

Multiple Choice

1. An expression is given. Evaluate it at the given value
 $-x^4 + x^3 + 8x$, $x = -1$

(A) -10 (B) 9 (C) 9 (D) 10 (E) -12

2. Simplify the expression. $\frac{x-2}{x^2-4}$

(A) $x+2$ (B) $\frac{1}{x+2}$ (C) $\frac{1}{x-2}$
 (D) $\frac{1}{x+4}$ (E) $\frac{1}{x-4}$

3. Simplify the expression. $\frac{x^3+7x^2+10x}{x^2+8x+15}$

(A) $\frac{x+2}{x+3}$ (B) $\frac{x(x+2)}{x+3}$ (C) $\frac{x+2}{x(x+3)}$
 (D) $x(x+2)$ (E) $\frac{x(x+3)}{x+2}$

4. Simplify the expression. $\frac{2y^2-5y-7}{4y^2-49} \div \frac{y^2-6y-7}{2y^2-7y-49}$

(A) 1 (B) $\frac{1}{y-1}$ (C) $\frac{1}{2y-7}$
 (D) $\frac{1}{y-7}$ (E) $2y-1$

5. Simplify the expression. $\frac{x}{x^2-6x-27} - \frac{4}{x+3} - \frac{6}{x-9}$

(A) $\frac{18+9x}{(x-3)(x+9)}$ (B) $\frac{18-9x^2}{(x+3)(x-9)}$
 (C) $\frac{18-9x}{(x+3)(x-9)}$ (D) $\frac{18-9x}{(x-3)(x+9)}$

6. Simplify the expression. $\frac{1}{x+3} - \frac{1}{(x+3)^2} + \frac{9}{x^2-9}$

(A) $\frac{x^2+8x+21}{(x+3)^2(x-3)^2}$ (B) $\frac{x^2+8x+21}{(x+3)^2+(x-3)}$
 (C) $\frac{x^2+8x+21}{(x+3)^2(x-3)}$ (D) $\frac{x^2+8x+21}{(x+3)(x-3)^2}$
 (E) $\frac{x^2-8x-21}{(x+3)^2(x-3)}$

7. Express the function in the form $f \circ g$.

$$H(x) = \sqrt{4 + \sqrt{x}}$$

(A) $f(x) = \sqrt{x}$, $g(x) = \sqrt{4+x}$
 (B) $f(x) = \sqrt{4+x}$, $g(x) = \sqrt{x}$
 (C) $f(x) = \sqrt{4-x}$, $g(x) = x^2$
 (D) $f(x) = \sqrt{x}$, $g(x) = \sqrt{4-x}$

8. Express the function in the form $f \circ g \circ h$.

$$j(x) = \frac{4}{(7 + \sqrt{x})^6}$$

(A) $f(x) = \frac{4}{x^6}$, $g(x) = 7+x$, $h(x) = \sqrt{x}$

(B) $f(x) = \sqrt{x}$, $g(x) = \frac{4}{x^6}$, $h(x) = 7+x$

(C) $f(x) = 7+x$, $g(x) = \sqrt{x}$, $h(x) = \frac{4}{x^6}$

(D) $f(x) = 7+x$, $g(x) = \frac{4}{x^6}$, $h(x) = \sqrt{x}$

9. Find the domain of $g \circ f$, if $f(x) = x^2$ and $g(x) = \sqrt{x-25}$.

(A) $(-\infty, -5] [5, \infty)$

(B) $[5, \infty)$

(C) $(-\infty, -5) (5, \infty)$

(D) $(-\infty, -20] [20, \infty)$

10. Simplify the expression. $\sqrt{1 + \left(\frac{x}{\sqrt{9-x^2}}\right)^2}$

(A) $\frac{3}{9-x^2}$ (B) $\frac{3}{\sqrt[3]{9-x^2}}$ (C) $\frac{3}{\sqrt[4]{9-x^2}}$

(D) $\frac{3}{\sqrt{9-x^2}}$ (E) $\frac{1}{9-x^2}$

11. Determine whether the given value is a solution of the equation. $\frac{1}{x} - \frac{1}{x-8} = \frac{1}{2}$, $x = 4$

(A) yes (B) no

12. Solve the equation. $-4w + 32 = -8w$

(A) 8 (B) 32 (C) 9 (D) -8 (E) -9

13. Solve the equation. $\frac{z}{9} = \frac{6}{63}z + 7$

(A) -49 (B) 7 (C) 6 (D) 63 (E) 441

14. Solve the equation. $x - \frac{1}{12}x - \frac{1}{2}x - \frac{80}{24} = 0$

(A) 8 (B) 6 (C) -6 (D) -8 (E) 9

15. Solve the equation. $\frac{4}{x-6} + \frac{12}{x+6} = \frac{144}{x^2-36}$

(A) 6 (B) 4 (C) -6 (D) 36 (E) 12

16. Solve the equation. $(t-5)^2 = (t+5)^2 + 160$

(A) -5 (B) 5 (C) -8 (D) 8 (E) -32

17. Find all real solutions of the equation.

$$2x^2 + 7x - 4 = 0$$

(A) none of these (B) $x = -\frac{1}{2}, 4$

(C) $x = \frac{3}{2}, -1$ (D) $x = \frac{1}{2}, -4$ (E) $x = -\frac{1}{2}, -4$

18. Find all real solutions of the equation.

$$\sqrt{4x+16}+4=x$$

- (A) 4, 0 (B) 0 (C) -12
(D) 0, 12 (E) 12

19. Solve the linear inequality. Express the solution using interval notation. $3(5x-2)\leq 12x+27$

- (A) $(-\infty, 13]$ (B) $(-\infty, 11]$ (C) $(-\infty, 10]$
(D) $(-\infty, 14]$ (E) $(-\infty, 12]$

20. Solve the nonlinear inequality. Express the solution using interval notation. $x^2-2x-24\leq 0$

- (A) $(-\infty, -5)$ $[8, \infty)$ (B) $(-\infty, -5]$ $[8, \infty)$
(C) $[-5, 8]$ (D) $[-4, 6]$ (E) $(-\infty, -6)$ $[4, \infty)$

21. Solve the nonlinear inequality. Express the solution using interval notation. $\frac{3x+1}{x-4}\leq 4$

- (A) $(-\infty, 4)$ $[19, \infty)$ (B) $(-\infty, 4)$ $[18, \infty)$
(C) $(-\infty, 4)$ $[17, \infty)$ (D) $(-\infty, 4)$ $[15, \infty)$
(E) $(-\infty, 4)$ $[16, \infty)$

22. Solve the inequality. Express the solution using interval notation. $0 < 11 - 5x$

- (A) $\left[\frac{14}{5}, \infty\right)$ (B) $\left(\frac{14}{5}, \infty\right)$ (C) $\left(-\infty, \frac{11}{5}\right)$
(D) $\left(-\infty, \frac{14}{5}\right)$ (E) $\left(-\infty, \frac{11}{5}\right)$

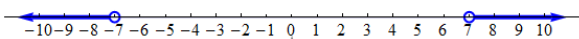
23. Solve the inequality. Express the solution using interval notation. $3 \leq x+9 < 6$

- (A) $[-8, -6)$ (B) $[2, 7)$ (C) $[3, 6)$
(D) $[-6, -3)$ (E) $[-7, -2)$

24. Solve the inequality. Express the answer using interval notation. $|x+9|\geq 6$

- (A) \emptyset (B) $[-15, -3]$ (C) $[-3, \infty)$
(D) $(-\infty, -15]$ $[-3, \infty)$ (E) $(-\infty, -15)$ $(-3, \infty)$

25. A set of real numbers is graphed. Find an inequality involving an absolute value that describes the set.



- (A) $|x| > 7$ (B) $|x-6| < 7$ (C) $|x| \geq 7$
(D) $|x| \leq 7$ (E) $|x| < 7$

26. Solve the nonlinear inequality. Express the solution using interval notation and graph the solution set.

$$\frac{x}{x+1} > 3x$$

- (A) $(-\infty, -1)$ $(0, \infty)$ (B) $(-\infty, -1)$ $\left(-\frac{2}{3}, 0\right)$
(C) $(-\infty, -1)$ $\left(-\frac{2}{3}, \infty\right)$ (D) $(-1, 0)$ $\left(\frac{2}{3}, \infty\right)$

27. Evaluate the function $f(x) = x^2 + 6x$ at $f(8)$.

- (A) $f(8) = 56$ (B) $f(8) = 16$ (C) $f(8) = 112$
(D) $f(8) = 72$ (E) $f(8) = 120$

28. Evaluate the function $f(x) = \frac{13-x}{-1+x}$ at $f(5)$.

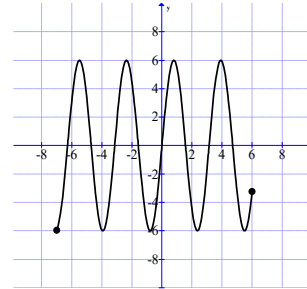
- (A) $f(5) = 1.5$ (B) $f(5) = 1.75$ (C) $f(5) = 2.25$
(D) $f(5) = 1.25$ (E) $f(5) = 2$

29. Find the domain of the following function:

$$f(x) = \sqrt[3]{x-4}$$

- (A) $(-\infty, \infty)$ (B) $[0, \infty)$ (C) $(0, \infty)$
(D) $[4, \infty)$ (E) $(-\infty, 4]$

30. What is the domain and range of the function that is graphed below?



- (A) Domain: $(-7, 6)$, Range: $[-6, 6]$
(B) Domain: $(-\infty, \infty)$, Range: $[-6, 6]$
(C) Domain: $[-7, 6]$, Range: $[-6, 6]$
(D) Domain: $[-7, 6]$, Range: $(-\infty, \infty)$
(E) Domain: $[-6, 6]$, Range: $[-7, 6]$

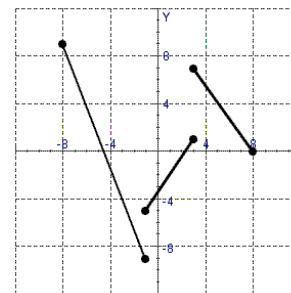
31. What is the average rate of change of the function $f(x) = x^3 - 2x^2$ between $x = 0$ and $x = 8$?

- (A) 44 (B) 47 (C) 48 (D) 46 (E) 41

32. What is the average rate of change of the function $f(x) = x + x^2$ between $x = 0$ and $x = 8$?

- (A) 6 (B) 7 (C) 10 (D) 8 (E) 5

33. The graph of the function is sketched as follows:



Determine the interval on which the function is increasing.

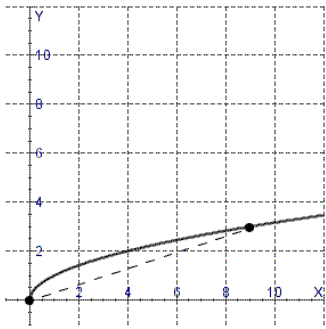
- (A) $(-1, -8)$
(B) $(3, 8)$
(C) $(-8, -1)$
(D) $(-1, 3)$
(E) $(3, -2)$

34. How many units must we shift the graph of $f(x) = 2(x+8)^4$ to obtain the graph of

$$f(x) = 2(x+12)^4$$

- (A) 3 left
(B) 4 left
(C) 4 right
(D) 2 right
(E) 8 left

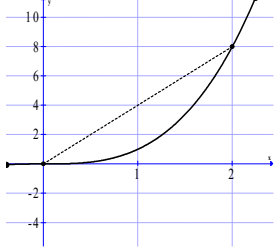
35. The graph of a function is given as follows:



Determine the average rate of change for the function between the indicated values of the variable.

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

36. The graph of a function is sketched as follows:



Determine the average rate of change of the function between the indicated values.

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

37. The table shows the number of CD players sold in a small electronics store in the years 1989 - 1999 as follows:

| Year | CD players sold |
|------|-----------------|
| 1989 | 545 |
| 1990 | 675 |
| 1991 | 665 |
| 1992 | 665 |
| 1993 | 600 |
| 1994 | 550 |
| 1995 | 680 |
| 1996 | 560 |
| 1997 | 545 |
| 1998 | 560 |
| 1999 | 695 |

What was the average rate of change of sales between 1989 and 1999?

- (A) 70 CD players/year
 (B) 695 CD players/year
 (C) 150 CD players/year
 (D) 15 CD players/year
 (E) 37.5 CD players/year

38. Suppose the graph of f is given. Describe how the graph of the function can be obtained from the graph of f . $y = 4f(x+5) - 3$

- (A) Shift the graph of $y = f(x)$ to the right 4 units, stretch vertically by a factor of 5, and then shift downward 3 units.
 (B) Shift the graph of $y = f(x)$ to the left 4 units, stretch vertically by a factor of 5, and then shift downward 3 units.
 (C) Shift the graph of $y = f(x)$ to the right 5 units, stretch vertically by a factor of 4, and then shift downward 3 units.
 (D) Shift the graph of $y = f(x)$ to the left 5 units, stretch vertically by a factor of 4, and then shift upward 3 units.
 (E) Shift the graph of $y = f(x)$ to the left 5 units, stretch vertically by a factor of 4, and then shift downward 3 units.

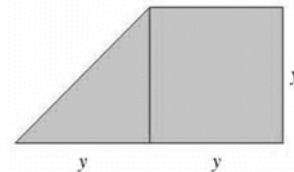
Short Answer

39. Perform the addition and simplify. $\frac{1}{x+5} + \frac{1}{x^2-25}$

40. Perform the subtraction and simplify.

$$\frac{x}{x^2-x-20} - \frac{1}{x+4} - \frac{3}{x-5}$$

41. Find the length y in the figure, if the shaded area is 96 in^2 .



42. Perform the multiplication and simplify.

$$\frac{x^2-3x-40}{x^2-25} \cdot \frac{5+x}{8-x}$$

43. Determine whether the given value is a solution of the equation.

$$\frac{x^{5/2}}{x-6} = x-20$$

- (A) $x = 8$ (B) $x = 4$

44. Solve the equation. $4t-10=18-4t$

45. Solve the equation by factoring. $2y^2+5y+2=0$

46. Solve the equation by completing the square.

$$x^2 = \frac{3}{5}x - \frac{2}{25}$$

47. Find all real solutions of the equation. $|3x|=7$

48. Simplify $(5ab)^4$

49. Simplify $\left(\frac{20t^3}{10s^4}\right)^2$

50. Simplify: $(6x^7 - 8x^6 - 12) - (3x^7 + 6x^6 + 2)$

51. Simplify:
 $(1.3x^3 + 7.2x^2 + 4.8) + (6.3x - 2.6) - (3.1x^2 - x - 9.4)$

52. Multiply: $(2y - 1)(3y + 10)$

53. Multiply: $(x - 5)(x^2 + 5x + 25)$

54. Factor: $120m^9 - 24m^7 + 60m^2$

55. Factor: $x(y + 11) + 9(y + 11)$

56. Factor: $10y^2 - 23y + 12$

57. Factor: $x^4 - 625$

58. Factor: $x^2 - \frac{1}{16}$

59. Multiply: $5y^2(5y^2 + 2y - 3)$

60. Simplify each radical and combine if possible:
 $2\sqrt{8} - 4\sqrt{72}$

61. Simplify each radical and combine if possible:
 $\sqrt{20} + \sqrt{405}$

62. Simplify each radical and combine if possible:
 $\sqrt{75xy^6} \cdot \sqrt{3x^2y^6}$

63. Rationalize and simplify: $\frac{3}{\sqrt{2}}$

64. Rationalize and simplify: $\sqrt{\frac{10}{x}}$

65. Simplify: $125^{2/3}$

66. Simplify: $\left(\frac{8}{27}\right)^{2/3}$

67. Simplify: $9^{-3/2}$

68. If $f(x) = x^2 - 4$, determine the graph of
 $w(x) = |x^2 - 4|$?

69. Find the domain of the function. $g(x) = \sqrt{8 - x} + 3$

70. Sketch the graph of the piecewise defined function.

$$f(x) = \begin{cases} 2 & \text{if } x < -2 \\ -x & \text{if } -2 \leq x \leq 2 \\ -2 & \text{if } x > 2 \end{cases}$$

71. Sketch the graph of the piecewise defined function.

$$f(x) = \begin{cases} -2x^2 & \text{if } |x| \leq 1 \\ -2 & \text{if } |x| > 1 \end{cases}$$

72. A man is running around a circular track 200 m in circumference. An observer uses a stopwatch to record the runner's time at the end of each lap, obtaining the data in the table.

| Time (s) | Distance (m) |
|----------|--------------|
| 32 | 200 |
| 66 | 400 |
| 104 | 600 |
| 153 | 800 |
| 209 | 1000 |
| 270 | 1200 |
| 341 | 1400 |
| 419 | 1600 |

- (a) What was the man's average speed (rate) between 66 s and 153 s? Please round your answer to the nearest hundredth.
- (b) What was the man's average speed (rate) between 270 s and 419 s? Please round your answer to the nearest hundredth.

For the following, graph, determine the domain and range, and determine where the graph is increasing.

73. $f(x) = x^2 - 3$

74. $f(x) = \frac{1}{x - 2}$

75. $f(x) = -\sqrt{6 - x}$

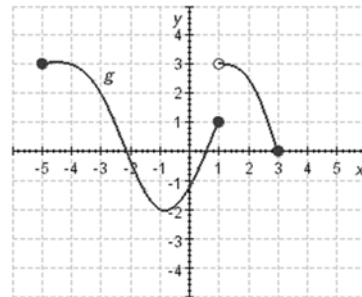
76. $f(x) = (x - 1)^3 + 2$

77. $f(x) = \frac{1}{(x - 3)^2} + 1$

78. $f(x) = \sqrt[3]{2x - 6} - 1$

79. $f(x) = -|x + 2| - 1$

80. Determine where the function is increasing.



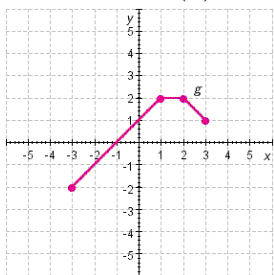
81. A function is given. Determine the average rate of change of the function between the values of the variable. $g(x) = \frac{2}{x + 1}$; $x = 0$, $x = h$

82. Evaluate the following piecewise defined function at $f(1)$, $f(3)$, and $f(7)$.

$$f(x) = \begin{cases} 1 & \text{if } x < 3 \\ 8x - 6 & \text{if } x \geq 3 \end{cases}$$

83. Find the domain of the function. $h(x) = \sqrt{8x - 7}$

84. The graph of g is given. Sketch the graph of the function. $y = g(x) - 2$



85. In a certain country, income tax T is assessed according to the following function of income x .

$$T(x) = \begin{cases} 0 & \text{if } 0 \leq x \leq 10,000 \\ 0.1x & \text{if } 10,000 < x \leq 20,000 \\ 1,800 + 0.12x & \text{if } 20,000 < x \end{cases}$$

- (A) Find $T(3,000)$. (B) Find $T(15,000)$.
(C) Find $T(30,000)$.

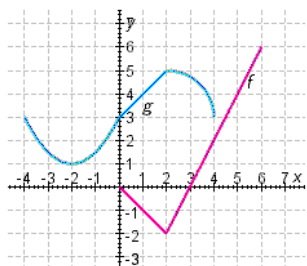
86. Assume f is a one-to-one function. If $f(x) = 3 - 6x$, find $f^{-1}(33)$.

87. Use $f(x) = 2x - 8$ and $g(x) = 4 - x^2$ to evaluate $f(g(-1))$.

88. Find the inverse function of $f(x) = \frac{2-7x}{9-5x}$.

89. Find the inverse function of $f(x) = 7 + \sqrt[3]{x}$.

90. Use the given graphs of f and g to evaluate the expression.

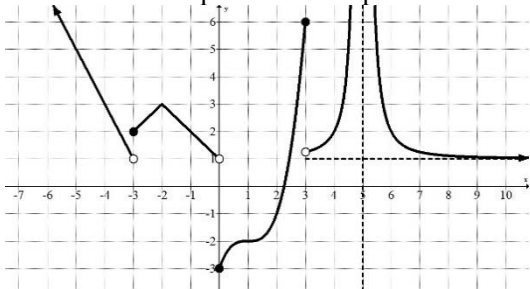


- (A) $(g \circ f)(3) =$
(B) $(g \circ g)(-2) =$

91. Use $f(x) = 2x - 5$ and $g(x) = 12 - x^2$ to evaluate the expression.

(A) $(f \circ f)(-1) =$ (B) $(g \circ g)(4) =$

92. Determine the equation of the piece-wise function.



93. Graph the following function:

$$f(x) = \begin{cases} (x+5)^2 - 2, & x < -3 \\ \sqrt{1-x} + 1, & -3 \leq x \leq 1 \\ \frac{1}{x-3} - 2, & x > 1 \end{cases}$$

94. Identify the value of $\sin^{-1}(.5)$ (in degrees)

95. $\theta = 325^\circ$, find θ_{ref}

96. $\theta = -185^\circ$, find θ_{ref}

97. $\theta = -142^\circ$, $\theta_{\text{ref}} = ?$

98. Convert 710° into radians

99. Convert 135° into radians

100. Convert $\frac{-3\pi}{8}$ into degrees

101. Convert $\frac{2\pi}{9}$ into degrees

102. $\sin \theta = -\frac{2}{3}$ and θ terminates in Quadrant III, $\tan \theta = ?$

103. $\sec \theta = \frac{5}{2}$ and θ terminates in Quadrant IV, find $\csc \theta$

104. $\cos \theta = \frac{1}{3}$ and θ terminates in Quadrant I, find $\cot \theta$

105. If the terminal side of θ passes through $(4, -3)$, find $\tan \theta$.

106. If $\tan \theta = \frac{5}{7}$ in Quadrant III, find $\csc \theta$

107. Which functions are positive in Quadrant I?

108. Which trigonometric functions are positive in Quadrant II?

109. Which trigonometric functions are positive in Quadrant IV?

110. $y = \csc x$ is positive in Quadrants?

Find:

111. $\tan \frac{\pi}{3}$

117. $\sec \frac{-5\pi}{6}$

112. $\sin \left(\frac{5\pi}{6} \right)$

118. $\cos \left(-\frac{\pi}{3} \right)$

113. $\cos \left(\frac{2\pi}{3} \right)$

119. $\cos^2 \left(-\frac{\pi}{3} \right) + \sin^2 \left(-\frac{\pi}{3} \right)$

114. $\csc \frac{7\pi}{6}$

120. $4\cos \left(\frac{3\pi}{4} \right) \sin \left(\frac{3\pi}{4} \right)$

115. $\sec \frac{3\pi}{4}$

121. $\cos^2 \left(-\frac{\pi}{3} \right) - \sin^2 \left(\frac{\pi}{6} \right)$

116. $\cos \frac{-\pi}{6}$

122. $\sec^2 \left(\frac{\pi}{3} \right) - \csc^2 \left(\frac{\pi}{4} \right)$

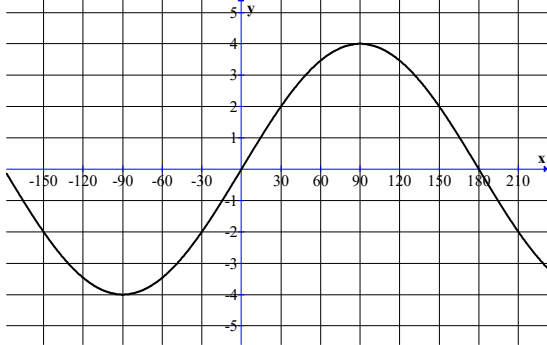
123. Graph $y = 2 + 3 \cos \frac{1}{2}(\theta - 20^\circ)$

124. Graph $y = 1 + \tan \theta$

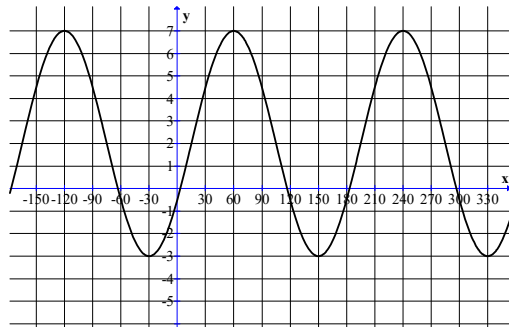
125. Graph $y = -1 + 2 \cos 3(\theta - 50^\circ)$

126. Graph $y = 2 + 3 \sin 2(\theta - 30^\circ)$

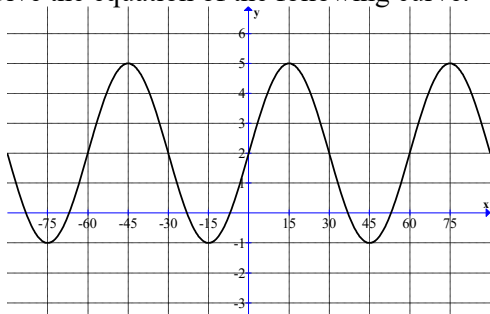
127. What is the amplitude of the following graph



128. What is the horizontal shift if the graph is a sine curve? A cosine curve?



129. Give the equation of the following curve.



130. Identify the period of $y = -2 + 3 \cos \frac{1}{4}(\theta - 20^\circ)$

131. What transformation were performed on

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

132. Identify the equation of a sinusoid whose period is 180° , whose vertical shift is 3, whose amplitude is 6, and whose horizontal shift for \sin is 100° .

133. Identify the equation of a sinusoid whose period is 120° , whose vertical shift is 2, whose amplitude is 1, and whose horizontal shift for \sin is 55° .

134. Identify the range of $y = 2 + 3 \cos \frac{1}{2}x$

135. Identify the period of $y = 3 \sec 5(\theta - 30^\circ)$

136. Identify the vertical shift of $y = 2 + 3 \cos 4x$

137. Identify the horizontal shift of

$$y = 9 + 7 \sin \frac{1}{4}(\theta - 100^\circ)$$

138. Simplify $\frac{\sin^2 x + \cos^2 x}{\tan x}$

139. Show that $\csc x - \sin x = \cot x \cos x$

140. Prove $\frac{\csc^2 x - 1}{\cos x} = \cot x \csc x$

141. Simplify $\cos x + \sin x \tan x$

142. Simplify $(1 - \cos x)(\csc x + \cot x)$

143. Simplify $\frac{\cos x \cot x + \sin x}{2 \cos x}$

144. Simplify $\cos x \sin x \tan x$

145. $\sin 75^\circ =$

146. $\sec 195^\circ =$

147. Given with $\sin A = \frac{2}{3}$ with $\frac{\pi}{2} < A < \pi$ and

$\sin B = -\frac{1}{2}$ with $\pi < B < \frac{3\pi}{2}$, use identities to find

exact values for

a. $\cos 2A$

b. $\tan 2B$

c. $\sin(A + B)$

d. $\cos(A - 2B)$

148. Determine a positive and negative coterminal

angle to $\frac{\pi}{4}$.

Answer Section

- 1) A 8) A 15) E
 2) B 9) A 16) C
 3) B 10) D 17) D
 4) A 11) A 18) E
 5) C 12) D 19) B
 6) C 13) E 20) D
 7) B 14) A 21) C

- 22) E 29) A 36) C
 23) D 30) C 37) D
 24) D 31) C 38) E
 25) A 32) A
 26) B 33) D
 27) C 34) B
 28) E 35) D

39) $\frac{x-4}{(x-5)(x+5)}$

40) $\frac{-3x-7}{(x-5)(x+4)}$

41) 8 in.

42) $\frac{5+x}{5-x}$

43) $x = 8$ is not a solution; $x = 4$ is a solution

44) $t = \frac{7}{2}$

45) $y = -2, y = -\frac{1}{2}$

46) $x = \frac{2}{5}, x = \frac{1}{5}$

47) $x = -\frac{7}{3}, x = \frac{7}{3}$

48) $625a^4b^4$

49) $\frac{4t^6}{s^8}$

50) $3x^7 - 14x^6 - 14$

51) $1.3x^3 + 4.1x^2 + 7.3x + 11.6$

52) $6y^2 + 17y - 10$

53) $x^3 - 125$

54) $12m^2(10m^7 - 2m^5 + 5)$

55) $(y+11)(x+9)$

56) $(2y-3)(5y-4)$

57) $(x^2+25)(x-5)(x+5)$

58) $\left(x - \frac{1}{4}\right)\left(x + \frac{1}{4}\right)$

59) $25y^4 + 10y^3 - 15y^2$

60) $-20\sqrt{2}$

61) $11\sqrt{5}$

62) $15xy^6\sqrt{x}$

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

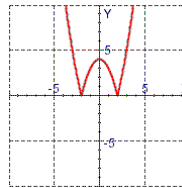
64) $\frac{\sqrt{10x}}{x}$

65) 25

66) $\frac{4}{9}$

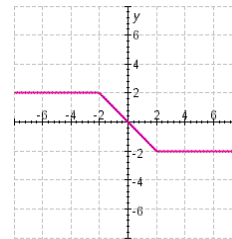
67) $\frac{1}{27}$

68)

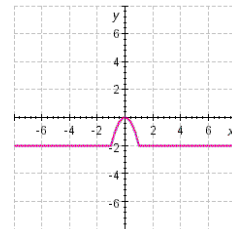


69) $(-\infty, 8]$

70)

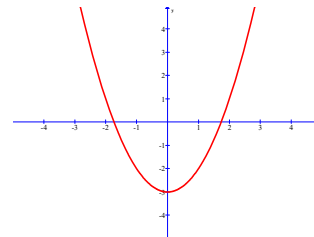


71)



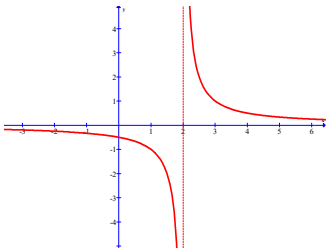
72) A) $\frac{400}{87}$ B) $\frac{400}{149}$

73)



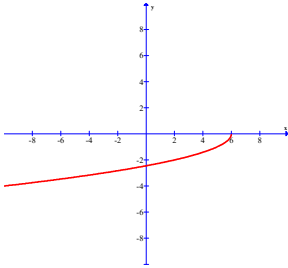
D: $(-\infty, \infty)$ R: $[-3, \infty)$ Inc: $(0, \infty)$

74)



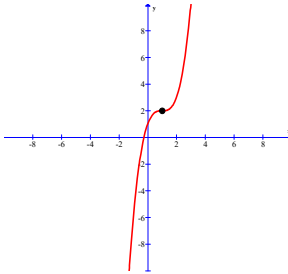
D: $(-\infty, 2) \cup (2, \infty)$ R: $(-\infty, 0) \cup (0, \infty)$
Inc: none

75)



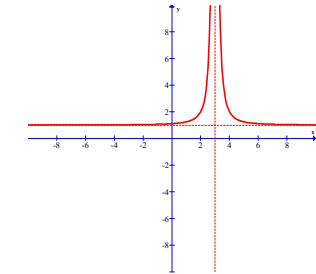
D: $(-\infty, 6]$ R: $(-\infty, 0]$
Inc: $(-\infty, 6)$

76)



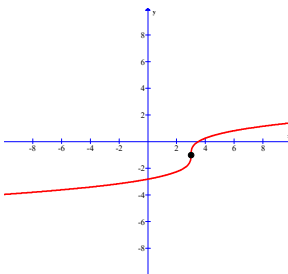
D: $(-\infty, \infty)$ R: $(-\infty, \infty)$
Inc: $(-\infty, \infty)$

77)



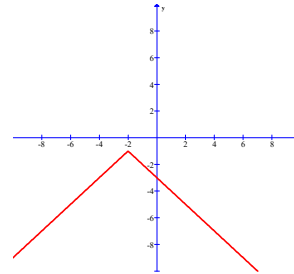
D: $(-\infty, 3) \cup (3, \infty)$ R: $(-\infty, 3)$
Inc: $(-\infty, 3)$

78)



D: $(-\infty, \infty)$ R: $(-\infty, \infty)$ Inc: $(-\infty, \infty)$

79)



D: $(-\infty, \infty)$ R: $(-\infty, -1]$
Inc: $(-\infty, -1]$

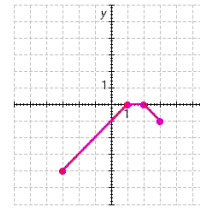
80) $(-1, 1)$

81) $\frac{-2}{h+1}$

82) $f(1)=1, f(3)=18, f(7)=50$

83) $\left[\frac{7}{8}, \infty\right)$

84)



85) (A) 0 (B) 1500 (C) 5400

86) -5

87) -2

88) $f^{-1}(x) = \frac{9x-2}{5x-7}$

89) $f^{-1}(x) = (x-7)^3$

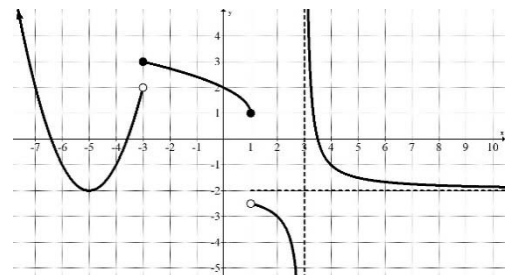
90) A) 3 B) 4

91) A) -19 B) -4

92)

$$f(x) = \begin{cases} -2x-5 & x < -3 \\ -|x+2|+3 & -3 \leq x \leq 0 \\ (x-1)^3-2 & 0 \leq x \leq 3 \\ \frac{1}{(x-5)^2}+1 & x > 3 \end{cases}$$

93)



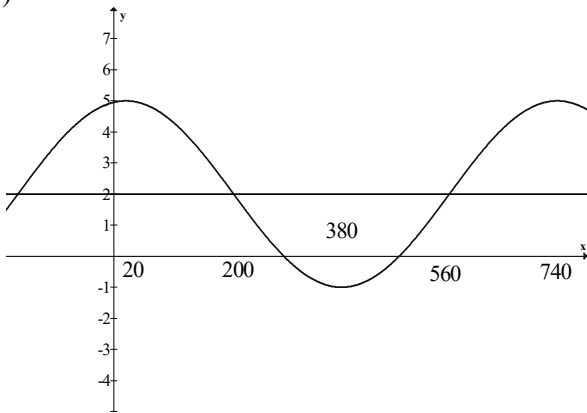
- 94) 30°
 95) 35°
 96) 5°
 97) 38°
 98) $\frac{71\pi}{18}$
 99) $\frac{3\pi}{4}$
 100) -67.5°
 101) 40°

- 102) $\frac{2\sqrt{5}}{5}$
 103) $-\frac{5\sqrt{21}}{21}$
 104) $\frac{\sqrt{2}}{4}$
 105) $-\frac{3}{4}$
 106) $-\frac{\sqrt{74}}{5}$
 107) All

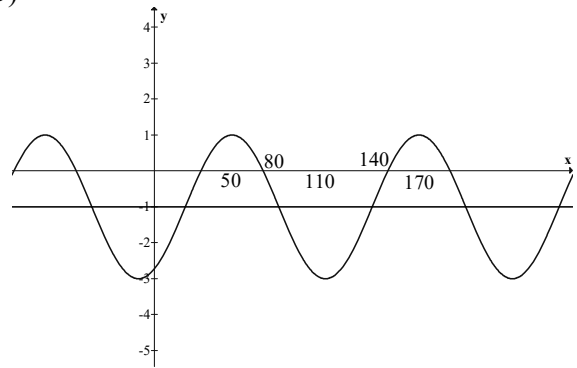
- 108) \sin, \csc
 109) \cos, \sec
 110) I, II
 111) $\sqrt{3}$
 112) $\frac{1}{2}$
 113) $-\frac{1}{2}$
 114) -2
 115) $-\sqrt{2}$

- 116) $\frac{\sqrt{3}}{2}$
 117) $-\frac{2\sqrt{3}}{3}$
 118) $\frac{1}{2}$
 119) 1
 120) -2
 121) 0
 122) 2

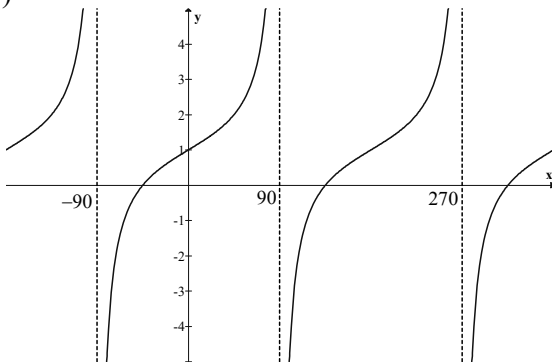
123)



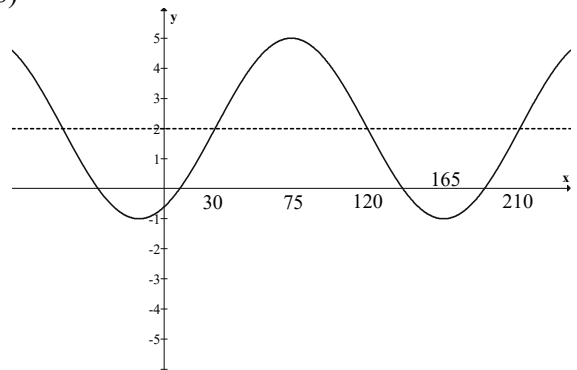
125)



124)



126)



- 127) 4
 128) 15° for \sin ; 60° for \cos
 129) $y = 2 + 3\cos(6(\theta - 15^\circ))$
 or
 $y = 2 + 3\sin(6\theta)$
 130) 1440°
 131) $y = -2 + 3\cos\left(3\left(x + \frac{\pi}{6}\right)\right)$
 A: 3; B: 120° ; C: -2 ; D: $\frac{\pi}{6}$
 132) $y = 3 + 6\sin(2(x - 100^\circ))$
 133) $y = 2 + \sin(3(x - 55^\circ))$

- 134) $[-1, 5]$
 135) 72°
 136) up 2
 137) 100° right
 138) $\cot x$
 139) $\cos x \cot x$
 140) $\csc x \cot x$
 141) $\sec x$
 142) $\sin x$
 143) $\csc 2x$
 144) $\sin^2 x$
 145) $\frac{\sqrt{6} + \sqrt{2}}{4}$

- 146) $\sqrt{2} - \sqrt{6}$
 147) a. $\frac{1}{9}$
 b. $\sqrt{3}$
 c. $\frac{\sqrt{5} - 2\sqrt{3}}{6}$
 d. $\frac{-\sqrt{5} + 2\sqrt{3}}{6}$
 148) $\frac{9\pi}{4}, -\frac{7\pi}{4}$