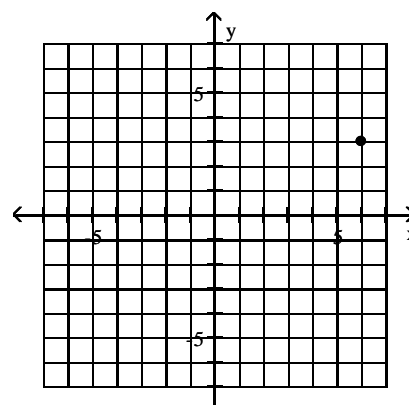
Quadrant I

C)



Quadrant II

D)



Quadrant I

Find the midpoint of the line segment joining the points P_1 and P_2 .

2) $P_1 = (8, 3); P_2 = (6, 1)$

A) (2, 2)

B) (7, 2)

C) (14, 4)

D) (2, 7)

2) _____

Determine whether the given point is on the graph of the equation.

3) Equation: $y = x^4 - \sqrt{x}$

Point: (-4, 254)

A) Yes

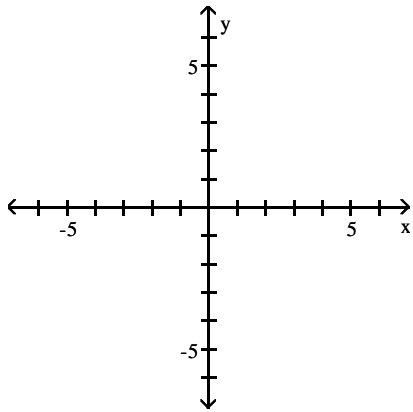
B) No

3) _____

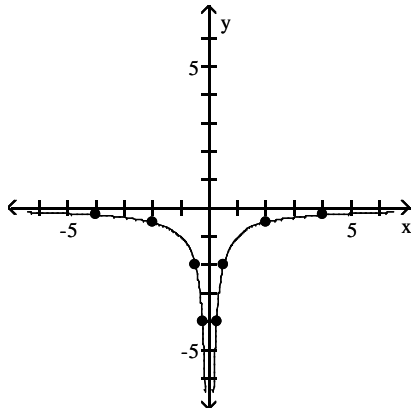
Graph the equation by plotting points.

4) $y = \frac{1}{x}$

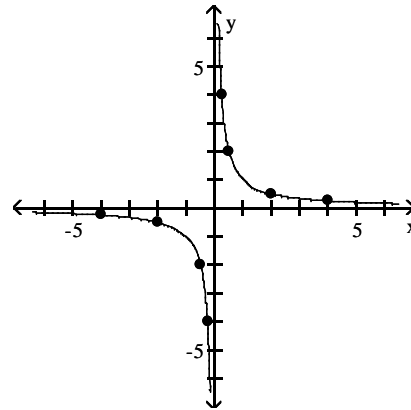
4) _____



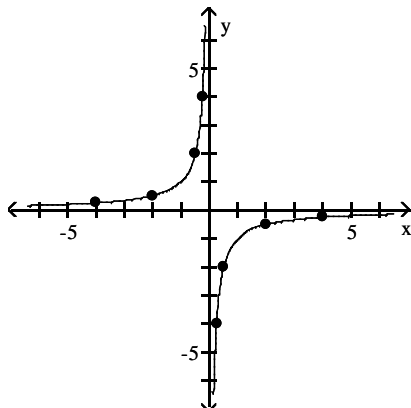
A)



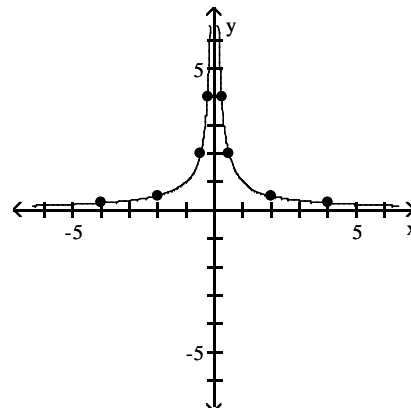
B)



C)



D)



Determine whether the relation represents a function. If it is a function, state the domain and range.

5) $\{(11, -4), (-5, -3), (-5, 0), (4, 3), (20, 5)\}$

A) function

domain: $\{11, 4, -5, 20\}$

range: $\{-4, -3, 0, 3, 5\}$

B) function

domain: $\{-4, -3, 0, 3, 5\}$

range: $\{11, 4, -5, 20\}$

C) not a function

5) _____

Find the value for the function.

6) Find $f(-2)$ when $f(x) = x^2 - 5x - 1$.

A) 15

B) -7

C) -5

D) 13

6) _____

Find the domain of the function.

7) $f(x) = -4x + 4$

A) $\{x \mid x \neq 0\}$

C) $\{x \mid x \geq -4\}$

B) $\{x \mid x > 0\}$

D) all real numbers

7) _____

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

8) $f(x) = \frac{-x^3}{2x^2 - 9}$

A) even

B) odd

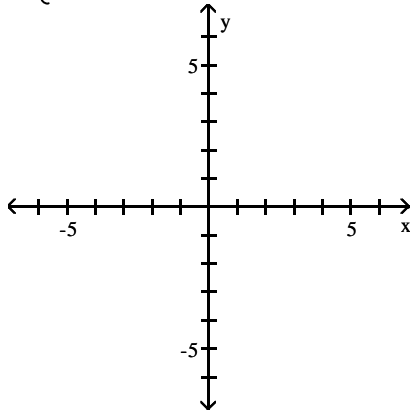
C) neither

8) _____

Graph the function.

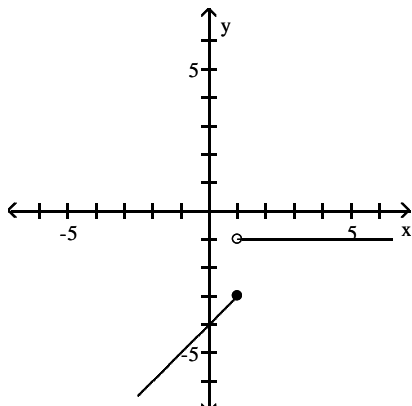
9)

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

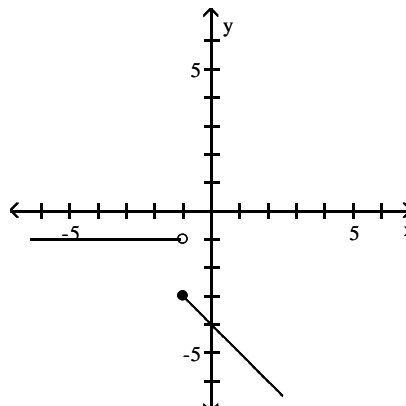


9) _____

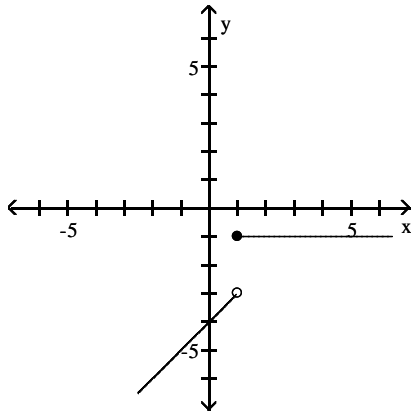
A)



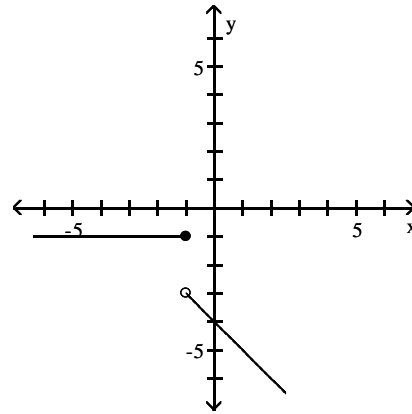
B)



C)



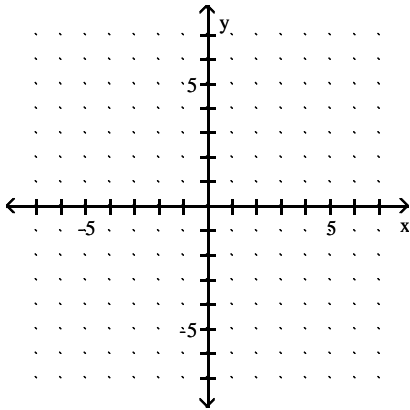
D)



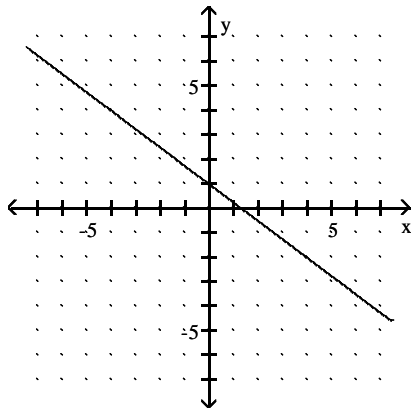
Use the slope and y-intercept to graph the linear function.

10) $h(x) = -\frac{3}{4}x + 1$

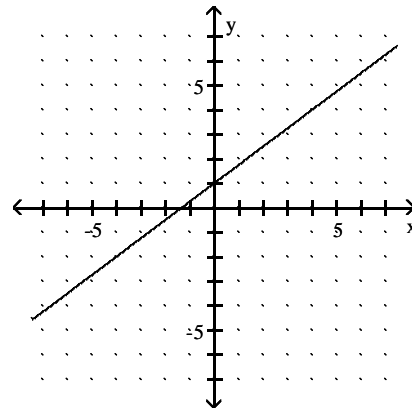
10) _____

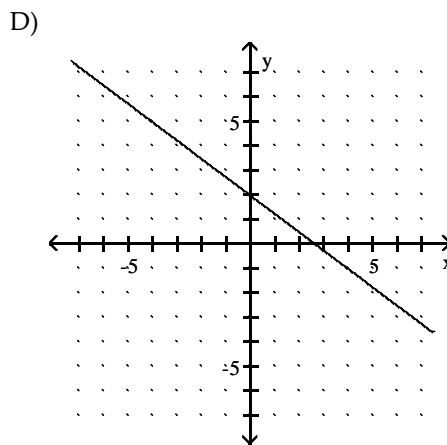
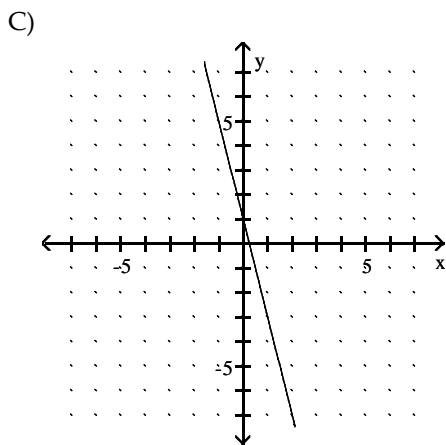


A)



B)





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

11) $f(x) = 7x^3 + 7x^2 + 9$

- A) Yes; degree 6
C) Yes; degree 5

- B) No; the last term has no variable
D) Yes; degree 3

11) _____

Find the domain of the rational function.

12) $R(x) = \frac{x+6}{x^4-49}$

- A) $\{x \mid x \neq -7, x \neq 7, x \neq -6\}$
C) $\{x \mid x \neq -7, x \neq 7\}$

- B) $\{x \mid x \neq 0, x \neq 49\}$
D) all real numbers

12) _____

Solve the inequality. Express the solution using interval notation.

13) $(x+2)^2(x+8) > 0$

- A) $(-\infty, -8)$ or $(8, \infty)$
C) $(-\infty, -8)$

- B) $(-\infty, -8]$
D) $(-8, \infty)$

13) _____

For the given functions f and g , find the requested composite function value.

14) $f(x) = \sqrt{x+3}$, $g(x) = 2x$; Find $(f \circ g)(4)$.

A) $2\sqrt{7}$

B) $\sqrt{11}$

C) $2\sqrt{14}$

D) $\sqrt{14}$

14) _____

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

15) $2.52^{1.55}$

A) 4.190

B) 10.269

C) 3.906

D) 3.017

15) _____

16) $4.55^{2.319}$

A) 10.551

B) 45.932

C) 986.170

D) 33.568

16) _____

Solve the equation.

17) $3^1 + 2x = 27$

A) $\{3\}$

B) $\{9\}$

C) $\{1\}$

D) $\{-1\}$

17) _____

Change the exponential expression to an equivalent expression involving a logarithm.

18) $3^{-2} = \frac{1}{9}$

18) _____

A) $\log_{-2} \frac{1}{9} = 3$

B) $\log_3 \frac{1}{9} = -2$

C) $\log_{1/9} 3 = -2$

D) $\log_3 -2 = \frac{1}{9}$

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

19) $\ln e^{\sqrt{7}}$

19) _____

A) 49

B) e

C) $\sqrt{7}$

D) 7

Solve the equation.

20) $\log_2 x = 3$

20) _____

A) {9}

B) {1.58}

C) {6}

D) {8}

In the problem, t is a real number and $P = (x, y)$ is the point on the unit circle that corresponds to t . Find the exact value of the indicated trigonometric function of t .

21) $(\frac{4}{7}, \frac{\sqrt{33}}{7})$ Find $\sin t$.

21) _____

A) $\frac{4\sqrt{33}}{33}$

B) $\frac{\sqrt{33}}{7}$

C) $\frac{\sqrt{33}}{4}$

D) $\frac{4}{7}$

Solve the problem.

22) For what numbers x , $0 \leq x \leq 2\pi$, does $\sin x = 0$?

22) _____

A) 0, 1

B) 0, 1, 2

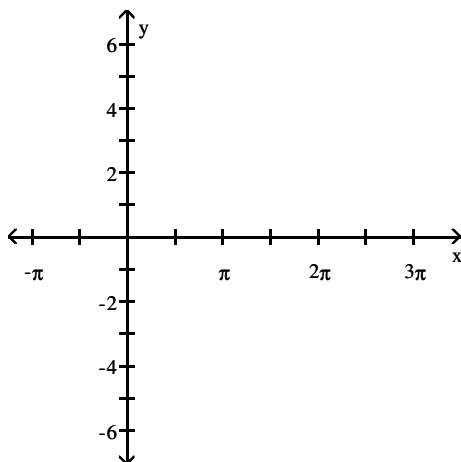
C) 0, π , 2π

D) $\frac{\pi}{2}$, $\frac{3\pi}{2}$

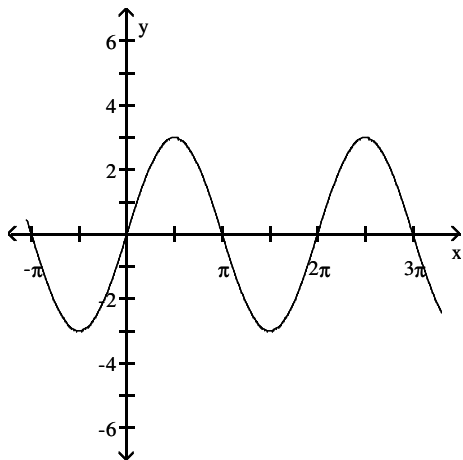
Use transformations to graph the function.

23) $y = -3 \sin x$

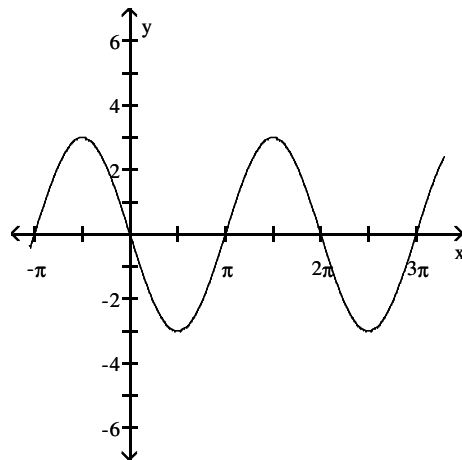
23) _____



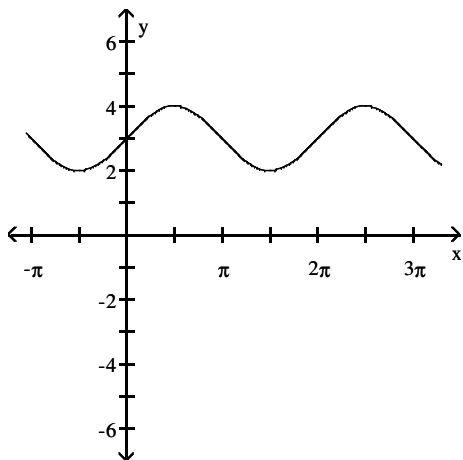
A)



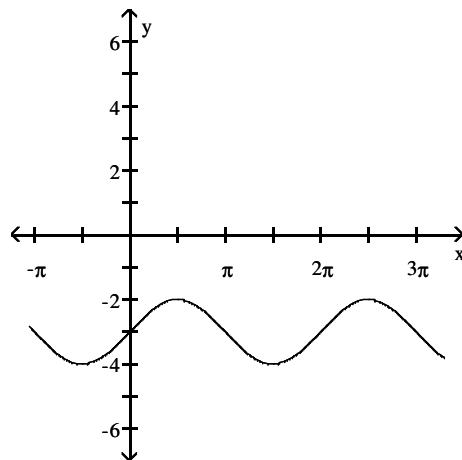
B)



C)



D)



Solve the problem.

24) For what numbers x , $0 \leq x \leq 2\pi$, does $\cos x = 1$?

A) $\frac{\pi}{2}, \frac{3\pi}{2}$

B) $0, 2\pi$

C) $\frac{\pi}{2}$

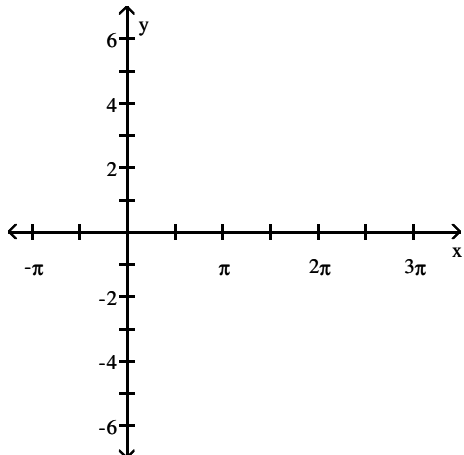
D) none

24) _____

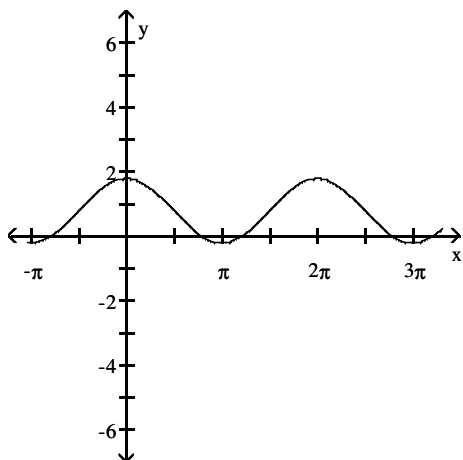
Use transformations to graph the function.

25) $y = \cos\left(\frac{\pi}{4}x\right)$

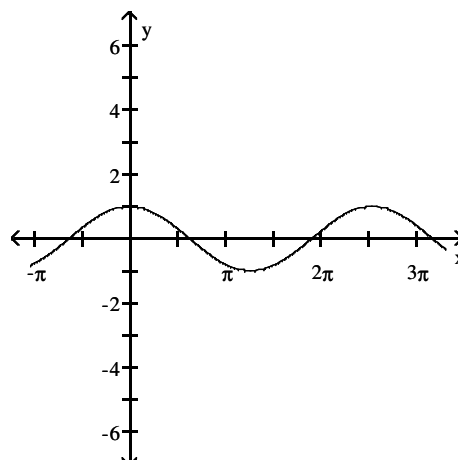
25) _____



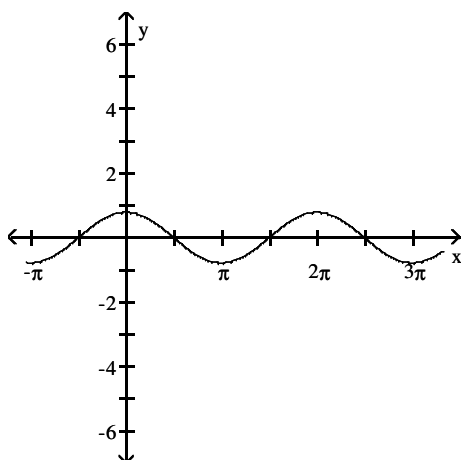
A)



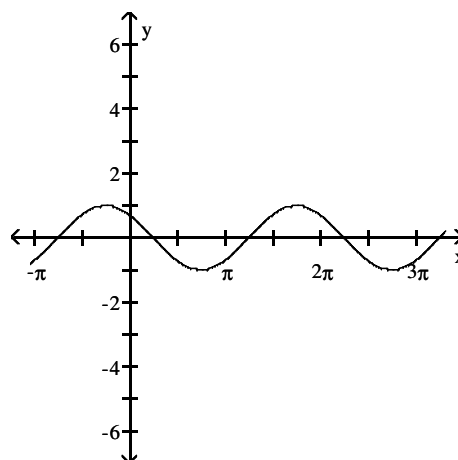
B)



C)



D)



Without graphing the function, determine its amplitude or period as requested.

26) $y = -2 \sin \frac{1}{3}x$ Find the amplitude.

26) _____

A) 6π

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

C) $\frac{\pi}{2}$

D) 2

27) $y = 3 \cos \frac{1}{2}x$ Find the period.

27) _____

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

B) 4π

C) 3

D) $\frac{\pi}{2}$

In the problem, t is a real number and $P = (x, y)$ is the point on the unit circle that corresponds to t . Find the exact value of the indicated trigonometric function of t .

28) $(\frac{4}{9}, -\frac{\sqrt{65}}{9})$ Find $\csc t$.

28) _____

A) $-\frac{9\sqrt{65}}{65}$

B) $-\frac{\sqrt{65}}{9}$

C) $\frac{\sqrt{65}}{9}$

D) $\frac{\sqrt{65}}{4}$

Find the exact value. Do not use a calculator.

29) $\sec(-\pi)$

A) 0

B) -1

C) 1

D) undefined

29) _____

Find the exact value of the expression if $\theta = 45^\circ$. Do not use a calculator.

30) $g(\theta) = \sin \theta$ Find $6g(\theta)$.

A) $-6\sqrt{2}$

B) $3\sqrt{2}$

C) $-3\sqrt{2}$

D) $6\sqrt{2}$

30) _____

Find the exact value. Do not use a calculator.

31) $\cot \frac{\pi}{3}$

A) 1

B) $\frac{1}{2}$

C) $\frac{\sqrt{3}}{3}$

D) $\sqrt{3}$

31) _____

32) $\cot 570^\circ$

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

B) $\frac{\sqrt{3}}{3}$

C) $\sqrt{3}$

D) $-\sqrt{3}$

32) _____

Find the exact value of the expression. Do not use a calculator.

33) $\sin 330^\circ \sin 270^\circ$

A) $-\frac{1}{2}$

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

C) $\frac{\sqrt{3}}{2}$

D) $\frac{1}{2}$

33) _____

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

34) $\csc 64^\circ$

A) 1.16

B) 1.04

C) 1.09

D) 1.11

34) _____

Solve the problem.

35) What is the range of the cosine function?

A) all real numbers greater than or equal to 0

B) all real numbers from -1 to 1, inclusive

C) all real numbers greater than or equal to 1 or less than or equal to -1

D) all real numbers

35) _____

Use the fact that the trigonometric functions are periodic to find the exact value of the expression. Do not use a calculator.

36) $\tan 1080^\circ$

A) $\frac{\sqrt{3}}{3}$

B) 1

C) 0

D) undefined

36) _____

37) $\sec \frac{19\pi}{4}$

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

B) -2

C) $-\sqrt{2}$

D) $\frac{\sqrt{2}}{2}$

37) _____

Solve the problem.

38) If $f(\theta) = \cos \theta$ and $f(a) = \frac{1}{6}$, find the exact value of $f(a) + f(a + 2\pi) + f(a + 4\pi)$. 38) _____

- A) $\frac{1}{2}$ B) $\frac{1}{2} + 6\pi$ C) $\frac{1}{6}$ D) $\frac{5}{2}$

Name the quadrant in which the angle θ lies.

39) $\sec \theta < 0$, $\tan \theta < 0$ 39) _____
A) I B) II C) III D) IV

40) $\tan \theta < 0$, $\sin \theta < 0$ 40) _____
A) I B) II C) III D) IV

41) $\cos \theta > 0$, $\csc \theta < 0$ 41) _____
A) I B) II C) III D) IV

In the problem, $\sin \theta$ and $\cos \theta$ are given. Find the exact value of the indicated trigonometric function.

42) $\sin \theta = \frac{\sqrt{7}}{4}$, $\cos \theta = \frac{3}{4}$ Find $\tan \theta$. 42) _____

- A) $\frac{\sqrt{7}}{3}$ B) $\frac{4\sqrt{7}}{7}$ C) $\frac{3\sqrt{7}}{7}$ D) $\frac{4}{3}$

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

43) $\tan 70^\circ - \frac{\sin 70^\circ}{\cos 70^\circ}$ 43) _____

- A) 1 B) 70 C) 0 D) undefined

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

44) $\tan \theta = -\frac{10}{7}$, θ in quadrant II Find $\cos \theta$. 44) _____

- A) $\frac{\sqrt{149}}{10}$ B) $-\frac{\sqrt{149}}{7}$ C) $-\frac{7\sqrt{149}}{149}$ D) $\frac{7\sqrt{149}}{149}$

45) $\sin \theta = -\frac{2}{9}$, $\tan \theta > 0$ Find $\sec \theta$. 45) _____

- A) $-\frac{2\sqrt{77}}{77}$ B) $\frac{\sqrt{9}}{2}$ C) $-\frac{\sqrt{77}}{9}$ D) $-\frac{9\sqrt{77}}{77}$

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

46) $\sec(-60^\circ)$ 46) _____

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

Solve the problem.

47) If $f(\theta) = \cos \theta$ and $f(a) = \frac{1}{5}$, find the exact value of $f(-a)$.

47) _____

A) $\frac{1}{5}$

B) $-\frac{4}{5}$

C) $-\frac{1}{5}$

D) $\frac{4}{5}$

Solve the equation.

48) $\log_3 x + \log_3(x - 24) = 4$

48) _____

A) $\{-3, 27\}$

B) $\{27\}$

C) $\{53\}$

D) \emptyset

49) $2 + \log_3(2x + 5) - \log_3 x = 4$

49) _____

A) $\left\{\frac{5}{4}\right\}$

B) $\left\{\frac{1 \pm \sqrt{46}}{9}\right\}$

C) $\left\{\frac{5}{7}\right\}$

D) $\left\{\frac{1 + \sqrt{46}}{9}\right\}$

Solve the problem.

50) $f(x) = \log_3(x + 1)$ and $g(x) = \log_3(2x - 7)$.

50) _____

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

A) $\{8\}, (8, \log_3(1))$

B) $\{8\}, (8, \log_3(8))$

C) $\{8\}, (8, \log_3(9))$

D) No solution.

Solve the equation.

51) $3^x = 27$

51) _____

A) $\{3\}$

B) $\{2\}$

C) $\{4\}$

D) $\{9\}$

Solve the problem.

52) $f(x) = 3^x + 1$ and $g(x) = 3^{-x} + 3$.

52) _____

Find the point of intersection of the graphs of f and g by solving $f(x) = g(x)$.

A) $(1, 9)$

B) $(1, 3)$

C) $(3, 1)$

D) $(9, 1)$

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

53) $e^{\log_e 2^4}$

53) _____

A) e^2

B) 4

C) 2

D) e^4

Suppose that $\ln 2 = a$ and $\ln 5 = b$. Use properties of logarithms to write each logarithm in terms of a and b .

54) $\ln 20$

54) _____

A) $2a + b$

B) $a + b$

C) $2a + 2b$

D) $4b$

Write as the sum and/or difference of logarithms. Express powers as factors.

55) $\log_9 \frac{11}{4}$

55) _____

A) $\log_9 11 + \log_9 11$

B) $\log_9 4 - \log_9 11$

C) $\log_9 11 - \log_9 4$

D) $\log_9 11 \div \log_9 4$

56) $\log_4 \sqrt{\frac{pq}{7}}$ 56) _____

A) $\frac{1}{2} \log_4 p \cdot \frac{1}{2} \log_4 q \div \frac{1}{2} \log_4 7$ B) $\frac{1}{2} \log_4 pq - \frac{1}{2} \log_4 7$

C) $\frac{1}{2} \log_4 p + \frac{1}{2} \log_4 q - \frac{1}{2} \log_4 7$ D) $\frac{1}{2} \log_4 p + \frac{1}{2} \log_4 q - \log_4 7$

Express as a single logarithm.

57) $\ln \frac{x^2 - 6x - 27}{x - 7} - \ln \frac{x^2 - 4x - 21}{x + 7} + \ln(x^2 - 18x + 81), x > 0$ 57) _____

A) $\ln \frac{(x - 9)^3}{(x - 7)^2(x + 7)}$ B) $\ln \frac{3(x - 9)}{2(x - 7)(x + 7)}$

C) $\ln \frac{3(x - 9)(x + 7)}{2(x - 7)}$ D) $\ln \frac{(x - 9)^3(x + 7)}{(x - 7)^2}$

Use the Change-of-Base Formula and a calculator to evaluate the logarithm. Round your answer to three decimal places.

58) $\log_2 60.29$ 58) _____

A) 5.914 B) 30.145 C) 0.169 D) 1.780

Use the Change-of-Base Formula and a calculator to evaluate the logarithm. Round your answer to two decimal places.

59) $\log_2 146.8$ 59) _____

A) 3.60 B) 7.20 C) 0.30 D) 0.14

Change the logarithmic expression to an equivalent expression involving an exponent.

60) $\log_5 x = 3$ 60) _____

A) $5^x = 3$ B) $x^3 = 5$ C) $5^3 = x$ D) $3^5 = x$

61) $\ln \frac{1}{e^4} = -4$ 61) _____

A) $e^{-4} = \frac{1}{e^4}$ B) $\left(\frac{1}{e^4}\right)^{-4} = e$ C) $-4e = \frac{1}{e^4}$ D) $\left(\frac{1}{e^4}\right)^e = -4$

Find the exact value of the logarithmic expression.

62) $\ln 1$ 62) _____

A) -1 B) e C) 1 D) 0

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

63) $\frac{\log 2 + \log 4}{\ln 2 - \ln 7}$ 63) _____

A) 0.240 B) -1.660 C) -0.721 D) 0.342

Find the domain of the function.

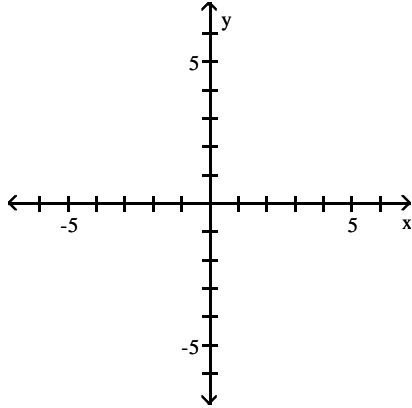
64) $f(x) = \log_{10} \left(\frac{x + 2}{x - 6} \right)$ 64) _____

A) $(-2, 6)$ B) $(-\infty, -2)$ C) $(6, \infty)$ D) $(-\infty, -2) \cup (6, \infty)$

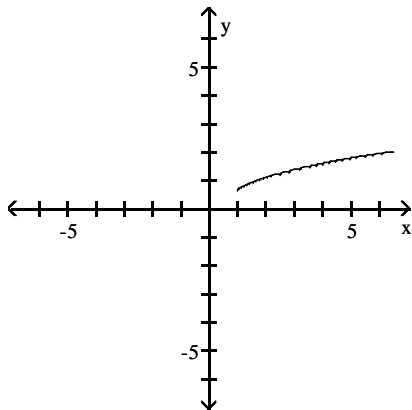
Graph the function.

65) $f(x) = 1 - \ln x$

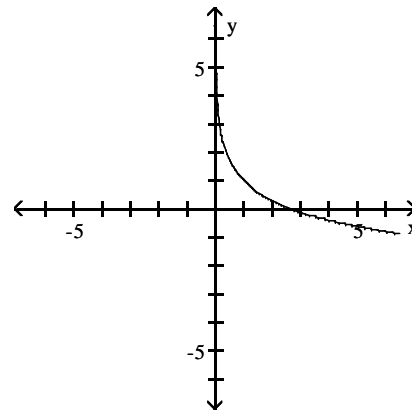
65) _____



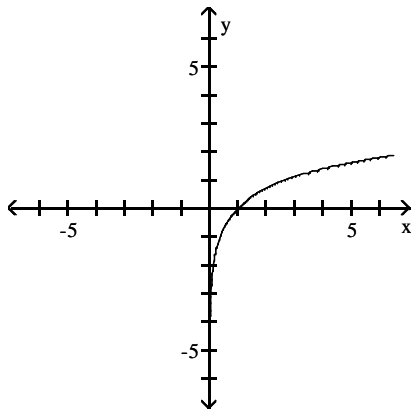
A)



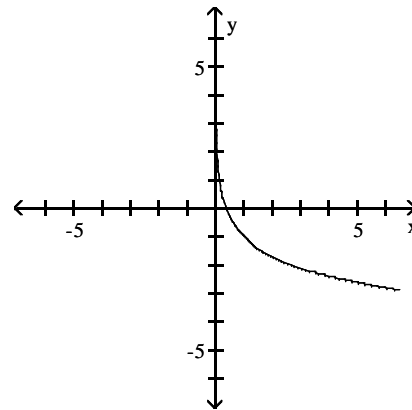
B)



C)



D)



Solve the equation.

66) $\log_4(x - 4) = -1$

66) _____

A) $\left\{\frac{17}{4}\right\}$

B) $\{-15\}$

C) $\{17\}$

D) $\left\{-\frac{15}{4}\right\}$

67) $e^{x+8} = 6$

67) _____

A) $\{e^{48}\}$

B) $\{e^6 + 8\}$

C) $\{\ln 14\}$

D) $\{\ln 6 - 8\}$

68) $9^{2x} \cdot 27(3-x) = \frac{1}{9}$

68) _____

A) $\left\{ \frac{9 + \sqrt{87}}{6}, \frac{9 - \sqrt{87}}{6} \right\}$

B) $\{-11\}$

C) $\{10\}$

D) $\{-8\}$

69) $e^x - 2 = \left(\frac{1}{e^5}\right)^{x+1}$

69) _____

A) $\left\{ -\frac{3}{4} \right\}$

B) $\left\{ \frac{1}{2} \right\}$

C) $\left\{ -\frac{7}{4} \right\}$

D) $\left\{ -\frac{1}{2} \right\}$

Solve the problem.

70) The bacteria in a 8-liter container double every 2 minutes. After 55 minutes the container is full. How long did it take to fill a quarter of the container?

70) _____

A) 27.5 min

B) 51 min

C) 41.3 min

D) 13.8 min

71) If $6^x = 5$, what does 6^{-3x} equal?

71) _____

A) 125

B) $\frac{1}{125}$

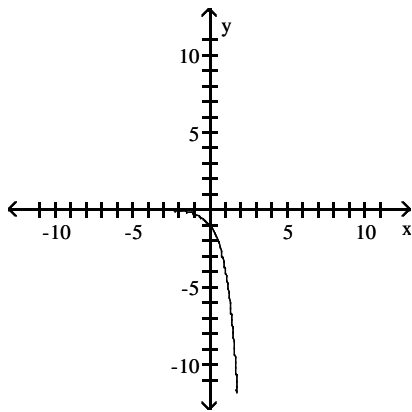
C) -125

D) $\frac{1}{15}$

The graph of an exponential function is given. Match the graph to one of the following functions

72)

72) _____



A) $f(x) = 4^{-x}$

B) $f(x) = 4^x$

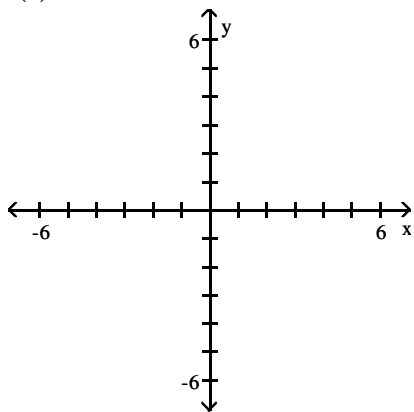
C) $f(x) = -4^{-x}$

D) $f(x) = -4^x$

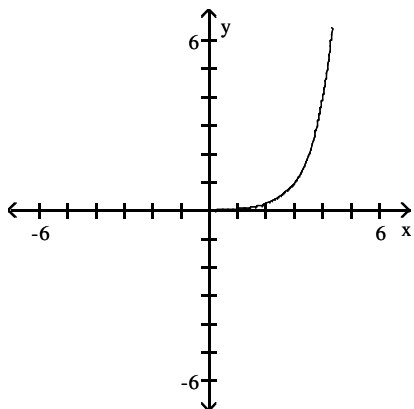
Use transformations to graph the function. Determine the domain, range, and horizontal asymptote of the function.

73) $f(x) = 4(x - 3)$

73) _____

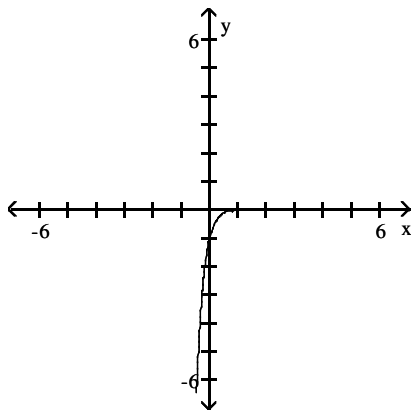


A)



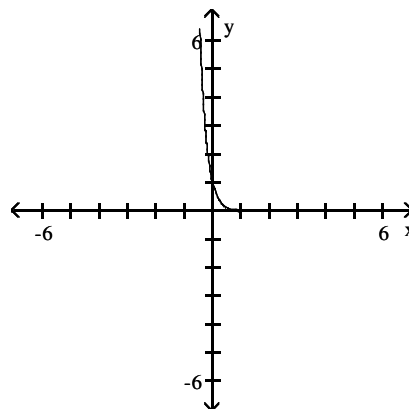
domain of $f: (-\infty, \infty)$; range of $f: (0, \infty)$
horizontal asymptote: $y = 0$

C)



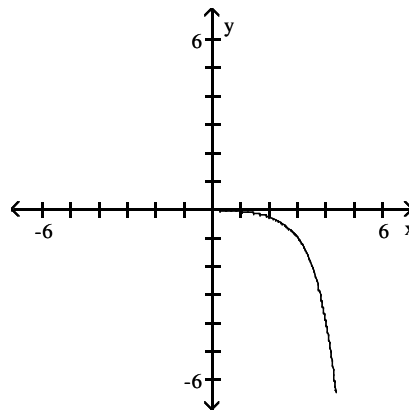
domain of $f: (-\infty, \infty)$; range of $f: (-\infty, 0)$
horizontal asymptote: $y = 0$

B)



domain of $f: (-\infty, \infty)$; range of $f: (0, \infty)$
horizontal asymptote: $y = 0$

D)



domain of $f: (-\infty, \infty)$; range of $f: (-\infty, 0)$
horizontal asymptote: $y = 0$

Solve the problem.

74) If $4^x = 5$, what does 4^{-2x} equal?

74) _____

A) $\frac{1}{25}$

B) $\frac{1}{10}$

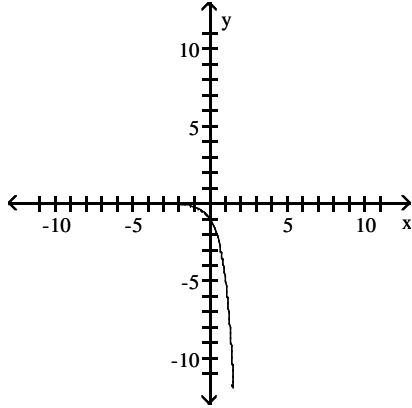
C) -25

D) 25

The graph of an exponential function is given. Match the graph to one of the following functions

75)

75) _____



A) $f(x) = 5^{-x}$

B) $f(x) = -5^x$

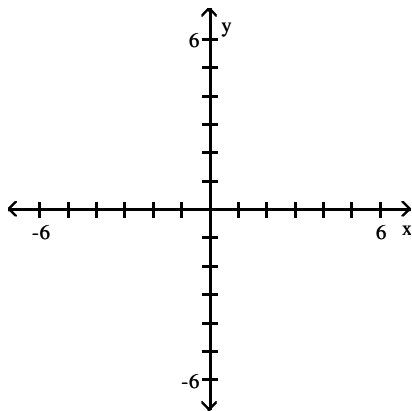
C) $f(x) = 5^x$

D) $f(x) = -5^{-x}$

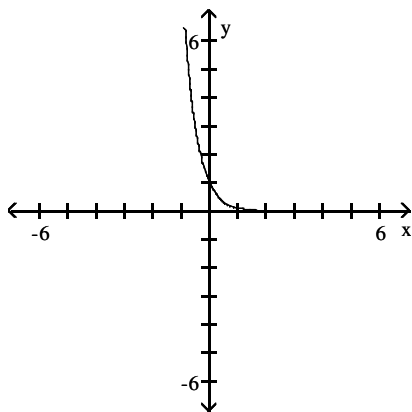
Use transformations to graph the function. Determine the domain, range, and horizontal asymptote of the function.

76) $f(x) = 3(x - 2)$

76) _____

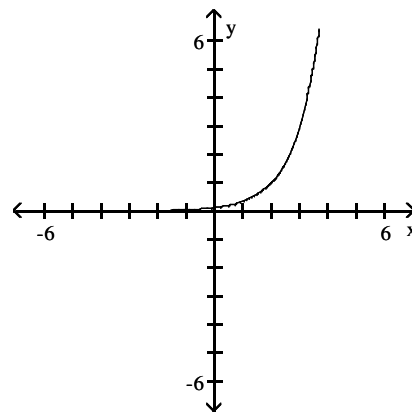


A)



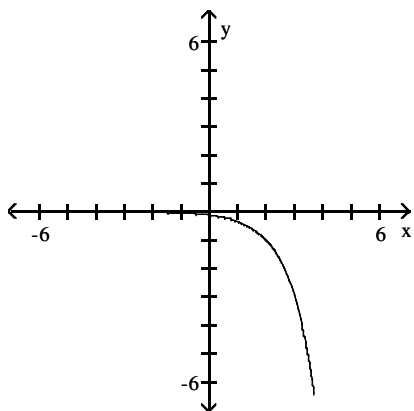
domain of $f: (-\infty, \infty)$; range of $f: (0, \infty)$
horizontal asymptote: $y = 0$

B)



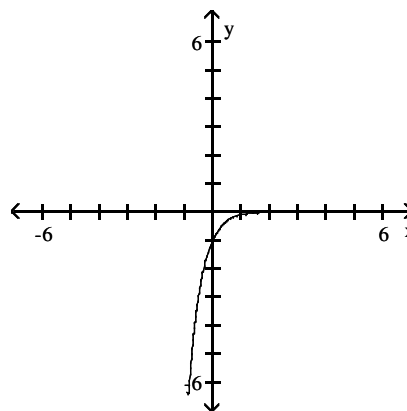
domain of $f: (-\infty, \infty)$; range of $f: (0, \infty)$
horizontal asymptote: $y = 0$

C)



domain of f : $(-\infty, \infty)$; range of f : $(-\infty, 0)$
horizontal asymptote: $y = 0$

D)



domain of f : $(-\infty, \infty)$; range of f : $(-\infty, 0)$
horizontal asymptote: $y = 0$

For the given functions f and g , find the requested composite function value.

77) $f(x) = \sqrt{x^4 + 18x^2 + 81}$, $g(x) = \frac{x+3}{3}$; Find $(f \circ g)(9)$.

77) _____

A) 31

B) 25

C) 625

D) 360

For the given functions f and g , find the requested composite function.

78) $f(x) = \frac{x-6}{2}$, $g(x) = 2x+6$; Find $(g \circ f)(x)$.

78) _____

A) $x-3$ B) x C) $x+12$ D) $2x+6$

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

79) $f(x) = \sqrt[5]{x-3}$, $g(x) = x^5 + 3$

79) _____

A) No, yes

B) No, no

C) Yes, no

D) Yes, yes

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

80) $H(x) = \sqrt[3]{x+1}$

80) _____

A) $f(x) = \sqrt[3]{x}$; $g(x) = 1$

B) $f(x) = \sqrt{x}$; $g(x) = x+1$

C) $f(x) = x+1$; $g(x) = \sqrt[3]{x}$

D) $f(x) = \sqrt[3]{x}$; $g(x) = x+1$

81) $H(x) = |8x+4|$

81) _____

A) $f(x) = |-x|$; $g(x) = 8x-4$

B) $f(x) = x$; $g(x) = 8x+4$

C) $f(x) = |x|$; $g(x) = 8x+4$

D) $f(x) = -|x|$; $g(x) = 8x+4$

Find the domain of the composite function $f \circ g$.

82) $f(x) = 6x+54$; $g(x) = x+6$

82) _____

A) $\{x \mid x \neq -6, x \neq -9\}$

B) $\{x \mid x \neq 15\}$

C) $\{x \mid x \text{ is any real number}\}$

D) $\{x \mid x \neq -15\}$

83) $f(x) = \sqrt{2-x}$; $g(x) = |2x-1|$

A) $\left\{x \mid -\frac{1}{2} \leq x \leq \frac{3}{2}\right\}$

C) all real numbers

B) $\{x \mid x \geq 2\}$

D) $\{x \mid x \leq 2\}$

83) _____

Indicate whether the function is one-to-one.

84) $\{(15, 3), (6, 9), (19, -19)\}$

A) Yes

B) No

84) _____

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

85) $\{(-8, 1), (-1, 8), (-4, -8), (4, 8)\}$

A) $\{(8, -4), (8, -1), (1, -1), (-8, 4)\}$; $D = \{(8, 8, 1, -8)\}$; $R = \{-4, -1, 4\}$

B) $\{(1, -8), (8, -1), (-8, -4), (8, 4)\}$; $D = \{1, 8, -8, 8\}$; $R = \{-8, -1, -4, 4\}$

C) $\{(8, -4), (-4, -1), (1, -8), (-8, 4)\}$; $D = \{8, -4, 1, -8\}$; $R = \{-4, -1, -8, 4\}$

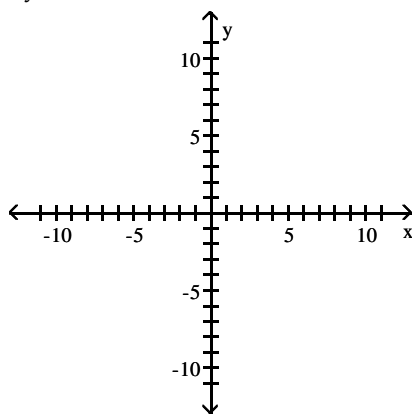
D) $\left\{(-8, 1), \left(-1, \frac{1}{8}\right), \left(-4, -\frac{1}{8}\right), \left(4, \frac{1}{8}\right)\right\}$; $D = \{-8, -1, -4, 4\}$; $R = \left\{1, \frac{1}{8}, -\frac{1}{8}, \frac{1}{8}\right\}$

85) _____

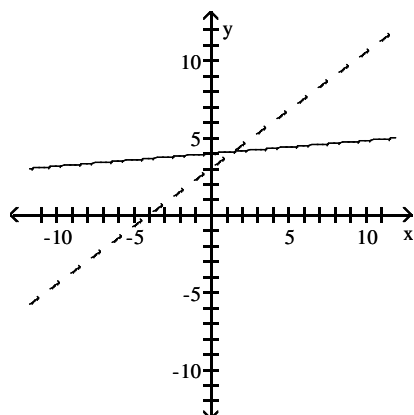
Graph the function as a solid line or curve and its inverse as a dashed line or curve on the same axes.

86) $3y - 12 = 4x$

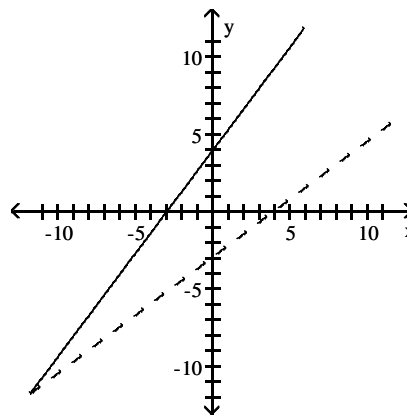
86) _____



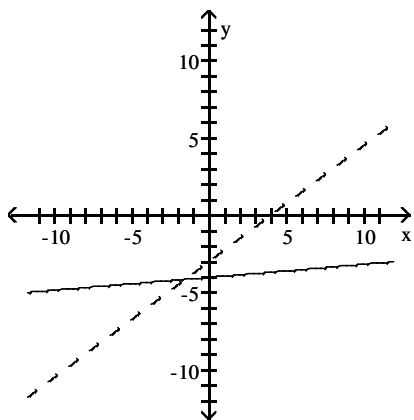
A)



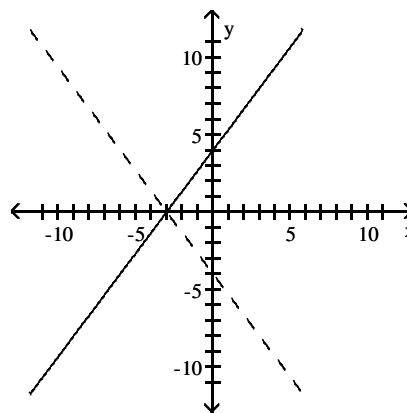
B)



C)



D)



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

87) $f(x) = 6x - 4$, $g(x) = \frac{x + 6}{4}$

87) _____

A) Yes

B) No

The function f is one-to-one. Find its inverse.

88) $f(x) = 6x$

88) _____

A) $f^{-1}(x) = \frac{6}{x}$

B) $f^{-1}(x) = 6x$

C) $f^{-1}(x) = -6x$

D) $f^{-1}(x) = \frac{x}{6}$

89) $f(x) = \frac{-6x + 7}{-3x - 1}$

89) _____

A) $f^{-1}(x) = \frac{1x + 7}{-3x + 6}$

B) $f^{-1}(x) = \frac{-6x + -6}{-3x - 1}$

C) $f^{-1}(x) = \frac{-6x + 7}{-3x - 1}$

D) $f^{-1}(x) = \frac{-3x + 6}{1x + 7}$

The function f is one-to-one. State the domain and the range of f and f^{-1} .

$$90) f(x) = \frac{5}{9x - 1}$$

90) _____

A) $f(x)$: D is all real numbers, R is all real numbers;

$f^{-1}(x)$: D is all real numbers, R is all real numbers

B) $f(x)$: $D = \left\{x \mid x \neq -\frac{1}{9}\right\}$, $R = \{y \mid y \neq 1\}$;

$f^{-1}(x)$: $D = \{x \mid x \neq 1\}$, $R = \left\{y \mid y \neq -\frac{1}{9}\right\}$

C) $f(x)$: $D = \left\{x \mid x \neq \frac{1}{9}\right\}$, $R = \{y \mid y \neq 0\}$;

$f^{-1}(x)$: $D = \{x \mid x \neq 0\}$, $R = \left\{y \mid y \neq \frac{1}{9}\right\}$

D) $f(x)$: $D = \left\{x \mid x \neq \frac{5}{9}\right\}$, $R = \{y \mid y \neq -5\}$;

$f^{-1}(x)$: $D = \{x \mid x \neq -5\}$, $R = \left\{y \mid y \neq \frac{5}{9}\right\}$

Solve the inequality. Express the solution using interval notation.

$$91) x^4 - 32x^2 - 144 > 0$$

91) _____

A) $(-6, 6)$

B) $(-6, -2)$ or $(2, 6)$

C) $(-\infty, -6)$ or $(6, \infty)$

D) $(-\infty, -6)$ or $(-2, 2)$ or $(6, \infty)$

Solve the problem.

$$92) \text{ What is the domain of the function } f(x) = \sqrt{x^3 - 4x^2} ?$$

92) _____

A) 0 or $[4, \infty)$

B) 0 or $(-\infty, -4]$

C) $[4, \infty)$

D) 0 or $(4, \infty)$

Solve the inequality. Express the solution using interval notation.

$$93) \frac{x - 8}{x + 7} < 0$$

93) _____

A) $(-\infty, -7)$

B) $(-\infty, -7)$ or $(8, \infty)$

C) $(-7, 8)$

D) $(8, \infty)$

$$94) \frac{x^2(x - 10)(x + 2)}{(x - 6)(x + 7)} \geq 0$$

94) _____

A) $(-7, -2]$ or $(6, 10]$

B) $(-\infty, -7)$ or $[-2, 0)$ or $(0, 6)$ or $[10, \infty)$

C) $(-\infty, -7)$ or $[10, \infty)$

D) $(-\infty, -7)$ or $[-2, 6)$ or $[10, \infty)$

Solve the inequality.

$$95) \frac{(8 - x)^3(8x - 5)}{x^3 + 1} < 0$$

95) _____

A) $(-1, \frac{5}{8}), (8, \infty)$

B) $(-8, \frac{5}{8}), (1, \infty)$

C) $(\frac{5}{8}, 1), (8, \infty)$

D) $(-1, 8), (\frac{5}{8}, \infty)$

Use the Remainder Theorem to find the remainder when $f(x)$ is divided by $x - c$.

96) $f(x) = x^4 + 8x^3 + 12x^2; x + 1$ 96) _____
 A) -21 B) 5 C) -5 D) 21

Use the Factor Theorem to determine whether $x - c$ is a factor of $f(x)$.

97) $7x^3 + 33x^2 - 9x - 5; x + 5$ 97) _____
 A) Yes B) No

Use the Rational Zeros Theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

98) $f(x) = x^4 + 9x^2 - 400$ 98) _____
 A) -4, 4; $f(x) = (x - 4)(x + 4)(x^2 + 25)$
 B) -4, -5, 4, 5; $f(x) = (x - 4)(x + 4)(x - 5)(x + 5)$
 C) -5, 5; $f(x) = (x - 5)(x + 5)(x^2 + 16)$
 D) 4; $f(x) = (x - 4)^2(x^2 + 25)$

99) $f(x) = 3x^4 - 12x^3 + 13x^2 - 4x + 4$ 99) _____
 A) no real roots; $f(x) = (x^2 + 4)(3x^2 + 1)$ B) -2, multiplicity 2; $f(x) = (x + 2)^2(3x^2 + 1)$
 C) -2, 2; $f(x) = (x - 2)(x + 2)(3x^2 + 1)$ D) 2, multiplicity 2; $f(x) = (x - 2)^2(3x^2 + 1)$

Find the intercepts of the function $f(x)$.

100) $f(x) = 4x^4 - 24x^3 + 37x^2 - 6x + 9$ 100) _____
 A) x-intercept: -3; y-intercept: 9 B) x-intercept: 3; y-intercept: 9
 C) x-intercepts: none; y-intercept: 9 D) x-intercepts: -3, 3; y-intercept: 9

101) $f(x) = (x - 4)^2(x^2 - 25)$ 101) _____
 A) x-intercepts: -5, 4, 5; y-intercept: -400 B) x-intercepts: 4, 25; y-intercept: 100
 C) x-intercepts: -5, 4, 5; y-intercept: 400 D) x-intercepts: -4, -25; y-intercept: 100

Solve the equation in the real number system.

102) $x^3 + 9x^2 + 26x + 24 = 0$ 102) _____
 A) {2, 3, 4} B) {3, 4} C) {-4, -3} D) {-4, -3, -2}

103) $2x^4 - 19x^3 + 71x^2 - 109x + 39 = 0$ 103) _____
 A) $\left\{3, -\frac{1}{2}\right\}$ B) $\left\{-3, \frac{1}{2}\right\}$ C) $\left\{3, \frac{1}{2}\right\}$ D) $\left\{-3, -\frac{1}{2}\right\}$

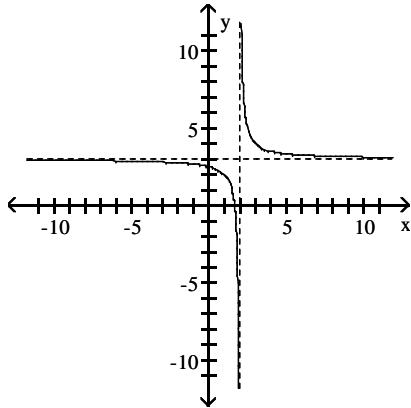
Find the domain of the rational function.

104) $H(x) = \frac{x(x - 1)}{25x^2 + 40x + 12}$ 104) _____
 A) $\left\{x \mid x \neq \frac{2}{5}, \frac{6}{5}\right\}$ B) $\left\{x \mid x \neq -\frac{2}{25}, -\frac{6}{25}\right\}$
 C) $\left\{x \mid x \neq -\frac{2}{5}, -\frac{6}{5}\right\}$ D) $\left\{x \mid x \neq -\frac{6}{25}, \frac{18}{25}\right\}$

Use the graph to determine the domain and range of the function.

105)

105) _____



A) domain: $\{x \mid x \neq 3\}$

range: $\{y \mid y \neq -2\}$

C) domain: $\{x \mid x \neq 2\}$

range: $\{y \mid y \neq 3\}$

B) domain: $\{x \mid x \neq -2\}$

range: $\{y \mid y \neq 3\}$

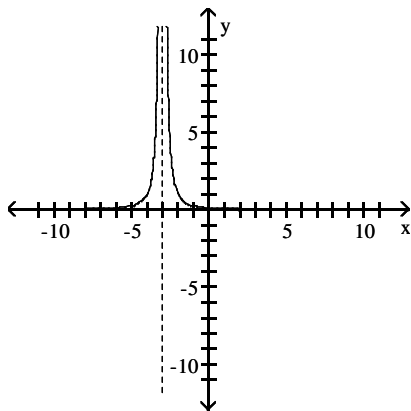
D) domain: $\{x \mid x \neq 3\}$

range: $\{y \mid y \neq 2\}$

Use the graph to find the vertical asymptotes, if any, of the function.

106)

106) _____



A) $x = -3, x = 0$

B) $x = -3$

C) $y = -3$

D) none

Find the vertical asymptotes of the rational function.

107) $H(x) = \frac{3x^2}{(x+7)(x-8)}$

107) _____

A) $x = 7, x = -8$

B) $x = -7, x = 8, x = -3$

C) $x = -7, x = 8$

D) $x = -3$

108) $H(x) = \frac{x-4}{16x-x^3}$

108) _____

A) $x = 0, x = -4$

B) $x = -4, x = 4$

C) $x = 0, x = 4$

D) $x = 0, x = -4, x = 4$

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

109) $P(x) = \frac{9x^3 - 5x - 9}{2x + 2}$ 109) _____

- A) $y = \frac{9}{2}$ B) $y = 9$ C) $y = 0$ D) none

110) $G(x) = \frac{x(x - 1)}{x^3 + 16x}$ 110) _____

- A) $x = 0, x = -16$ B) $y = 0$ C) $y = 1$ D) none

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

111) $T(x) = \frac{x^2 - 9x + 4}{x + 4}$ 111) _____

- A) $x = y + 9$ B) $y = x + 13$ C) $y = x - 13$ D) none

Find the domain of the rational function.

112) $g(x) = \frac{x}{x^3 - 8}$ 112) _____

- A) $\{x \mid x \neq 4\}$ B) $\{x \mid x \neq -2, 2\}$ C) $\{x \mid x \neq 2\}$ D) $\{x \mid x \neq -2\}$

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

113) y-intercept of $f(x) = \frac{6}{x^2 - 3x - 23}$ 113) _____

- A) $\left(0, -\frac{6}{23}\right)$ B) $\left(0, \frac{6}{23}\right)$ C) (0, 6) D) none

114) x-intercepts of $f(x) = \frac{x - 6}{x^2 + 2x - 2}$ 114) _____

- A) (2, 0) B) (-6, 0) C) (6, 0) D) none

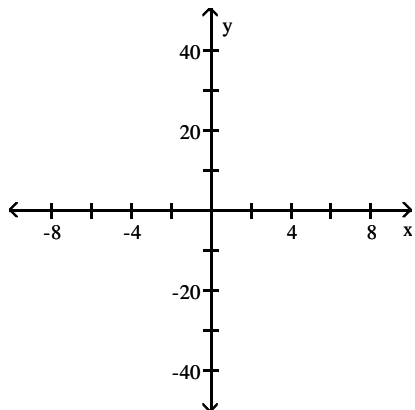
115) x-intercepts of $f(x) = x + \frac{49}{x}$ 115) _____

- A) (-7, 0), (7, 0) B) (7, 0) C) (-49, 0) D) none

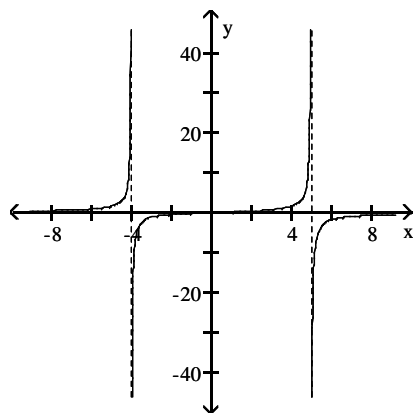
Graph the function.

116) $f(x) = \frac{3x}{(x+4)(x-5)}$

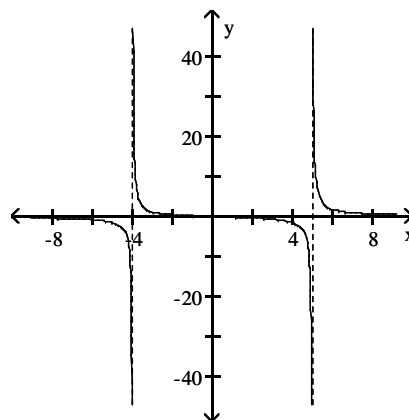
116) _____



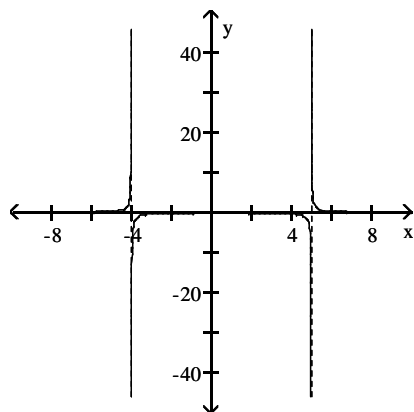
A)



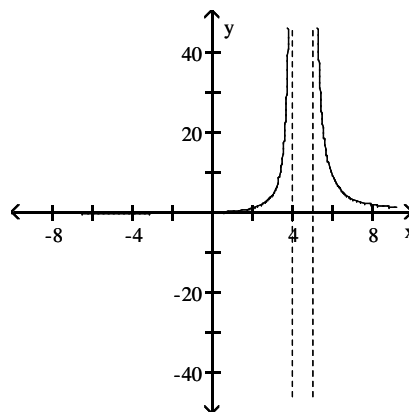
B)



C)

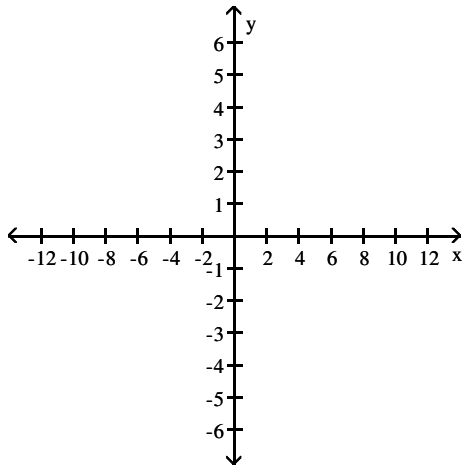


D)

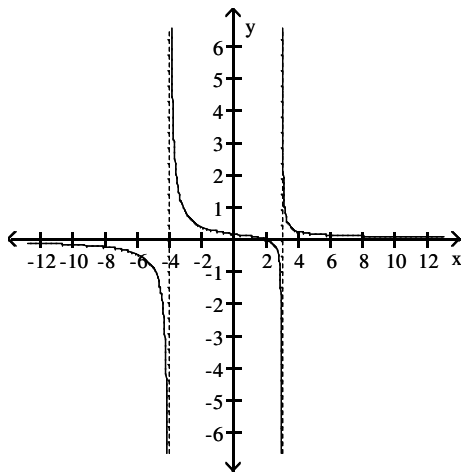


117) $f(x) = \frac{x - 2}{x^2 - x - 12}$

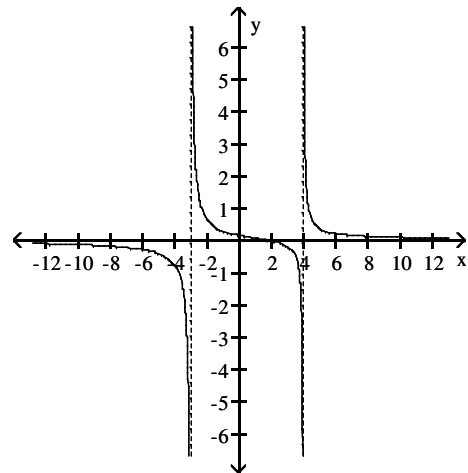
117) _____



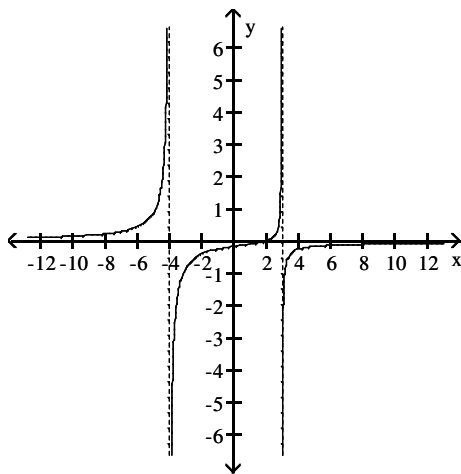
A)



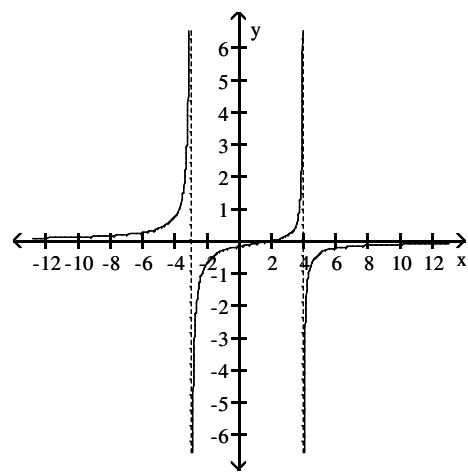
B)



C)



D)



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

118) $f(x) = x^{3/2} - x^4 - 8$

118) _____

A) Yes; degree 3/2

B) Yes; degree 3

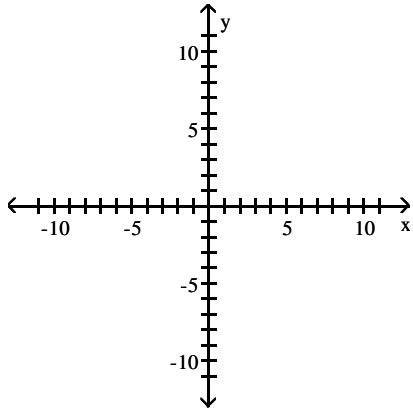
C) No; x is raised to non-integer 3/2 power

D) Yes; degree 4

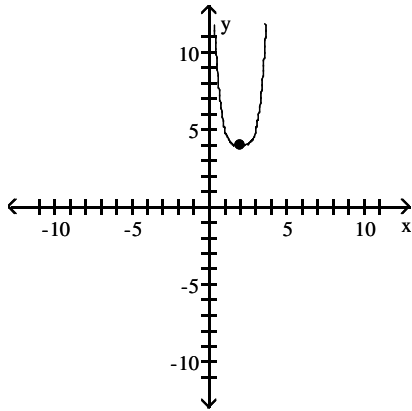
Use transformations of the graph of $y = x^4$ or $y = x^5$ to graph the function.

119) $f(x) = 4 - (x - 2)^4$

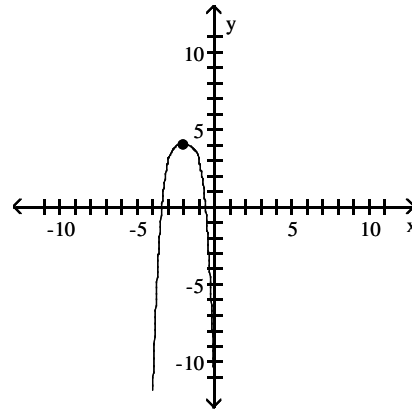
119) _____



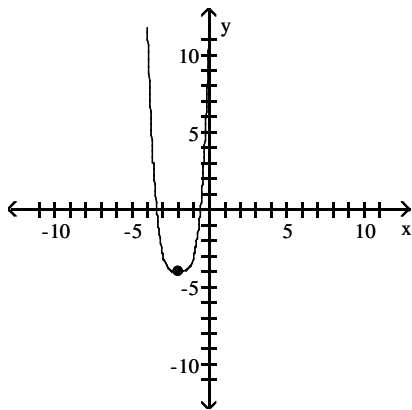
A)



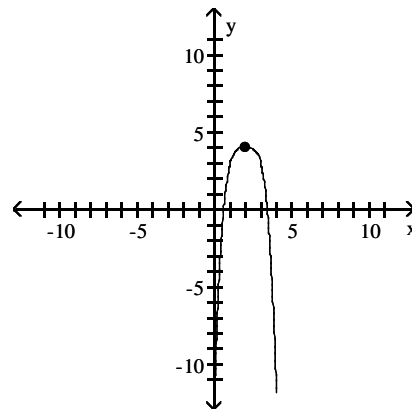
B)



C)



D)



Form a polynomial whose zeros and degree are given.

120) Zeros: 0, -7, 6; degree 3

120) _____

A) $f(x) = x^3 + x^2 - 42x$ for $a = 1$

B) $f(x) = x^3 + x^2 + x + 42$ for $a = 1$

C) $f(x) = x^3 + x^2 + x - 42$ for $a = 1$

D) $f(x) = x^3 + x^2 + 42x$ for $a = 1$

For the polynomial, list each real zero and its multiplicity. Determine whether the graph crosses or touches the x-axis at each x-intercept.

- 121) $f(x) = 2(x - 1)(x - 2)^4$ 121) _____
 A) -1, multiplicity 1, crosses x-axis; -2, multiplicity 4, touches x-axis
 B) 1, multiplicity 1, touches x-axis; 2, multiplicity 4, crosses x-axis
 C) 1, multiplicity 1, crosses x-axis; 2, multiplicity 4, touches x-axis
 D) -1, multiplicity 1, touches x-axis; -2, multiplicity 4, crosses x-axis

Find the x- and y-intercepts of f.

- 122) $f(x) = 6x - x^3$ 122) _____
 A) x-intercepts: 0, -6; y-intercept: 0
 B) x-intercepts: 0, -6; y-intercept: 6
 C) x-intercepts: 0, $\sqrt{6}$, $-\sqrt{6}$; y-intercept: 6
 D) x-intercepts: 0, $\sqrt{6}$, $-\sqrt{6}$; y-intercept: 0
- 123) $f(x) = (x - 3)^2(x^2 - 16)$ 123) _____
 A) x-intercepts: -4, 3, 4; y-intercept: 144
 B) x-intercepts: 3, 16; y-intercept: 48
 C) x-intercepts: -3, -16; y-intercept: 48
 D) x-intercepts: -4, 3, 4; y-intercept: -144

Determine the maximum number of turning points of f.

- 124) $f(x) = (x - 4)^2(x + 5)^2$ 124) _____
 A) 3
 B) 1
 C) 2
 D) 4

Use the x-intercepts to find the intervals on which the graph of f is above and below the x-axis.

- 125) $f(x) = (x - 2)^2(x + 3)^2$ 125) _____
 A) above the x-axis: $(-\infty, -3)$, $(-3, 2)$, $(2, \infty)$
 B) above the x-axis: no intervals
 below the x-axis: no intervals
 below the x-axis: $(-\infty, -3)$, $(-3, 2)$, $(2, \infty)$
 C) above the x-axis: $(-3, 2)$
 D) above the x-axis: $(-\infty, -3)$, $(2, \infty)$
 below the x-axis: $(-\infty, -3)$, $(2, \infty)$
 below the x-axis: $(-3, 2)$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Analyze the graph of the given function f as follows:

- Determine the end behavior: find the power function that the graph of f resembles for large values of $|x|$.
- Find the x- and y-intercepts of the graph.
- Determine whether the graph crosses or touches the x-axis at each x-intercept.
- Graph f using a graphing utility.
- Use the graph to determine the local maxima and local minima, if any exist. Round turning points to two decimal places.
- Use the information obtained in (a) - (e) to draw a complete graph of f by hand. Label all intercepts and turning points.
- Find the domain of f. Use the graph to find the range of f.
- Use the graph to determine where f is increasing and where f is decreasing.

- 126) $f(x) = -x^2(x - 1)(x + 3)$ 126) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

127) Suppose that $f(x) = -x - 9$ and $g(x) = x - 17$. 127) _____

(a) Solve $f(x) > 0$.

(b) Solve $g(x) > 0$.

(c) Solve $f(x) \leq g(x)$.

A) (a) $x < -9$; (b) $x > 17$; (c) $x \geq 4$

B) (a) $x < -9$; (b) $x < -17$; (c) $x \leq 4$

C) (a) $x < -9$; (b) $x < 17$; (c) $x \geq -13$

D) (a) $x > 9$; (b) $x > 17$; (c) $x > 4$

128) Linda needs to have her car towed. Little Town Auto charges a flat fee of \$65 plus \$2 per mile towed. Write a function expressing Linda's towing cost, c , in terms of miles towed, x . Find the cost of having a car towed 8 miles. 128) _____

A) $c(x) = 2x + 65$; \$81

B) $c(x) = 2x$; \$67

C) $c(x) = 2x$; \$16

D) $c(x) = 2x + 65$; \$71

129) A lumber yard has fixed costs of \$4022.30 per day and variable costs of \$0.7 per board-foot produced. Lumber sells for \$2.60 per board-foot. How many board-feet must be produced and sold daily to break even? 129) _____

A) 2117 board-feet

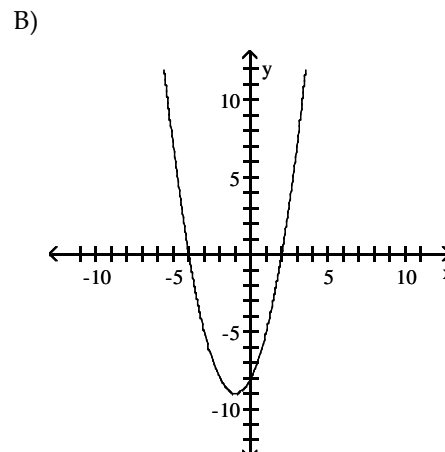
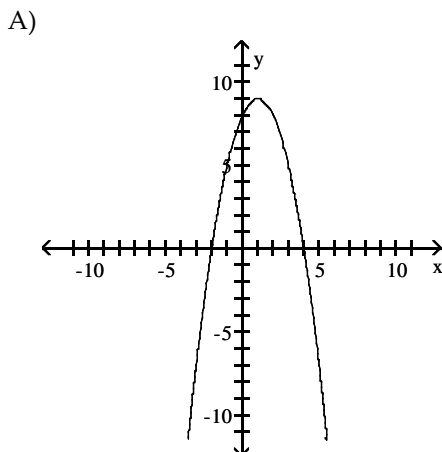
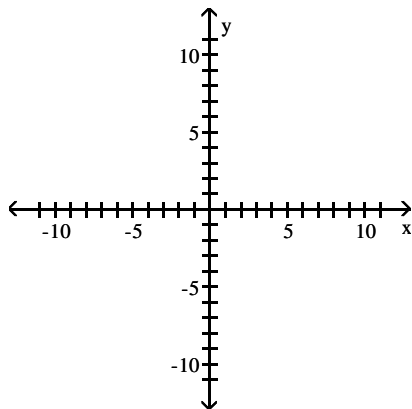
B) 1218 board-feet

C) 5746 board-feet

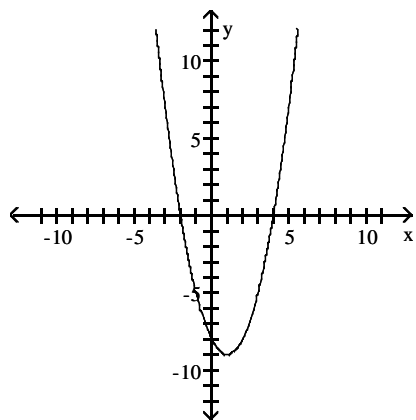
D) 1411 board-feet

Graph the function f by starting with the graph of $y = x^2$ and using transformations (shifting, compressing, stretching, and/or reflection).

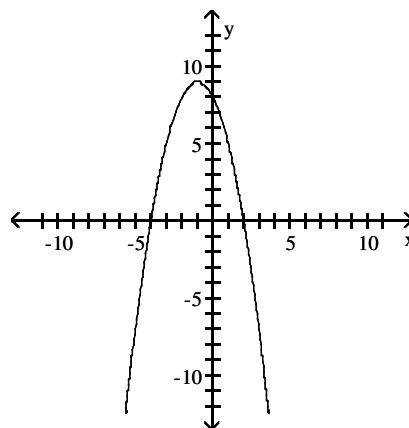
130) $f(x) = x^2 + 2x - 8$ 130) _____



C)



D)



Find the vertex and axis of symmetry of the graph of the function.

131) $f(x) = x^2 - 8x$

A) $(-4, 16); x = -4$

C) $(4, -16); x = 4$

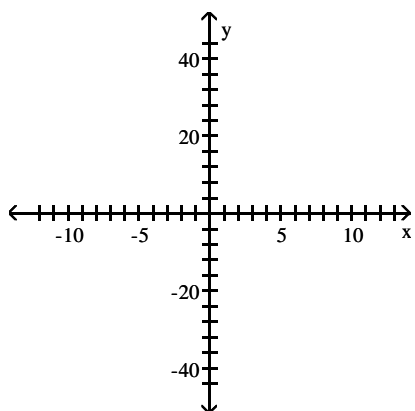
B) $(16, -4); x = 16$

D) $(-16, 4); x = -16$

131) _____

Graph the function using its vertex, axis of symmetry, and intercepts.

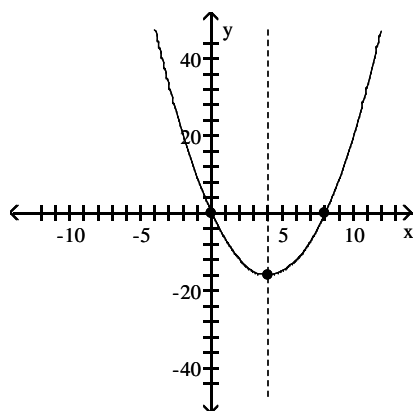
132) $f(x) = x^2 + 8x$



132) _____

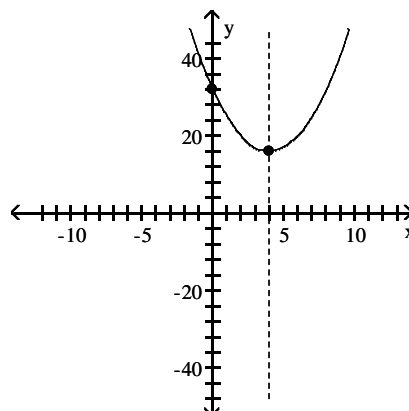
A) vertex $(4, -16)$

intercepts $(0, 0), (8, 0)$

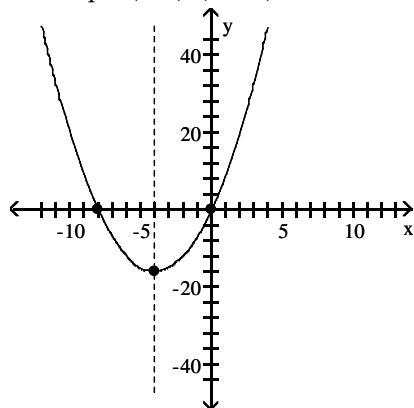


B) vertex $(4, 16)$

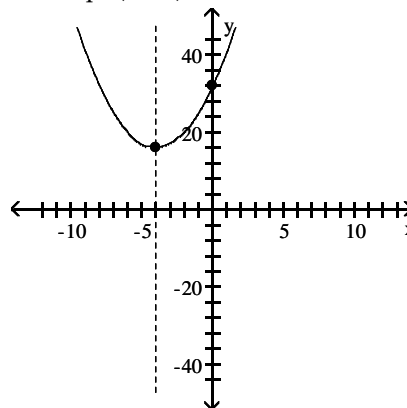
intercept $(0, 32)$



- C) vertex $(-4, -16)$
intercepts $(0, 0), (-8, 0)$



- D) vertex $(-4, 16)$
intercept $(0, 32)$



Determine the domain and the range of the function.

133) $f(x) = x^2 + 4x + 3$

- A) domain: all real numbers
range: $\{y \mid y \geq 1\}$
C) domain: all real numbers
range: $\{y \mid y \geq -1\}$

- B) domain: range: $\{x \mid x \geq 2\}$
range: $\{y \mid y \geq 1\}$
D) domain: range: $\{x \mid x \geq 2\}$
range: $\{y \mid y \geq -1\}$

133) _____

Determine where the function is increasing and where it is decreasing.

134) $f(x) = x^2 + 2x - 8$

- A) increasing on $(-\infty, -9)$
decreasing on $(-9, \infty)$
C) increasing on $(-1, \infty)$
decreasing on $(-\infty, -1)$

- B) increasing on $(-9, \infty)$
decreasing on $(-\infty, -9)$
D) increasing on $(-\infty, -1)$
decreasing on $(-1, \infty)$

134) _____

Determine, without graphing, whether the given quadratic function has a maximum value or a minimum value and then find that value.

135) $f(x) = x^2 + 3x - 8$

- A) maximum; $-\frac{41}{4}$
C) minimum; $-\frac{41}{4}$

- B) minimum; $-\frac{3}{2}$
D) maximum; $-\frac{3}{2}$

135) _____

Solve the problem.

- 136) The owner of a video store has determined that the cost C , in dollars, of operating the store is approximately given by $C(x) = 2x^2 - 26x + 690$, where x is the number of videos rented daily. Find the lowest cost to the nearest dollar.

- A) \$521 B) \$606 C) \$775 D) \$352

136) _____

- 137) You have 212 feet of fencing to enclose a rectangular region. What is the maximum area?

- A) 11,236 square feet B) 44,944 square feet
C) 2809 square feet D) 2805 square feet

137) _____

Write an equation that results in the indicated translation.

138) The squaring function, shifted 5 units upward

138) _____

A) $y = \frac{x^2}{5}$

B) $y = 5x^2$

C) $y = x^2 + 5$

D) $y = x^2 - 5$

139) The square root function, shifted 7 units to the left

139) _____

A) $y = \sqrt{x - 7}$

B) $y = \sqrt{x + 7}$

C) $y = \sqrt{x} - 7$

D) $y = \sqrt{x + 7}$

Suppose the point (2, 4) is on the graph of $y = f(x)$. Find a point on the graph of the given function.

140) $f(x) + 4$

140) _____

A) (6, 4)

B) (-2, 4)

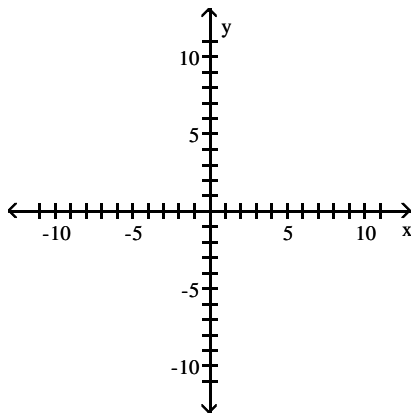
C) (2, -4)

D) (2, 8)

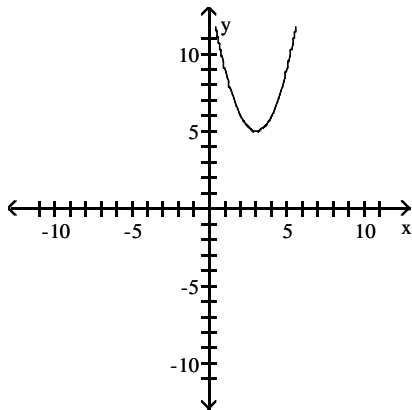
Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

141) $f(x) = (x - 3)^2 + 5$

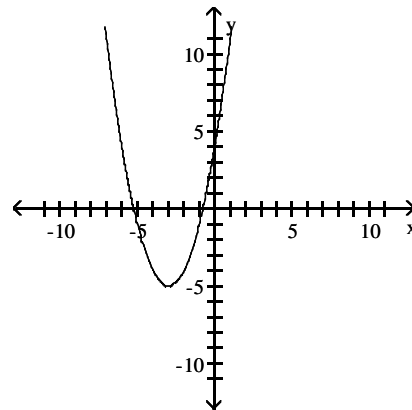
141) _____



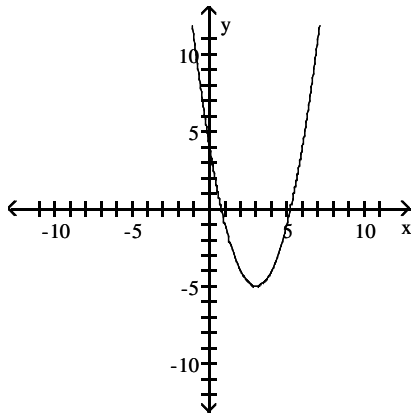
A)



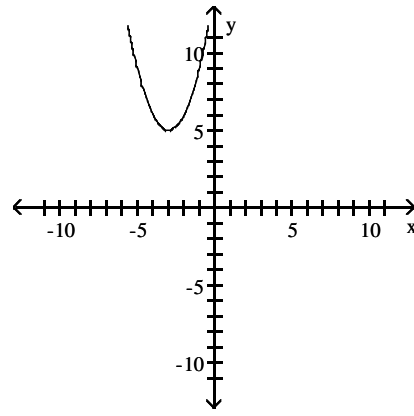
B)



C)

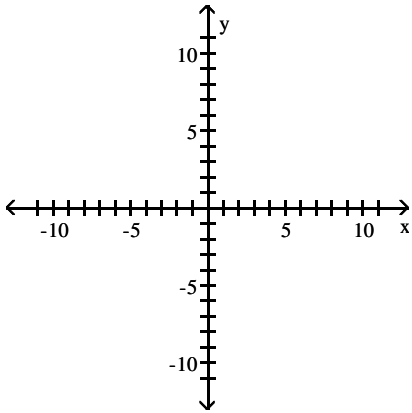


D)

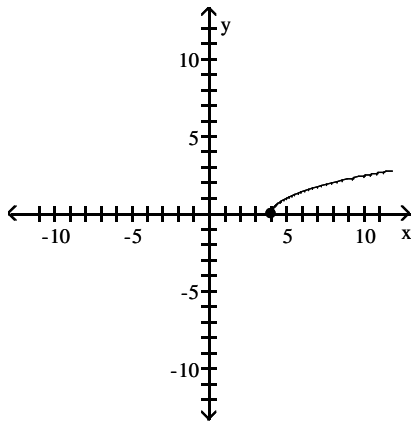


142) $f(x) = \sqrt{x} - 4$

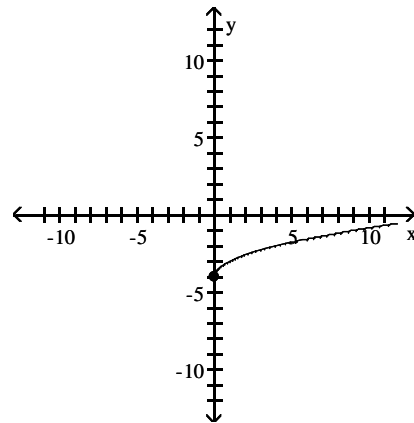
142) _____



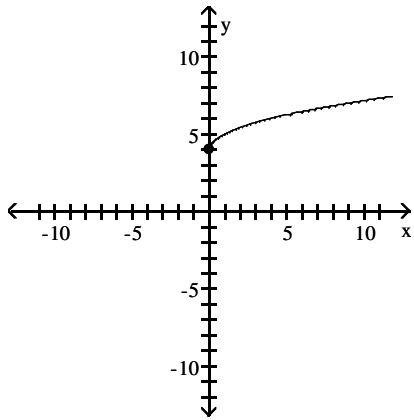
A)



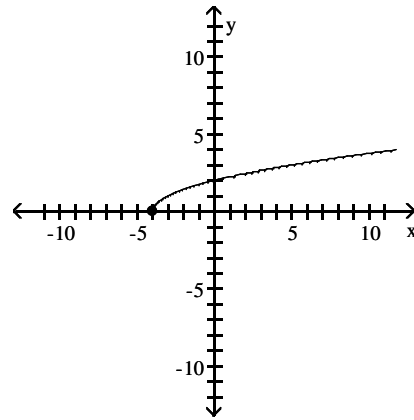
B)



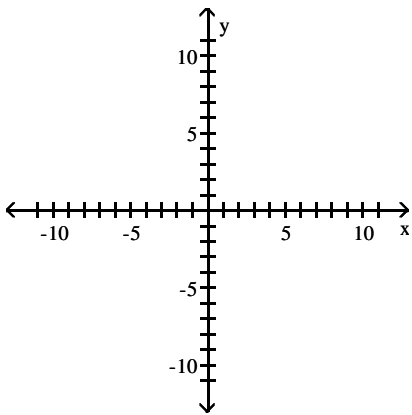
C)



D)

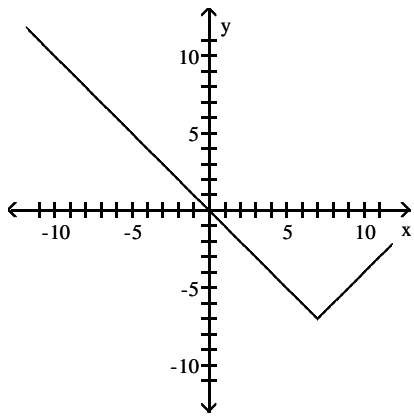


143) $f(x) = |x + 7| + 7$

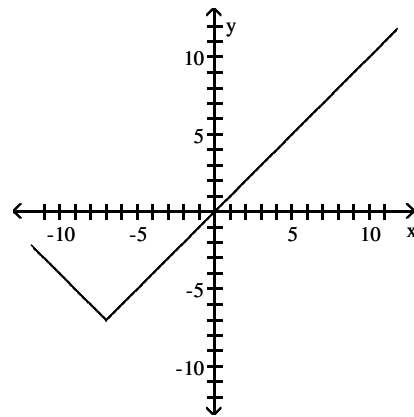


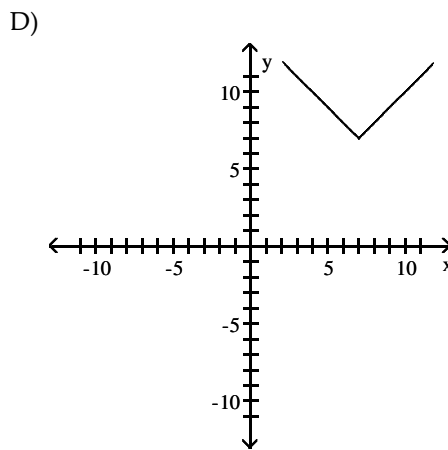
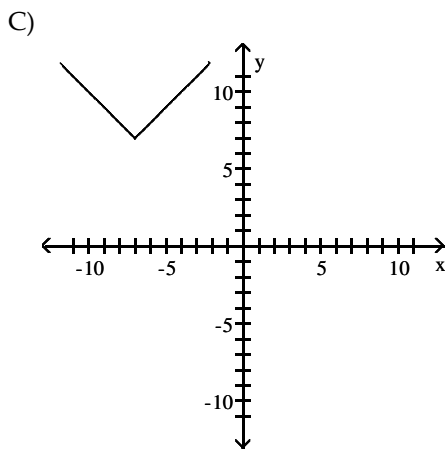
143) _____

A)



B)

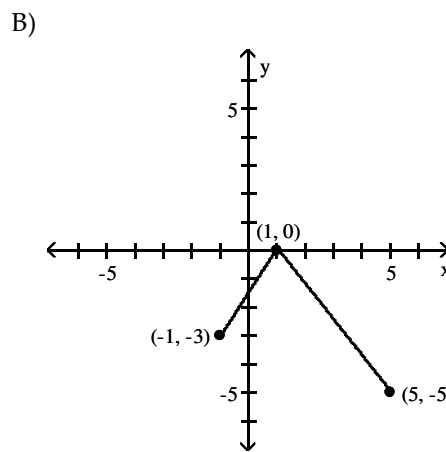
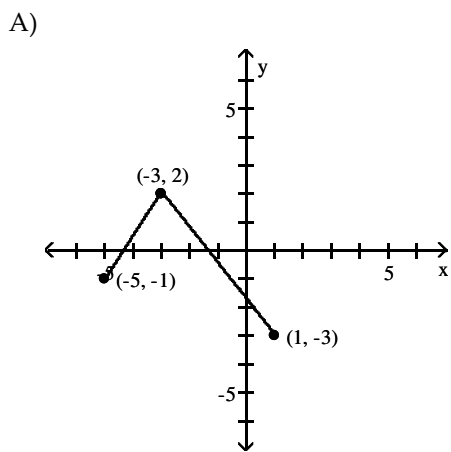
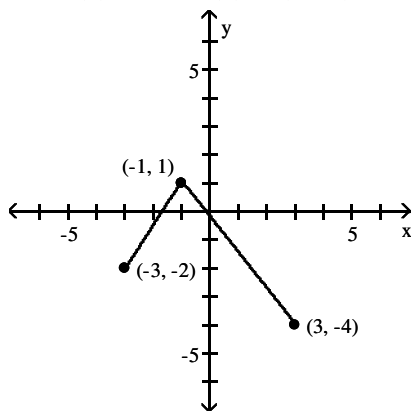




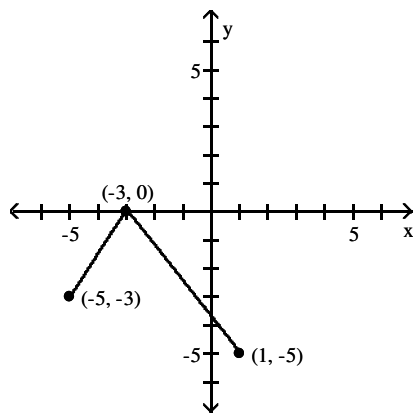
Using transformations, sketch the graph of the requested function.

144) The graph of a function f is illustrated. Use the graph of f as the first step toward graphing the function $F(x)$, where $F(x) = f(x + 2) - 1$.

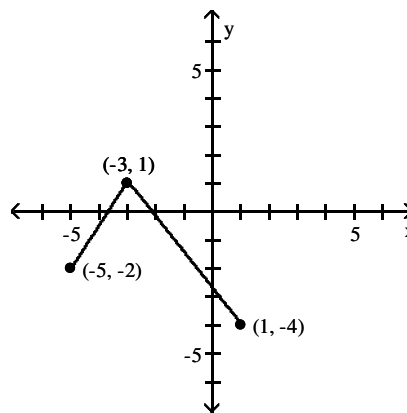
144) _____



C)



D)

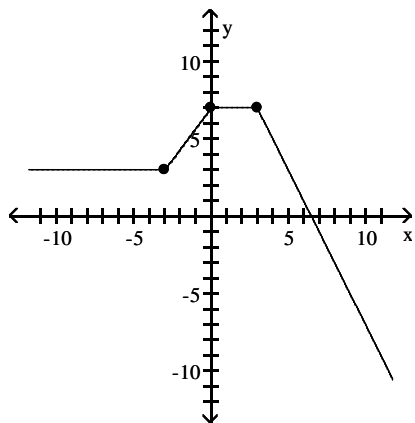


Solve the problem.

- 145) Suppose that the function $y = f(x)$ is increasing on the interval $(2, 6)$. Over what interval is the graph of $y = f(x - 4)$ increasing? 145) _____
- A) $(-2, 2)$ B) $(2, 6)$ C) $(8, 24)$ D) $(6, 10)$

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

- 146) $(0, 3)$ 146) _____



- A) increasing B) constant C) decreasing

Find the domain of the function.

- 147) $h(x) = \frac{x - 3}{x^3 - 4x}$ 147) _____
- A) all real numbers B) $\{x \mid x \neq 0\}$
 C) $\{x \mid x \neq 3\}$ D) $\{x \mid x \neq -2, 0, 2\}$

For the given functions f and g , find the requested function and state its domain.

148) $f(x) = \sqrt{x}$; $g(x) = 5x - 6$

148) _____

Find $\frac{f}{g}$.

A) $(\frac{f}{g})(x) = \frac{\sqrt{x}}{5x - 6}$; $\{x | x \geq 0, x \neq \frac{6}{5}\}$

B) $(\frac{f}{g})(x) = \frac{\sqrt{x}}{5x - 6}$; $\{x | x \neq \frac{6}{5}\}$

C) $(\frac{f}{g})(x) = \frac{5x - 6}{\sqrt{x}}$; $\{x | x \geq 0\}$

D) $(\frac{f}{g})(x) = \frac{\sqrt{x}}{5x - 6}$; $\{x | x \neq 0\}$

149) $f(x) = \frac{7x + 3}{2x - 3}$; $g(x) = \frac{3x}{2x - 3}$

149) _____

Find $f + g$.

A) $(f + g)(x) = \frac{10x + 3}{2x - 3}$; $\{x | x \neq 0\}$

B) $(f + g)(x) = \frac{4x - 3}{2x - 3}$; $\{x | x \neq \frac{3}{2}\}$

C) $(f + g)(x) = \frac{10x + 3}{2x - 3}$; $\{x | x \neq \frac{3}{2}\}$

D) $(f + g)(x) = \frac{10x + 3}{2x - 3}$; $\{x | x \neq \frac{3}{2}, x \neq -\frac{3}{10}\}$

Solve the problem.

150) Find $\left(\frac{f}{g}\right)(-2)$ when $f(x) = 3x - 5$ and $g(x) = 2x^2 + 14x + 2$.

150) _____

A) 0

B) $\frac{11}{18}$

C) 2

D) $-\frac{1}{9}$

Find the value for the function.

151) Find $f(x + 1)$ when $f(x) = \frac{x^2 - 9}{x - 3}$.

151) _____

A) $\frac{x^2 + 2x + 10}{x - 2}$

B) $\frac{x^2 + 2x - 8}{x + 4}$

C) $\frac{x^2 + 2x - 8}{x - 2}$

D) $\frac{x^2 - 8}{x - 2}$

Solve the problem.

152) If $f(x) = \frac{x - 4A}{-12x + 3}$ and $f(-12) = 12$, what is the value of A ?

152) _____

A) $A = 150$

B) $A = -444$

C) $A = 444$

D) $A = -150$

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

153) $-5x + x^2 - 63 = y$

153) _____

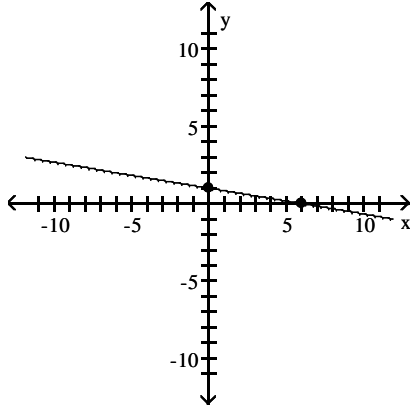
A) function

B) not a function

Find the slope of the line.

154)

154) _____



A) $\frac{1}{6}$

B) -6

C) 6

D) $-\frac{1}{6}$

Find the slope of the line containing the two points.

155) $(-4, -8); (4, -8)$

155) _____

A) 0

B) 8

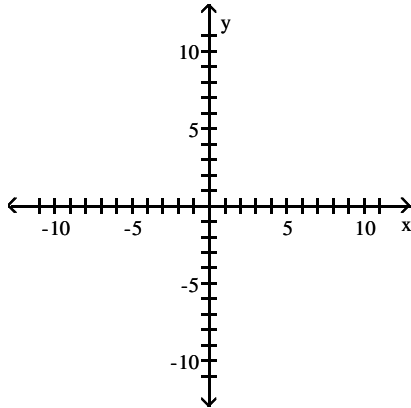
C) $-\frac{1}{8}$

D) undefined

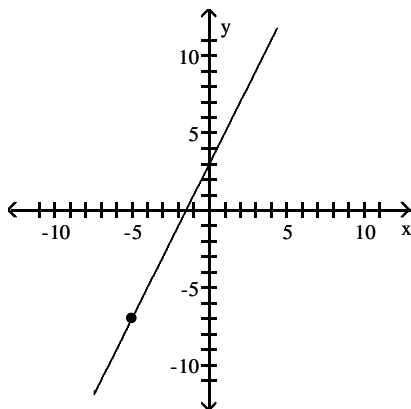
Graph the line containing the point P and having slope m.

156) $P = (-5, -7); m = -2$

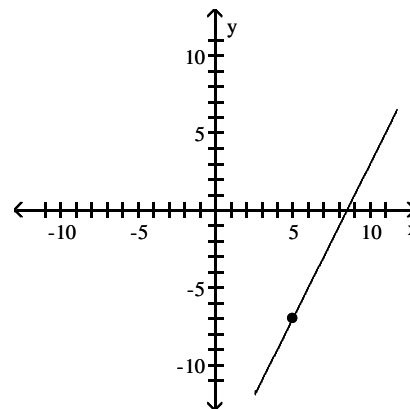
156) _____



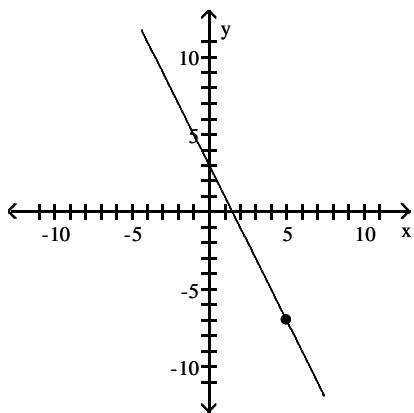
A)



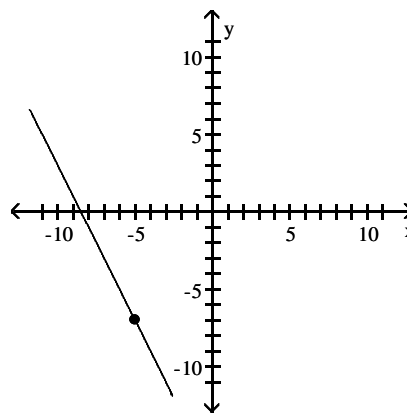
B)



C)



D)



Find an equation for the line with the given properties.

157) Vertical line; containing the point $(-0.2, 3.1)$

A) $x = -0.2$

B) $x = 3.1$

C) $x = 2.9$

D) $x = 0$

157) _____

Find the slope-intercept form of the equation of the line with the given properties.

158) Horizontal; containing the point $(-1.3, 8.7)$

A) $y = 7.4$

B) $y = 0$

C) $y = 8.7$

D) $y = -1.3$

158) _____

Find an equation for the line, in the indicated form, with the given properties.

159) Containing the points $(-4, 0)$ and $(5, 8)$; general form

A) $-8x - 9y = -32$

B) $8x - 9y = -32$

C) $4x + 3y = -4$

D) $-4x - 3y = -4$

159) _____

Find the slope-intercept form of the equation of the line with the given properties.

160) Slope = 4; containing the point $(-2, -2)$

A) $y = -4x - 6$

B) $y = 4x - 6$

C) $y = 4x + 6$

D) $y = -4x + 6$

160) _____

161) Slope = 0; containing the point $(7, -4)$

A) $x = -4$

B) $y = 7$

C) $y = -4$

D) $x = 7$

161) _____

Write the equation in slope-intercept form.

162) $8x - 9y = 4$

A) $y = 8x - 4$

B) $y = \frac{9}{8}x + \frac{4}{8}$

C) $y = \frac{8}{9}x + \frac{4}{9}$

D) $y = \frac{8}{9}x - \frac{4}{9}$

162) _____

Find the slope and y-intercept of the line.

163) $x + 7y = 1$

A) slope = $\frac{1}{7}$; y-intercept = $\frac{1}{7}$

B) slope = $-\frac{1}{7}$; y-intercept = $\frac{1}{7}$

C) slope = 1; y-intercept = 1

D) slope = -7; y-intercept = 7

163) _____

Find the general form of the equation for the line with the given properties.

164) Slope = $\frac{2}{3}$; containing $(0, 5)$

A) $-2x + 3y = -15$

B) $3x - 2y = -15$

C) $-2x + 3y = 15$

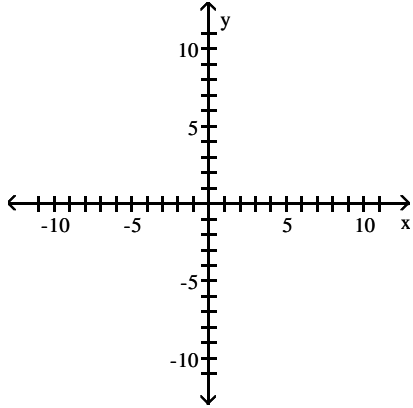
D) $-2x - 3y = 15$

164) _____

Find the slope of the line and sketch its graph.

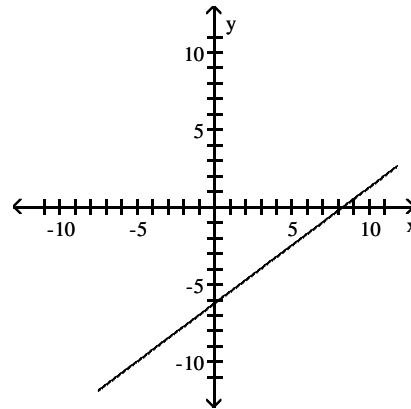
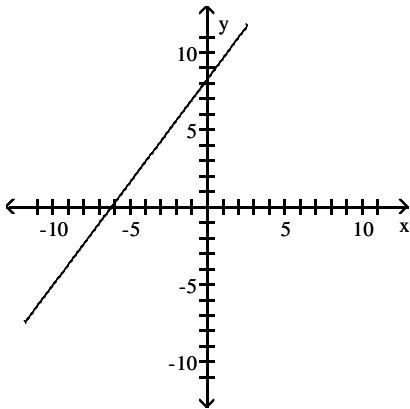
165) $3x + 4y = 25$

165) _____



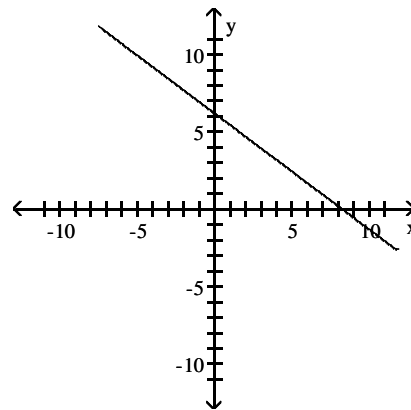
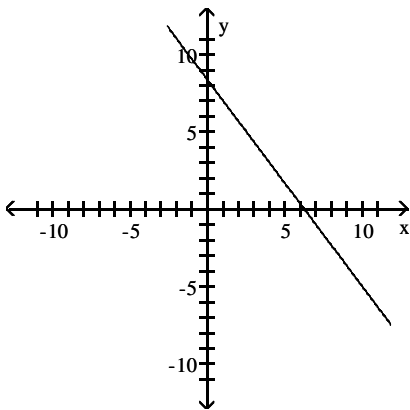
A) slope = $\frac{4}{3}$

B) slope = $\frac{3}{4}$



C) slope = $-\frac{4}{3}$

D) slope = $-\frac{3}{4}$



Find an equation for the line with the given properties.

166) Parallel to the line $y = 6$; containing the point $(5, 3)$

166) _____

A) $y = -3$

B) $y = 6$

C) $y = 3$

D) $y = 5$

167) Perpendicular to the line $x - 8y = 6$; containing the point $(2, 3)$

167) _____

A) $y = -8x - 19$

B) $y = -8x + 19$

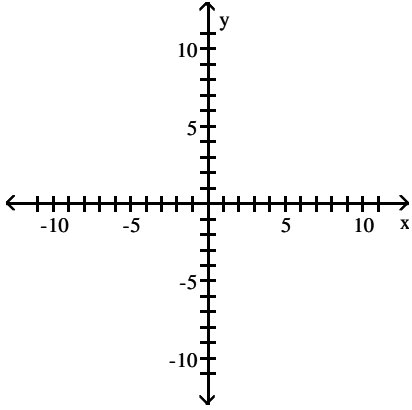
C) $y = -\frac{1}{8}x - \frac{19}{8}$

D) $y = 8x - 19$

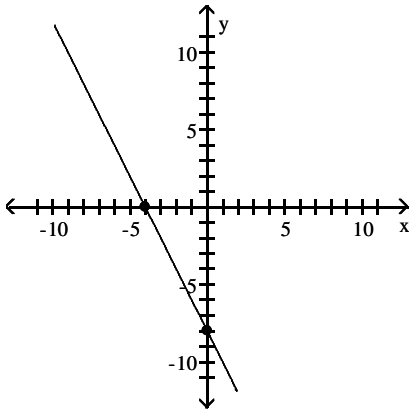
Graph the equation by plotting points.

168) $y = 2x + 8$

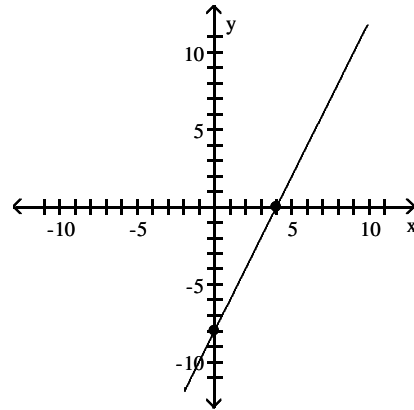
168) _____



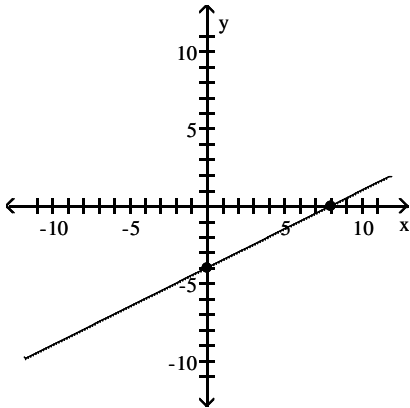
A)



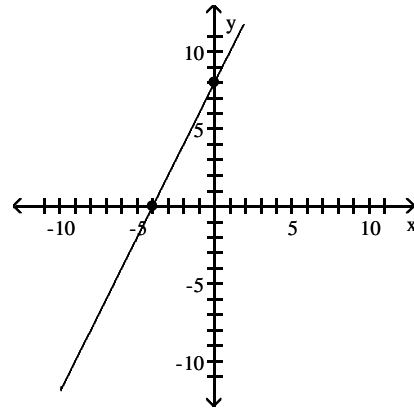
B)



C)

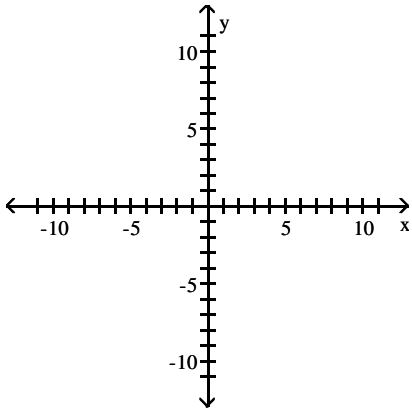


D)

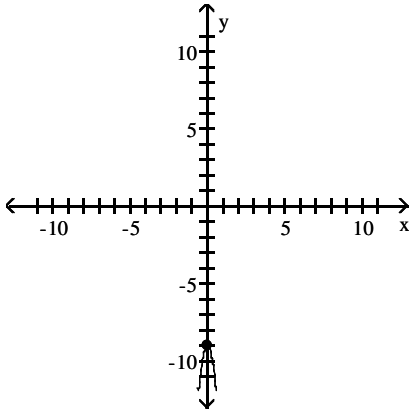


169) $9x^2 + y = 9$

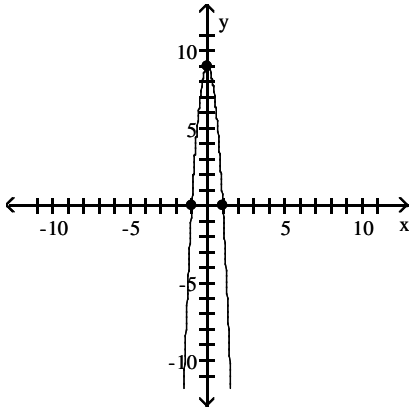
169) _____



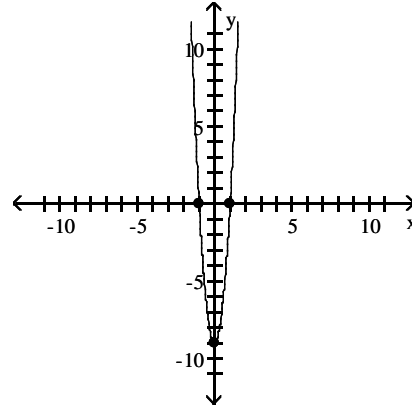
A)



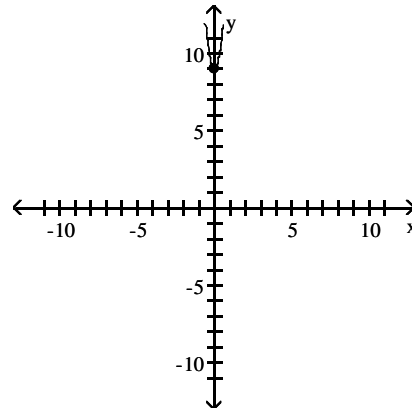
C)



B)



D)



Solve the problem.

170) If $(a, 3)$ is a point on the graph of $y = 2x - 5$, what is a ?

170) _____

A) -1

B) 1

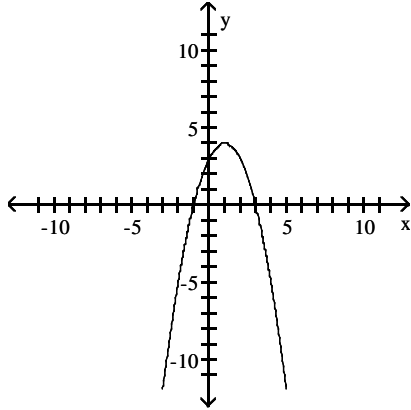
C) 4

D) -4

List the intercepts of the graph.

171)

171) _____



- A) (-1, 0), (0, 3), (0, 3)
- C) (-1, 0), (0, 3), (3, 0)

- B) (0, -1), (0, 3), (3, 0)
- D) (0, -1), (3, 0), (0, 3)

List the intercepts for the graph of the equation.

172) $9x^2 + y^2 = 9$

172) _____

- A) (-1, 0), (0, -3), (0, 3), (1, 0)
- C) (-1, 0), (0, -9), (0, 9), (1, 0)

- B) (-3, 0), (0, -1), (0, 1), (3, 0)
- D) (-9, 0), (0, -1), (0, 1), (9, 0)

173) $y = \frac{7x}{x^2 + 49}$

173) _____

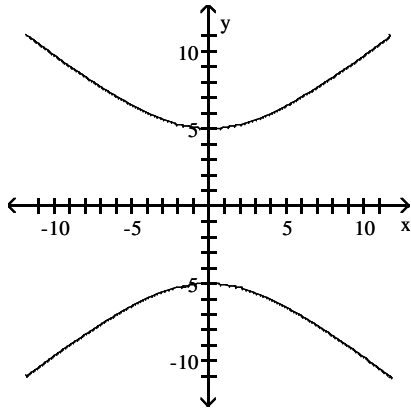
- A) (0, 0)
- C) (0, -7), (0, 0), (0, 7)

- B) (-7, 0), (0, 0), (7, 0)
- D) (-49, 0), (0, 0), (49, 0)

List the intercepts of the graph. Tell whether the graph is symmetric with respect to the x -axis, y -axis, origin, or none of these.

174)

174) _____

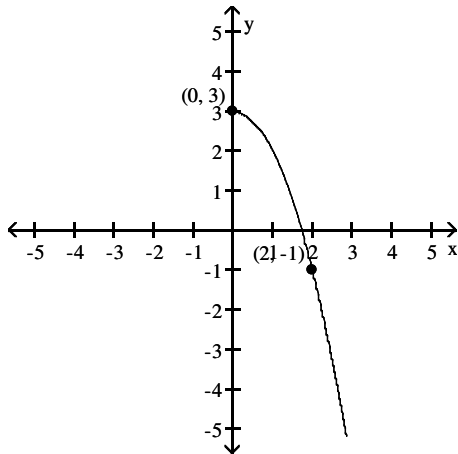


- A) intercepts: $(0, 5)$ and $(0, -5)$
symmetric with respect to x -axis, y -axis, and origin
- B) intercepts: $(5, 0)$ and $(-5, 0)$
symmetric with respect to y -axis
- C) intercepts: $(5, 0)$ and $(-5, 0)$
symmetric with respect to x -axis, y -axis, and origin
- D) intercepts: $(0, 5)$ and $(0, -5)$
symmetric with respect to origin

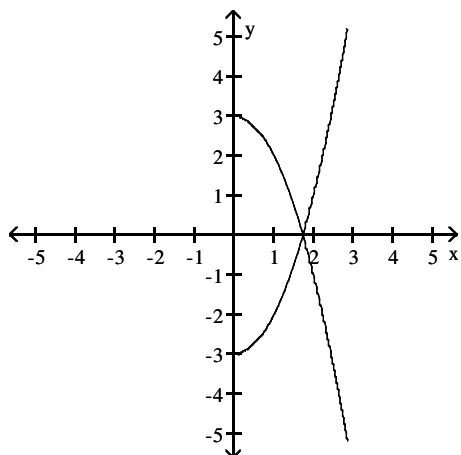
Draw a complete graph so that it has the given type of symmetry.

175) Symmetric with respect to the y -axis

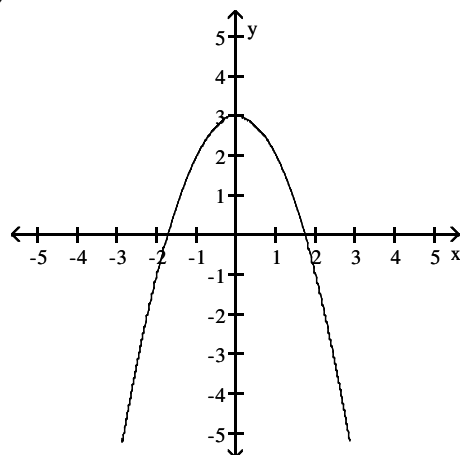
175) _____



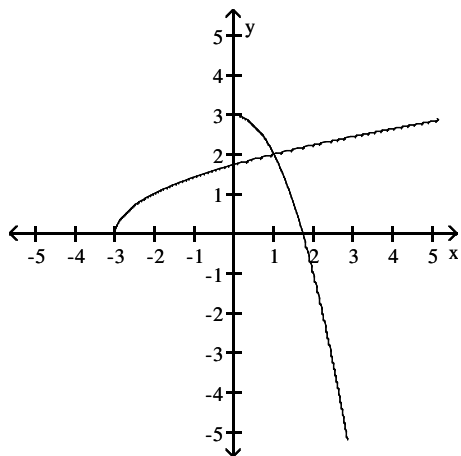
A)



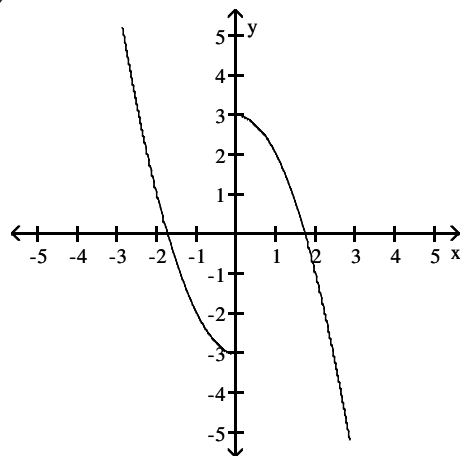
B)



C)



D)



List the intercepts and type(s) of symmetry, if any.

176) $y^2 = x + 4$

- A) intercepts: (4, 0), (0, 2), (0, -2)
symmetric with respect to x-axis
- C) intercepts: (0, -4), (2, 0), (-2, 0)
symmetric with respect to y-axis

- B) intercepts: (-4, 0), (0, 2), (0, -2)
symmetric with respect to x-axis
- D) intercepts: (0, 4), (2, 0), (-2, 0)
symmetric with respect to y-axis

176) _____

Determine whether the graph of the equation is symmetric with respect to the x-axis, the y-axis, and/or the origin.

177) $y = -7x^4 - 3x + 8$

- A) x-axis
- B) origin
- C) y-axis
- D) x-axis, y-axis, origin
- E) none

177) _____

Solve the problem.

178) If a graph is symmetric with respect to the origin and it contains the point (-4, 7), which of the following points is also on the graph?

- A) (4, -7)
- B) (4, 7)
- C) (-4, -7)
- D) (7, -4)

178) _____

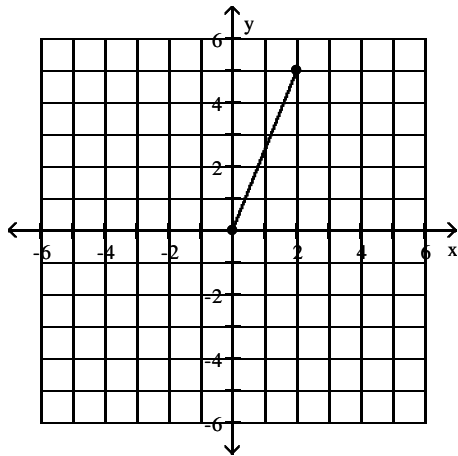
179) If $(1, -5)$ is the endpoint of a line segment, and $(5, 0)$ is its midpoint, find the other endpoint.

- A) $(11, 3)$ B) $(-7, -15)$ C) $(9, 5)$ D) $(9, -10)$

179) _____

Find the distance $d(P_1, P_2)$ between the points P_1 and P_2 .

180)



- A) 4 B) $\sqrt{29}$ C) $\sqrt{3}$ D) 2

180) _____

181) $P_1 = (-2, -3)$; $P_2 = (5, -2)$

- A) 6 B) $5\sqrt{2}$ C) $48\sqrt{3}$ D) 48

181) _____

Decide whether or not the points are the vertices of a right triangle.

182) $(-9, -1), (-3, 1), (3, -6)$

- A) Yes B) No

182) _____

Solve the problem.

183) A motorcycle and a car leave an intersection at the same time. The motorcycle heads north at an average speed of 20 miles per hour, while the car heads east at an average speed of 48 miles per hour. Find an expression for their distance apart in miles at the end of t hours.

- A) $52t$ miles B) $52\sqrt{t}$ miles C) $t\sqrt{68}$ miles D) $2t\sqrt{13}$ miles

183) _____

184) Find the length of each side of the triangle determined by the three points $P_1, P_2,$ and P_3 . State whether the triangle is an isosceles triangle, a right triangle, neither of these, or both.

$P_1 = (-5, -4), P_2 = (-3, 4), P_3 = (0, -1)$

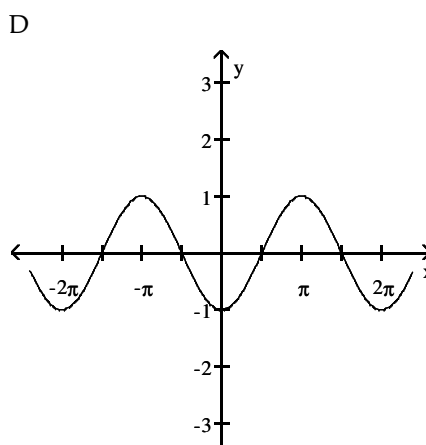
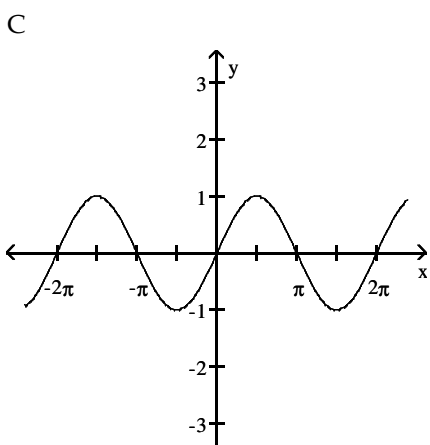
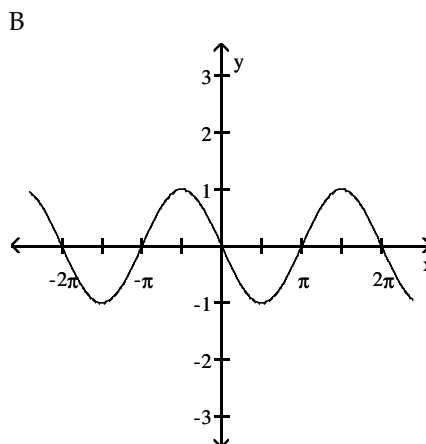
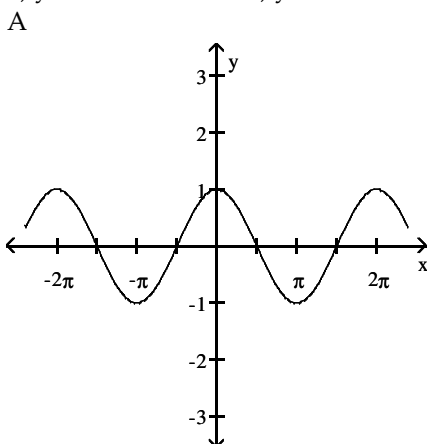
- A) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = 5\sqrt{2}$
neither
B) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = \sqrt{34}$
isosceles triangle
C) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = 5\sqrt{2}$
right triangle
D) $d(P_1, P_2) = 2\sqrt{17}$; $d(P_2, P_3) = \sqrt{34}$; $d(P_1, P_3) = \sqrt{34}$
both

184) _____

Match the given function to its graph.

- 185) 1) $y = \sin x$ 2) $y = \cos x$
 3) $y = -\sin x$ 4) $y = -\cos x$

185) _____



- A) 1A, 2D, 3C, 4B B) 1C, 2A, 3B, 4D C) 1A, 2B, 3C, 4D D) 1B, 2D, 3C, 4A

Find the exact value of the expression.

186) $\sin^{-1} \frac{\sqrt{2}}{2}$

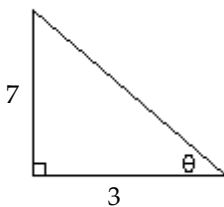
186) _____

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

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

187)

187) _____



Find $\sin \theta$.

- A) $\sin \theta = \frac{\sqrt{58}}{7}$ B) $\sin \theta = \frac{7\sqrt{58}}{58}$ C) $\sin \theta = \frac{3\sqrt{58}}{58}$ D) $\sin \theta = \frac{\sqrt{58}}{3}$

Verify that the values of the variables listed are solutions of the system of equations.

188)

$$\begin{cases} 2x + y = -16 \\ 3x + 2y = -26 \end{cases}$$

$x = -6, y = 4$

A) solution

B) not a solution

188) _____

Solve the system of equations using substitution.

189)

$$\begin{cases} xy = 42 \\ x + y = 13 \end{cases}$$

A) $x = -7, y = 6; x = -6, y = 7$
or $(-7, 6), (-6, 7)$

C) $x = 7, y = -6; x = 6, y = -7$
or $(7, -6), (6, -7)$

B) $x = -7, y = -6; x = -6, y = -7$
or $(-7, -6), (-6, -7)$

D) $x = 7, y = 6; x = 6, y = 7$
or $(7, 6), (6, 7)$

189) _____

Write out the first five terms of the sequence.

190) $\{s_n\} = \{n - 2\}$

A) $s_1 = -1, s_2 = 0, s_3 = 1, s_4 = 2, s_5 = 3$

C) $s_1 = -3, s_2 = -2, s_3 = -1, s_4 = 0, s_5 = 1$

B) $s_1 = 2, s_2 = 4, s_3 = 6, s_4 = 8, s_5 = 10$

D) $s_1 = -2, s_2 = -1, s_3 = 0, s_4 = 1, s_5 = 2$

190) _____

191) $\{s_n\} = \left\{ \frac{2^n}{3^{n+1}} \right\}$

A) $s_1 = \frac{2}{5}, s_2 = \frac{2}{7}, s_3 = \frac{8}{41}, s_4 = \frac{8}{61}, s_5 = \frac{32}{365}$

C) $s_1 = \frac{1}{2}, s_2 = \frac{4}{7}, s_3 = \frac{3}{5}, s_4 = \frac{8}{13}, s_5 = \frac{5}{8}$

B) $s_1 = \frac{1}{2}, s_2 = \frac{2}{5}, s_3 = \frac{2}{7}, s_4 = \frac{8}{41}, s_5 = \frac{8}{61}$

D) $s_1 = \frac{4}{7}, s_2 = \frac{3}{5}, s_3 = \frac{8}{13}, s_4 = \frac{5}{8}, s_5 = \frac{12}{19}$

191) _____

The given pattern continues. Write down the nth term of the sequence $\{a_n\}$ suggested by the pattern.

192) 4, 12, 20, 28, 36, ...

A) $a_n = 4(8)^{n-1}$

B) $a_n = 4n - 8$

C) $a_n = 2(4n - 2)$

D) $a_n = 8n - 2$

192) _____

The sequence is defined recursively. Write the first four terms.

193) $a_1 = 1; a_n = a_{n-1} - 1$

A) $a_1 = -1, a_2 = -2, a_3 = -3, a_4 = -4$

C) $a_1 = 1, a_2 = 0, a_3 = -1, a_4 = -2$

B) $a_1 = 1, a_2 = 2, a_3 = 3, a_4 = 4$

D) $a_1 = 1, a_2 = 2, a_3 = 1, a_4 = 0$

193) _____

194) $a_1 = y; a_n = a_{n-1} + T$

A) $a_1 = T, a_2 = T + y, a_3 = T + 2y, a_4 = T + 3y$

C) $a_1 = y, a_2 = y + T, a_3 = y + 2T, a_4 = y + 3T$

B) $a_1 = y, a_2 = y - T, a_3 = y - 2T, a_4 = y - 3T$

D) $a_1 = y, a_2 = T, a_3 = 2T, a_4 = 3T$

194) _____

Write out the sum.

- 195) $\sum_{k=1}^n (2k + 2)$ 195) _____
- A) $1 + 2 + 3 + \dots + n$ B) $2 + 4 + 6 + \dots + (2n + 2)$
C) $4 + 6 + 8 + \dots + (2n + 2)$ D) $2n + 2$

Express the sum using summation notation.

- 196) $3^4 + 4^4 + 5^4 + \dots + 10^4$ 196) _____
- A) $\sum_{k=1}^{10} k^4$ B) $\sum_{k=3}^n k^4$ C) $\sum_{k=3}^{10} k^4$ D) $\sum_{k=4}^{10} (k - 1)^4$

Find the sum of the sequence.

- 197) $\sum_{k=1}^4 2^k$ 197) _____
- A) 14 B) 30 C) 20 D) 18

Find the n th term and the indicated term of the arithmetic sequence $\{a_n\}$ whose initial term, a , and common difference, d , are given.

- 198) $a_1 = -8$; $d = 2$ 198) _____
 $a_n = ?$; $a_{10} = ?$
- A) $a_n = -8 + 2n$; $a_{10} = 10$ B) $a_n = -10 + 2n$; $a_{10} = 22$
C) $a_n = -10 + 2n$; $a_{10} = 10$ D) $a_n = -10 - 2n$; $a_{10} = 10$

Find the indicated term of the arithmetic sequence.

- 199) The fourteenth term of the arithmetic sequence $8\sqrt{3}, 3\sqrt{3}, -2\sqrt{3}, \dots$ 199) _____
- A) $73\sqrt{3}$ B) $78\sqrt{3}$ C) $-62\sqrt{3}$ D) $-57\sqrt{3}$

Find the first term, the common difference, and give a recursive formula for the arithmetic sequence.

- 200) 6th term is -10 ; 15th term is -46 200) _____
- A) $a_1 = -10$, $d = -4$, $a_n = a_{n-1} - 4$ B) $a_1 = 10$, $d = 4$, $a_n = a_{n-1} + 4$
C) $a_1 = 10$, $d = -4$, $a_n = a_{n-1} - 4$ D) $a_1 = -30$, $d = 4$, $a_n = a_{n-1} + 4$

Find the sum.

- 201) $7 + 14 + 21 + \dots + 700$ 201) _____
- A) 35000 B) $\frac{71407}{2}$ C) 34650 D) 35350

Solve.

- 202) A brick staircase has a total of 15 steps. The bottom step requires 100 bricks. Each successive step requires 5 less bricks than the prior one. How many bricks are required to build the staircase? 202) _____
- A) 975 bricks B) 937.5 bricks C) 1950 bricks D) 2025 bricks

Find the fifth term and the nth term of the geometric sequence whose initial term, a , and common ratio, r , are given.

203) $a = -2$; $r = -4$

A) $a_5 = -512$; $a_n = -2 \cdot (-4)^n$

C) $a_5 = -512$; $a_n = -2 \cdot (-4)^{n-1}$

B) $a_5 = 128$; $a_n = -2 \cdot (-4)^{n-1}$

D) $a_5 = 128$; $a_n = -2 \cdot (-4)^n$

203) _____

Find the indicated term of the geometric sequence.

204) 6th term of 0.8, 0.08, 0.008, ...

A) 0.00008

B) 0.00000008

C) 0.0000008

D) 0.000008

204) _____

Find the nth term $\{a_n\}$ of the geometric sequence. When given, r is the common ratio.

205) $3, -\frac{3}{2}, \frac{3}{4}, -\frac{3}{8}, \frac{3}{16}, \dots$

A) $a_n = 3 \cdot \left(-\frac{1}{2}\right)^n$

C) $a_n = 3 \cdot \left(-\frac{1}{4}\right)^{n-1}$

B) $a_n = 3 \cdot \left(-\frac{1}{2}\right)^{n+1}$

D) $a_n = 3 \cdot \left(-\frac{1}{2}\right)^{n-1}$

205) _____

Find the sum.

206) $\sum_{k=1}^4 \left(\frac{3}{4}\right)^{k+1}$

A) $\frac{1575}{1024}$

B) $\frac{7029}{1024}$

C) $\frac{1579}{1024}$

D) $\frac{525}{256}$

206) _____

Solve the system of equations using substitution.

207)

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

A) $x = -2, y = 1$; $x = -1, y = -2$; $x = 1, y = -2$; $x = 2, y = 1$
or $(-2, 1), (-1, -2), (1, -2), (2, 1)$

B) $x = -1, y = -2$; $x = 1, y = -2$
or $(-1, -2), (1, -2)$

C) $x = 1, y = -2$; $x = 4, y = 13$
or $(1, -2), (4, 13)$

D) $x = -2, y = 1$; $x = 2, y = 1$
or $(-2, 1), (2, 1)$

207) _____

208)

$$\begin{cases} 8x^2 + 11y^2 = 176 \\ y = x + 4 \end{cases}$$

A) $x = 0, y = 4$; $x = -\frac{88}{19}, y = -\frac{12}{19}$

or $(0, 4), \left(-\frac{88}{19}, -\frac{12}{19}\right)$

C) $x = 0, y = -4$; $x = -\frac{88}{19}, y = -\frac{12}{19}$

or $(0, -4), \left(-\frac{88}{19}, -\frac{12}{19}\right)$

B) $x = 0, y = -4$; $x = \frac{88}{19}, y = \frac{164}{19}$

or $(0, -4), \left(\frac{88}{19}, \frac{164}{19}\right)$

D) $x = 0, y = 4$; $x = \frac{88}{19}, y = \frac{164}{19}$

or $(0, 4), \left(\frac{88}{19}, \frac{164}{19}\right)$

208) _____

Solve using elimination.

209)

209) _____

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

A) $x = \frac{2\sqrt{3}}{3}, y = \frac{\sqrt{3}}{3}; x = -\frac{2\sqrt{3}}{3}, y = -\frac{\sqrt{3}}{3}$

or $\left(\frac{2\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right), \left(-\frac{2\sqrt{3}}{3}, -\frac{\sqrt{3}}{3}\right)$

C) $x = \frac{2\sqrt{3}}{3}, y = -\frac{\sqrt{3}}{3}; x = -\frac{2\sqrt{3}}{3}, y = \frac{\sqrt{3}}{3}$

or $\left(\frac{2\sqrt{3}}{3}, -\frac{\sqrt{3}}{3}\right), \left(-\frac{2\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right)$

B) $x = \frac{-2}{3}, y = -\frac{1}{3}; x = \frac{2\sqrt{3}}{3}, y = \frac{1}{3}$

or $\left(\frac{-2}{3}, -\frac{1}{3}\right), \left(\frac{2\sqrt{3}}{3}, \frac{1}{3}\right)$

D) $x = \frac{-2}{3}, y = \frac{1}{3}; x = \frac{2\sqrt{3}}{3}, y = -\frac{1}{3}$

or $\left(\frac{-2}{3}, \frac{1}{3}\right), \left(\frac{2\sqrt{3}}{3}, -\frac{1}{3}\right)$

Solve the system of equations by substitution.

210)

210) _____

$$\begin{cases} x + 7y = -2 \\ 3x + y = 34 \end{cases}$$

A) $x = 7, y = 12; (7, 12)$

C) $x = 3, y = 7; (3, 7)$

B) $x = 12, y = -2; (12, -2)$

D) $x = -2, y = 3; (-2, 3)$

211)

211) _____

$$\begin{cases} 3x + y = 13 \\ 2x - 7y = 24 \end{cases}$$

A) $x = -5, y = 2; (-5, 2)$

C) $x = 5, y = 2; (5, 2)$

B) $x = 5, y = -2; (5, -2)$

D) $x = -5, y = -2; (-5, -2)$

Solve the system of equations by elimination.

212)

212) _____

$$\begin{cases} 3x - 5y = -12 \\ 6x + 8y = -24 \end{cases}$$

A) $x = -4, y = 0; (-4, 0)$

C) $x = 0, y = 4; (0, 4)$

B) $x = 0, y = -4; (0, -4)$

D) $x = 4, y = 0; (4, 0)$

Solve the problem.

213) A flat rectangular piece of aluminum has a perimeter of 54 inches. The length is 11 inches longer than the width. Find the width.

213) _____

A) 19 in.

B) 30 in.

C) 27 in.

D) 8 in.

Solve the system of equations. If the system has no solution, say that it is inconsistent.

214)

214) _____

$$\begin{cases} 7x - 9y = 3 \\ 14x - 18y = 9 \end{cases}$$

A) $x = 3, y = 9; (3, 9)$

C) $x = 2, y = 3; (2, 3)$

B) $x = \frac{4}{7}, y = -\frac{4}{9}; \left(\frac{4}{7}, \frac{4}{9}\right)$

D) inconsistent

Solve the system of equations.

215)

$$\begin{cases} x - y + 5z = -5 \\ 3x + z = 0 \\ x + 3y + z = 15 \end{cases}$$

- A) $x = 0, y = 0, z = 5; (0, 0, 5)$
 C) $x = 0, y = 5, z = -5; (0, 5, -5)$

- B) $x = 0, y = 5, z = 0; (0, 5, 0)$
 D) inconsistent

215) _____

216)

$$\begin{cases} 4x + 3y + z = -13 \\ 2x - 2y - z = -9 \\ 4x + y + 4z = -26 \end{cases}$$

- A) $x = -4, y = -3, z = 2; (-4, -3, 2)$
 C) $x = -3, y = 2, z = -4; (-3, 2, -4)$

- B) $x = -4, y = 2, z = -3; (-4, 2, -3)$
 D) inconsistent

216) _____

Solve the problem.

217) A ceramics workshop makes wreaths, trees, and sleighs for sale at Christmas. A wreath takes 3 hours to prepare, 2 hours to paint, and 10 hours to fire. A tree takes 16 hours to prepare, 3 hours to paint, and 4 hours to fire. A sleigh takes 4 hours to prepare, 13 hours to paint, and 7 hours to fire. If the workshop has 90 hours for preparation time, 50 hours for painting, and 90 hours for firing, how many of each can be made?

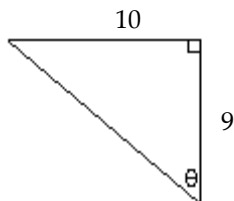
- A) 2 wreaths, 6 trees, 4 sleighs
 C) 6 wreaths, 4 trees, 2 sleighs

- B) 4 wreaths, 2 trees, 6 sleighs
 D) 7 wreaths, 5 trees, 3 sleighs

217) _____

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

218)



Find $\cot \theta$.

A) $\cot \theta = \frac{10}{9}$

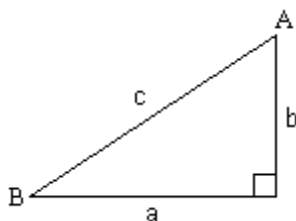
B) $\cot \theta = \frac{10\sqrt{181}}{181}$

C) $\cot \theta = \frac{9}{10}$

D) $\cot \theta = \frac{9\sqrt{181}}{181}$

218) _____

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



219) $a = 4, c = 8$; Find b, A , and B .

- A) $b = 8.94$
 $A = 31^\circ$
 $B = 59^\circ$

- B) $b = 6.93$
 $A = 60^\circ$
 $B = 30^\circ$

- C) $b = 8.94$
 $A = 30^\circ$
 $B = 60^\circ$

- D) $b = 6.93$
 $A = 30^\circ$
 $B = 60^\circ$

219) _____

Solve the problem.

220) A photographer points a camera at a window in a nearby building forming an angle of 42° with the camera platform. If the camera is 52 m from the building, how high above the platform is the window, to the nearest hundredth of a meter? 220) _____

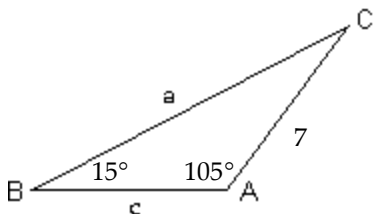
- A) 0.9 m B) 1.11 m C) 46.82 m D) 57.75 m

221) 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. 221) _____

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

Solve the triangle.

222) _____ 222) _____



- A) $C = 60^\circ, a = 23.42, c = 26.12$ B) $C = 55^\circ, a = 23.42, c = 26.12$
 C) $C = 65^\circ, a = 26.12, c = 23.42$ D) $C = 60^\circ, a = 26.12, c = 23.42$

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.

223) $A = 30^\circ, a = 13, b = 26$ 223) _____

- A) $B = 60^\circ, C = 90^\circ, c = 22.5$ B) $B = 60^\circ, C = 60^\circ, c = 22.5$
 C) $B = 90^\circ, C = 60^\circ, c = 22.5$ D) no triangle

224) $B = 41^\circ, a = 4, b = 3$ 224) _____

- A) two triangles
 $A_1 = 61^\circ, C_1 = 78^\circ, c_1 = 0.1;$
 $A_2 = 119^\circ, C_2 = 20^\circ, c_2 = 0.1$
 B) one triangle
 $A = 29^\circ, C = 110^\circ, c = 5.7$
 C) two triangles
 $A_1 = 61^\circ, C_1 = 78^\circ, c_1 = 4.5;$
 $A_2 = 119^\circ, C_2 = 20^\circ, c_2 = 1.6$
 D) no triangle

Solve the triangle.

225) $a = 6, b = 8, C = 70^\circ$ 225) _____

- A) $c = 8.2, A = 43.5^\circ, B = 66.5^\circ$ B) $c = 9, A = 52.8^\circ, B = 57.2^\circ$
 C) $c = 6.3, A = 28.6^\circ, B = 81.4^\circ$ D) $c = 10, A = 56.9^\circ, B = 53.1^\circ$

226) $a = 9, b = 13, c = 16$ 226) _____

- A) $A = 32.2^\circ, B = 54.3^\circ, C = 93.5^\circ$ B) $A = 36.2^\circ, B = 52.3^\circ, C = 91.5^\circ$
 C) $A = 34.2^\circ, B = 54.3^\circ, C = 91.5^\circ$ D) no triangle

Find the area of the triangle. If necessary, round the answer to two decimal places.

227) $a = 12, b = 15, C = 52^\circ$ 227) _____

- A) 88.80 B) 35.46 C) 141.84 D) 70.92

228) $a = 14, b = 32, c = 26$

A) 177.99

B) 5280.01

C) 181.99

D) 3219.69

228) _____

Solve the problem.

229) A painter needs to cover a triangular region 63 meters by 68 meters by 71 meters. A can of paint covers 70 square meters. How many cans will be needed?

A) 3 cans

B) 318 cans

C) 28 cans

D) 14 cans

229) _____

Find the exact value of the expression.

230) $\tan^{-1}(1)$

A) $\frac{3\pi}{4}$

B) $\frac{5\pi}{4}$

C) $\frac{\pi}{4}$

D) $\frac{7\pi}{4}$

230) _____

Use a calculator to find the value of the expression rounded to two decimal places.

231) $\cos^{-1}(0.6)$

A) 0.64

B) 53.13

C) 0.93

D) 36.87

231) _____

Find the exact value of the expression. Do not use a calculator.

232) $\sin^{-1}\left(\sin \frac{6\pi}{7}\right)$

A) $\frac{6\pi}{7}$

B) $\frac{7}{\pi}$

C) $\frac{\pi}{7}$

D) $\frac{7}{6\pi}$

232) _____

233) $\cos^{-1}\left(\cos \frac{4\pi}{5}\right)$

A) $\frac{4\pi}{5}$

B) $\frac{5}{4\pi}$

C) $\frac{\pi}{5}$

D) $\frac{5}{\pi}$

233) _____

Find the exact value, if any, of the composite function. If there is no value, say it is "not defined". Do not use a calculator

234) $\cos[\cos^{-1}(-4)]$

A) -4

B) 1

C) 4

D) not defined

234) _____

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

235) $f(x) = 3 \sin x - 8$

A) $f^{-1}(x) = \cos\left(\frac{x+8}{3}\right)$

B) $f^{-1}(x) = \sin^{-1}\left(\frac{x+8}{3}\right)$

C) $f^{-1}(x) = 3 \sin^{-1} x - 8$

D) $f^{-1}(x) = \sin^{-1}\left(\frac{x+3}{8}\right)$

235) _____

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

236) $f(x) = 4 \sin x - 8$

A) Domain of f : $(-\infty, \infty)$

Domain of f^{-1} : $[4, 12]$

C) Domain of f : $(-\infty, \infty)$

Domain of f^{-1} : $(-\infty, \infty)$

B) Domain of f : $(-\infty, \infty)$

Domain of f^{-1} : $[-12, -4]$

D) Domain of f : $[4, 12]$

Domain of f^{-1} : $[-12, -4]$

236) _____

237) $f(x) = 3 \sin(4x - 1)$

237) _____

A) Domain of f : $(-\infty, \infty)$
 Domain of f^{-1} : $[-3, 3]$

B) Domain of f : $[-3, 3]$
 Domain of f^{-1} : $(-\infty, \infty)$

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

D) Domain of f : $\left[-\frac{1}{4}, \frac{1}{4}\right]$
 Domain of f^{-1} : $(-\infty, \infty)$

Find the exact solution of the equation.

238) $\cos^{-1} x = 0$

238) _____

A) $x = -1$

B) $x = 1$

C) $x = \pi$

D) $x = 0$

239) $-\sin^{-1}(4x) = \frac{\pi}{4}$

239) _____

A) $x = -\frac{\sqrt{2}}{2}$

B) $x = \frac{\sqrt{2}}{8}$

C) $x = 0$

D) $x = -\frac{\sqrt{2}}{8}$

240) $7 \sin^{-1} x - 4\pi = 5 \sin^{-1} x - 5\pi$

240) _____

A) -1

B) $-\frac{1}{2}$

C) 1

D) 0

Find the exact value of the expression.

241) $\sec\left[\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right]$

241) _____

A) 2

B) 0

C) 1

D) $\frac{\sqrt{2}}{2}$

242) $\sec\left(\tan^{-1}\frac{\sqrt{3}}{3}\right)$

242) _____

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

B) 2

C) $\frac{1}{2}$

D) $\sqrt{3}$

243) $\csc\left[\tan^{-1}\left(-\frac{2}{7}\right)\right]$

243) _____

A) $\frac{7\sqrt{53}}{53}$

B) $\frac{\sqrt{53}}{7}$

C) $-\frac{\sqrt{53}}{2}$

D) $-\frac{7\sqrt{53}}{53}$

Given that $f(x) = \sin x$, $g(x) = \cos x$, and $h(x) = \tan x$, find the exact value of the composite function.

244) $f\left(g^{-1}\left(\frac{2}{3}\right)\right)$

244) _____

A) $\frac{\sqrt{5}}{2}$

B) $\frac{\sqrt{5}}{3}$

C) $\frac{2}{3}$

D) $\frac{2\sqrt{5}}{5}$

$$245) \ln \left(g^{-1} \left(\frac{2}{3} \right) \right)$$

A) $\frac{3}{2}$

B) $\frac{\sqrt{5}}{3}$

C) $\frac{\sqrt{5}}{2}$

D) $\sqrt{5}$

245) _____

Write the trigonometric expression as an algebraic expression in u.

$$246) \sin(\tan^{-1} u)$$

A) $u\sqrt{u^2 + 1}$

B) $\frac{u\sqrt{u^2 - 1}}{u^2 - 1}$

C) $\frac{u\sqrt{u^2 + 1}}{u^2 + 1}$

D) $\frac{\sqrt{u^2 + 1}}{u^2 + 1}$

246) _____

$$247) \cot(\cos^{-1} u)$$

A) $\frac{u\sqrt{u^2 + 1}}{u^2 + 1}$

B) $\sqrt{1 - u^2}$

C) $\frac{\sqrt{1 - u^2}}{u}$

D) $\frac{u\sqrt{1 - u^2}}{1 - u^2}$

247) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Establish the identity.

$$248) \cot \theta \cdot \sec \theta = \csc \theta$$

248) _____

$$249) (1 - \cos x)(1 + \cos x) = \sin^2 x$$

249) _____

$$250) \frac{\cot u + \csc u - 1}{\cot u - \csc u + 1} = \csc u + \cot u$$

250) _____

$$251) 1 + \sec^2 x \sin^2 x = \sec^2 x$$

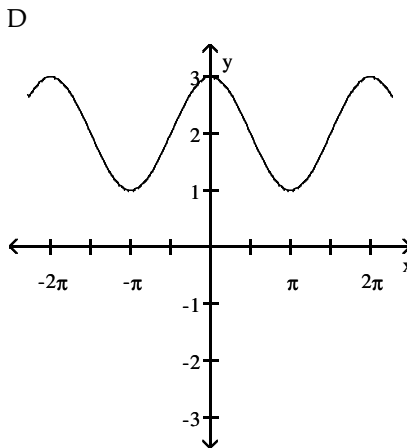
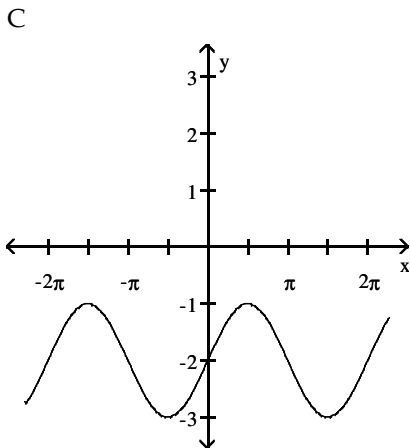
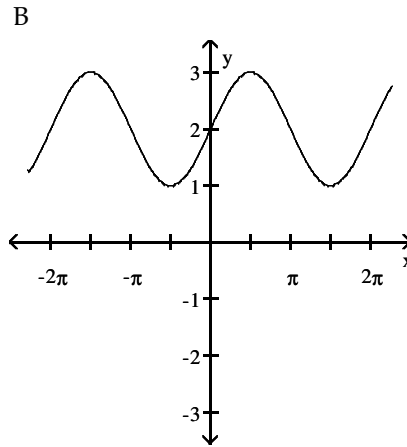
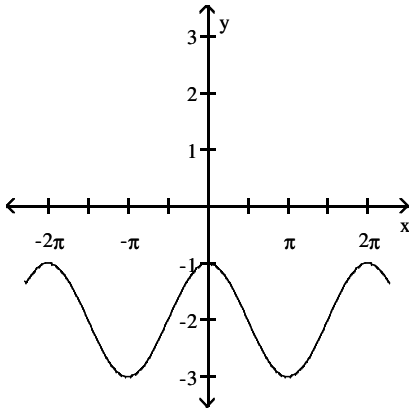
251) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Match the given function to its graph.

- 252) 1) $y = 2 + \sin x$ 2) $y = 2 + \cos x$
 3) $y = -2 + \sin x$ 4) $y = -2 + \cos x$

252) _____



A) 1B, 2D, 3C, 4A

B) 1A, 2C, 3D, 4B

C) 1A, 2D, 3C, 4B

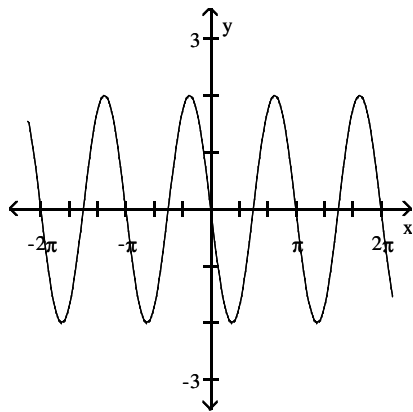
D) 1A, 2B, 3C, 4D

253) 1) $y = -2 \sin(2x)$ 2) $y = -2 \sin\left(\frac{1}{2}x\right)$

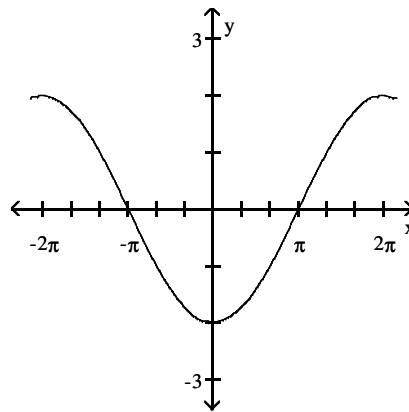
253) _____

3) $y = -2 \cos(2x)$ 4) $y = -2 \cos\left(\frac{1}{2}x\right)$

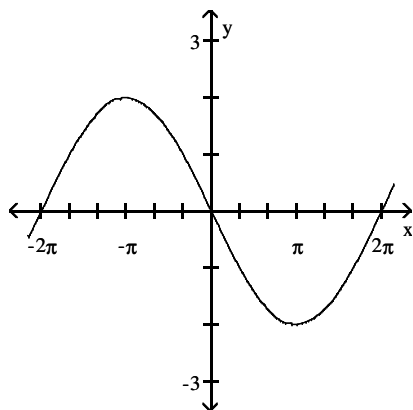
A



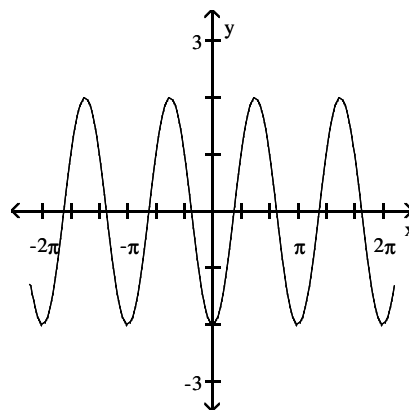
B



C



D



A) 1D, 2B, 3A, 4C

B) 1C, 2A, 3B, 4D

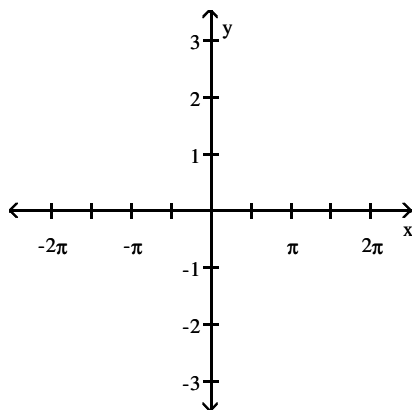
C) 1C, 2A, 3D, 4B

D) 1A, 2C, 3D, 4B

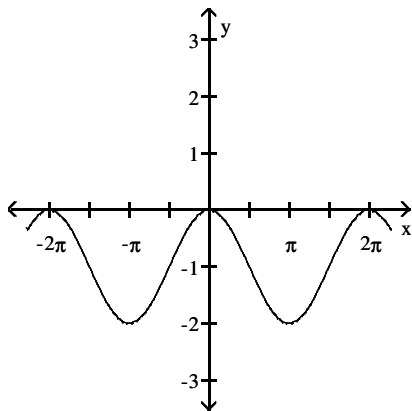
Graph the sinusoidal function using key points.

254) $y = \sin x - 1$

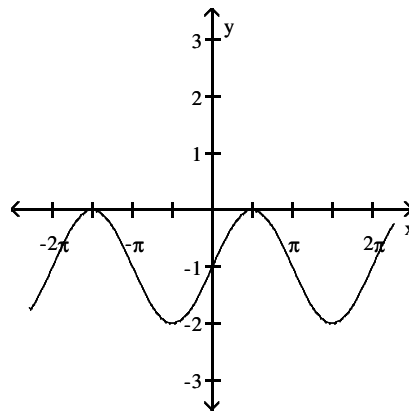
254) _____



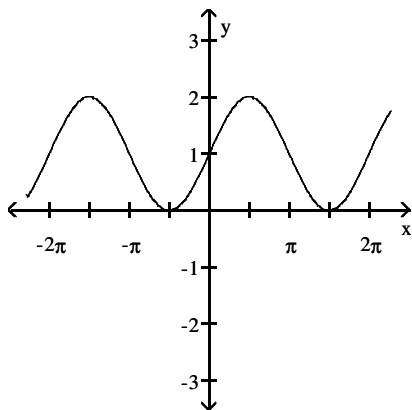
A)



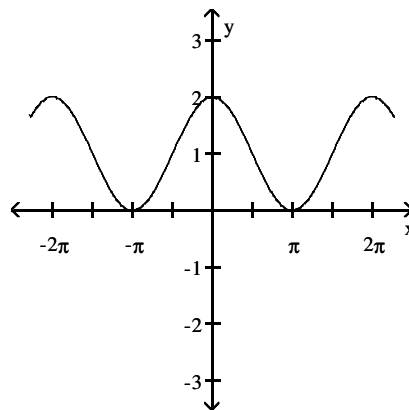
B)



C)



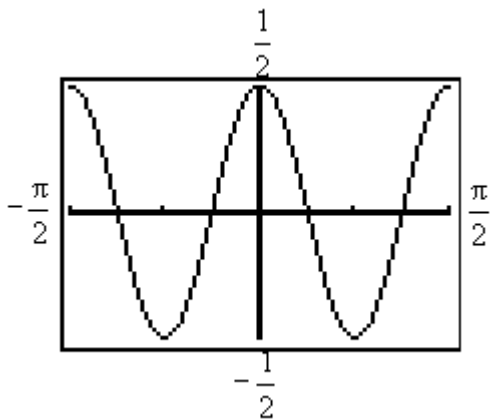
D)



Find an equation for the graph.

255)

255) _____



A) $y = \cos(4x)$

B) $y = \frac{1}{2} \cos\left(\frac{1}{4}x\right)$

C) $y = \frac{1}{2} \cos(4x)$

D) $y = \frac{1}{2} \cos\left(\frac{1}{2}x\right)$

Answer Key

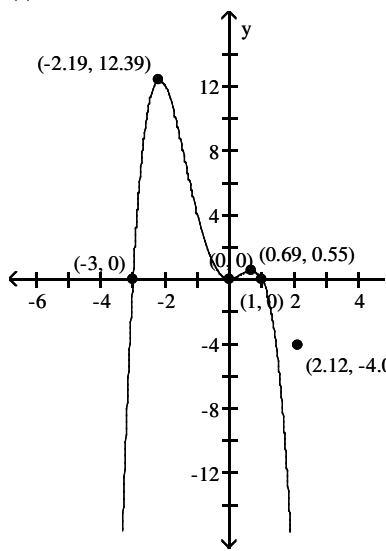
Testname: PRECALCULUS ONLINE REVIEW

- | | | |
|-------|--------|--------|
| 1) D | 51) A | 101) A |
| 2) B | 52) A | 102) D |
| 3) B | 53) C | 103) C |
| 4) B | 54) A | 104) C |
| 5) C | 55) C | 105) C |
| 6) D | 56) C | 106) B |
| 7) D | 57) D | 107) C |
| 8) B | 58) A | 108) A |
| 9) C | 59) B | 109) D |
| 10) A | 60) C | 110) B |
| 11) D | 61) A | 111) C |
| 12) C | 62) D | 112) C |
| 13) C | 63) C | 113) A |
| 14) B | 64) D | 114) C |
| 15) A | 65) B | 115) D |
| 16) D | 66) A | 116) B |
| 17) C | 67) D | 117) B |
| 18) B | 68) B | 118) C |
| 19) C | 69) D | 119) D |
| 20) D | 70) B | 120) A |
| 21) B | 71) B | 121) C |
| 22) C | 72) D | 122) D |
| 23) B | 73) A | 123) D |
| 24) B | 74) A | 124) A |
| 25) B | 75) B | 125) A |
| 26) D | 76) B | |
| 27) B | 77) B | |
| 28) A | 78) B | |
| 29) B | 79) D | |
| 30) B | 80) D | |
| 31) C | 81) C | |
| 32) C | 82) C | |
| 33) D | 83) A | |
| 34) D | 84) A | |
| 35) B | 85) B | |
| 36) C | 86) B | |
| 37) C | 87) B | |
| 38) A | 88) D | |
| 39) B | 89) A | |
| 40) D | 90) C | |
| 41) D | 91) C | |
| 42) A | 92) A | |
| 43) C | 93) C | |
| 44) C | 94) D | |
| 45) D | 95) A | |
| 46) D | 96) B | |
| 47) A | 97) B | |
| 48) B | 98) A | |
| 49) C | 99) D | |
| 50) C | 100) B | |

Answer Key

Testname: PRECALCULUS ONLINE REVIEW

- 126) (a) For large values of $|x|$, the graph of $f(x)$ will resemble the graph of $y = -x^4$.
 (b) y-intercept: $(0, 0)$,
 x-intercepts: $(-3, 0)$, $(0, 0)$, and $(1, 0)$
 (c) The graph of f crosses the x-axis at $(1, 0)$ and $(-3, 0)$ and touches the x-axis at $(0, 0)$.
 (e) Local maxima at $(-2.19, 12.39)$ and $(0.69, 0.55)$; Local minimum at $(0, 0)$
 (f)



- (g) Domain of f : all real numbers; range of f : $(-\infty, 12.39]$
 (h) f is increasing on $(-\infty, -2.19)$ and $(0, 0.69)$; f is decreasing on $(-2.19, 0)$ and $(0.69, \infty)$

- 127) A
 128) A
 129) A
 130) B
 131) C
 132) C
 133) C
 134) C
 135) C
 136) B
 137) C
 138) C
 139) D
 140) D
 141) A
 142) B

- 143) C
 144) C
 145) D
 146) B
 147) D
 148) A
 149) C
 150) B
 151) C
 152) B
 153) A
 154) D
 155) A
 156) D
 157) A
 158) C
 159) B
 160) C
 161) C
 162) D
 163) B
 164) C
 165) D
 166) C
 167) B
 168) D
 169) C
 170) C
 171) C
 172) A
 173) A
 174) A
 175) B
 176) B
 177) E
 178) A
 179) C
 180) B
 181) B
 182) B
 183) A
 184) D
 185) B
 186) B
 187) B
 188) B
 189) D
 190) A
 191) B
 192) C

- 193) C
 194) C
 195) C
 196) C
 197) B
 198) C
 199) D
 200) C
 201) D
 202) A
 203) C
 204) D
 205) D
 206) A
 207) A
 208) A
 209) A
 210) B
 211) B
 212) A
 213) D
 214) D
 215) B
 216) B
 217) C
 218) C
 219) D
 220) C
 221) B
 222) D
 223) C
 224) C
 225) A
 226) C
 227) D
 228) A
 229) C
 230) C
 231) C
 232) C
 233) A
 234) D
 235) B
 236) B
 237) A
 238) B
 239) D
 240) A
 241) A
 242) A

Answer Key

Testname: PRECALCULUS ONLINE REVIEW

243) C

244) B

245) C

246) C

247) D

$$248) \cot \theta \cdot \sec \theta = \frac{\cos \theta}{\sin \theta} \cdot \frac{1}{\cos \theta} =$$

$$\frac{1}{\sin \theta} = \csc \theta$$

$$249) (1 - \cos x)(1 + \cos x) = 1 - \cos^2 x$$

$$= \sin^2 x$$

$$250) \frac{\cot u + \csc u - 1}{\cot u - \csc u + 1} =$$

$$\frac{\cot u + (\csc u - 1)}{\cot u - (\csc u - 1)} =$$

$$\frac{\cot u + (\csc u - 1)}{\cot u - (\csc u - 1)} \cdot$$

$$\frac{\cot u + (\csc u - 1)}{\cot u + (\csc u - 1)} =$$

$$\frac{\cot^2 u + 2 \cot u(\csc u - 1) + (\csc^2 u - 2 \csc u + 1)}{\cot^2 u - (\csc^2 u - 2 \csc u + 1)}$$

=

$$\frac{\csc^2 u - 1 + 2 \cot u(\csc u - 1) + (\csc^2 u - 2 \csc u + 1)}{\csc^2 u - 1 - (\csc^2 u - 2 \csc u + 1)}$$

=

$$\frac{2 \csc^2 u - 2 \csc u + 2 \cot u(\csc u - 1)}{-2 + 2 \csc u}$$

=

$$\frac{2 \csc u(\csc u - 1) + 2 \cot u(\csc u - 1)}{2(\csc u - 1)}$$

$$= \frac{2(\csc u + \cot u)(\csc u - 1)}{2(\csc u - 1)} =$$

$$\csc u + \cot u$$

$$251) 1 + \sec^2 x \sin^2 x = 1 + \frac{\sin^2 x}{\cos^2 x} = 1$$

$$+ \tan^2 x = \sec^2 x.$$

252) A

253) D

254) B

255) C