

## Pre-Calculus Review

**Solve each equation.**

1)  $84 = 2n + 2(7 - 6n)$

2)  $8(6 + 3b) = 168$

3)  $7(-4 + 3n) + 3(1 - n) = -25$

4)  $7(-2 + 2m) + 2(4m - 8) = 36$

5)  $-(6v + 5) - 5(v + 4) = -7v + v$

6)  $5(x + 4) = -(-2x - 3) - 7$

7)  $-\frac{4}{3} - p = -\frac{4}{3}\left(-\frac{7}{4}p - \frac{3}{2}\right)$

8)  $-\frac{102}{25} + n = \frac{11}{5}\left(-3n + \frac{8}{5}\right)$

**Solve each equation by factoring.**

9)  $a^2 - 8a = -7$

10)  $7m^2 + 49m = -84$

11)  $n^2 = 4$

12)  $k^2 = 13k - 42$

**Solve each equation. Round your answers to the nearest ten-thousandth.**

25)  $12^{n-1} + 8 = 42$

26)  $11^{-10n} + 9 = 23$

**Solve each equation.**

27)  $6^{-2x-2} = 6^3$

28)  $\left(\frac{1}{27}\right)^{-m-2} = 243^{3m}$

**Evaluate each function.**

29)  $k(x) = x + 2$ ; Find  $k(8)$

30)  $w(x) = -3|2x|$ ; Find  $w(-7)$

31)  $g(x) = -x^2 + 4x$ ; Find  $g(-2)$

32)  $w(n) = -3 \cdot 5^{-n}$ ; Find  $w(-1)$

33)  $f(n) = 3 \cdot 2^{3n+2} + 2$ ; Find  $f(-1)$

34)  $g(t) = t^2 - 4t$ ; Find  $g(-7)$

35)  $k(x) = |-2x - 3|$ ; Find  $k(2)$

36)  $h(n) = n^3 - 2n$ ; Find  $h(-5)$

13)  $35b^2 + 329b = -392$

14)  $9n^2 - 69n = -120$

**Solve each equation by taking square roots.**

15)  $9p^2 + 8 = -43$

16)  $5b^2 - 2 = 243$

**Solve each equation with the quadratic formula.**

17)  $-2v^2 + 3 = v$

18)  $-5a^2 + 3a = 1$

19)  $8k^2 = 2k + 4$

20)  $-b^2 + 23 = -6b$

**Solve each equation. Remember to check for extraneous solutions.**

21)  $\sqrt{a-1} = \sqrt{21-a}$

22)  $-3 = \sqrt{4r-7}$

**Solve each equation.**

23)  $|-10x - 9| = 69$

24)  $|8x - 4| = 36$

37)  $w(x) = -|x + 3|$ ; Find  $w(t)$

38)  $g(t) = t^2 - 6t$ ; Find  $g(-4t)$

39)  $h(x) = x^2 + 3$ ; Find  $h(-2 - x)$

40)  $f(x) = x^2 - 4$ ; Find  $f(-1 + x)$

**Perform the indicated operation.**

41)  $h(a) = 4a - 5$   
 $g(a) = 4a - 3$   
Find  $h(g(a))$

42)  $f(x) = -3x^2 - 4x$   
 $g(x) = 3x + 1$   
Find  $f(x) + g(x)$

43)  $f(x) = x - 2$   
 $g(x) = x + 1$   
Find  $f(-6) + g(-6)$

44)  $g(n) = -n + 3$   
 $h(n) = -n - 5$   
Find  $g(3) - h(3)$

45)  $g(x) = x + 3$   
 $h(x) = x^3 - 2$   
Find  $g(3x) \cdot h(3x)$

46)  $h(x) = 3x - 5$   
 $g(x) = -2x^2 + 2x$   
Find  $h(g(x - 1))$

**Find the exact value of each trigonometric function.**

47)  $\csc \frac{3\pi}{4}$

48)  $\cot \frac{3\pi}{4}$

49)  $\sec \frac{5\pi}{6}$

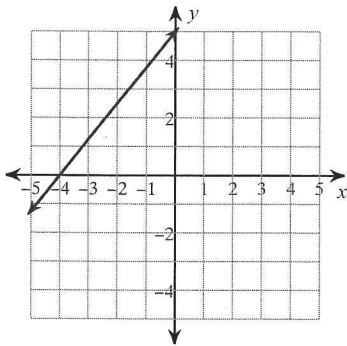
50)  $\tan 0$

51)  $\sin \frac{\pi}{6}$

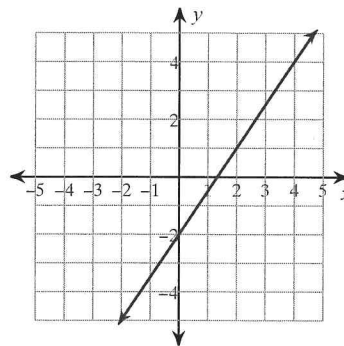
52)  $\cos \frac{\pi}{2}$

Write the slope-intercept form of the equation of each line.

53)



54)



Write the slope-intercept form of the equation of the line through the given point with the given slope.

55) through:  $(5, 2)$ , slope =  $\frac{4}{5}$

56) through:  $(-1, -1)$ , slope = 3

Write the slope-intercept form of the equation of the line through the given points.

57) through:  $(-1, 1)$  and  $(4, -4)$

58) through:  $(0, -2)$  and  $(3, 5)$

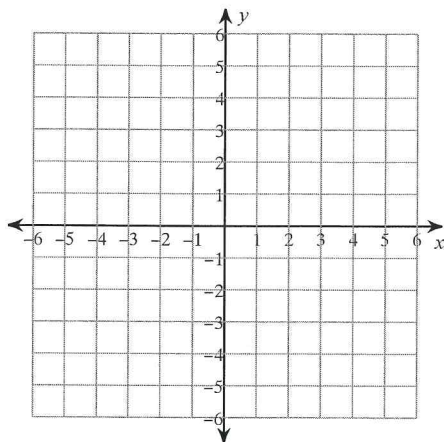
Write the slope-intercept form of the equation of the line described.

59) through:  $(-4, 3)$ , parallel to  $y = -x$

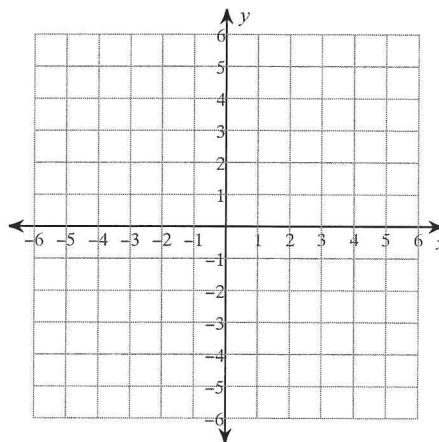
60) through:  $(5, 3)$ , parallel to  $y = \frac{2}{5}x + 4$

Sketch the graph of each line.

61)  $4x + y = -4$

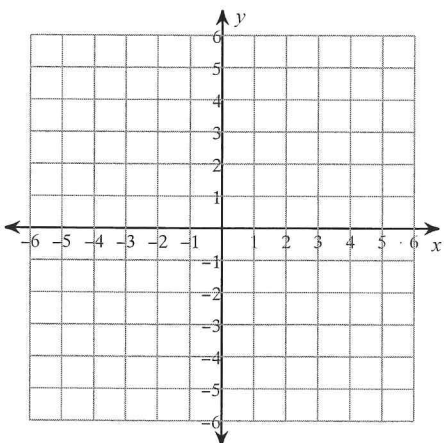


62)  $y = -\frac{3}{5}x - 2$

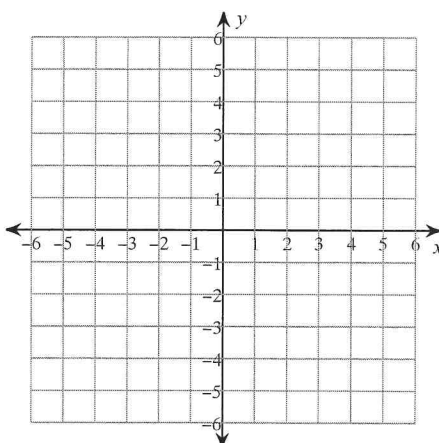


Graph each equation.

63)  $y = |x + 3| + 3$



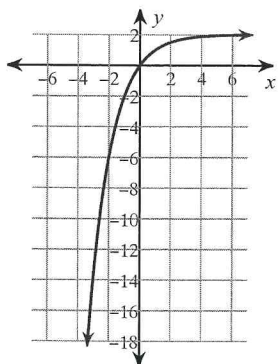
64)  $y = |x + 4| + 3$



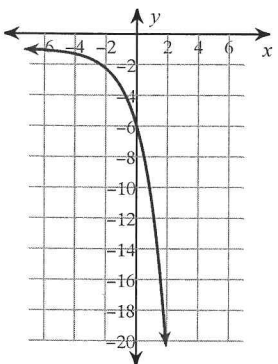
Sketch the graph of each function.

65)  $f(x) = -5 \cdot 2^x - 1$

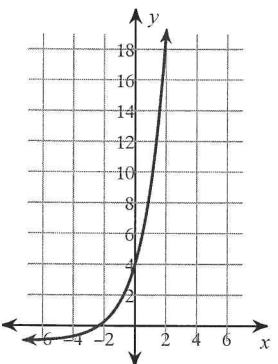
A)



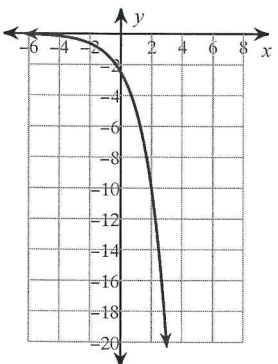
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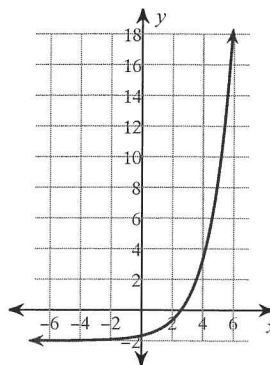


D)

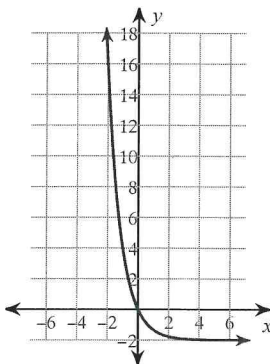


66)  $f(x) = 2 \cdot \left(\frac{1}{3}\right)^x - 2$

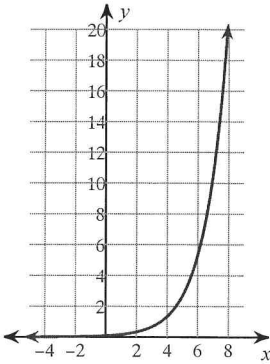
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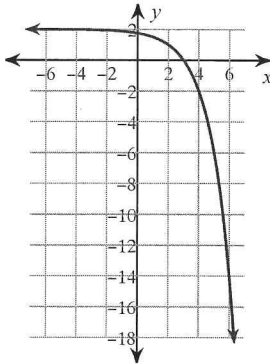
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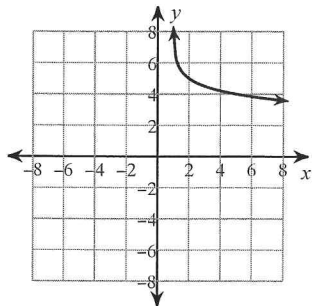


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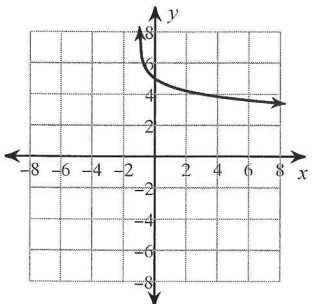


$$67) f(x) = \log_{\frac{1}{4}}(x - 1) - 5$$

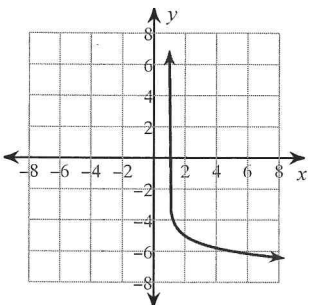
A)



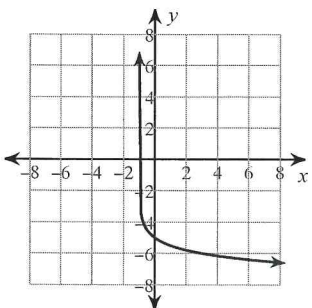
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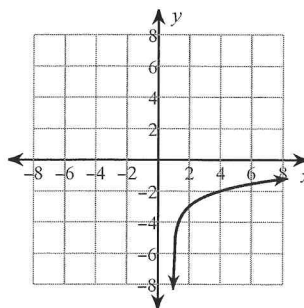


D)

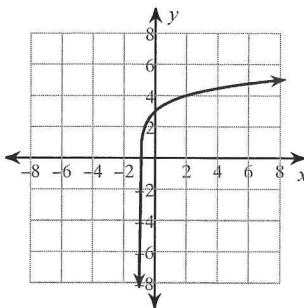


$$68) f(x) = \log_3(x - 1) - 3$$

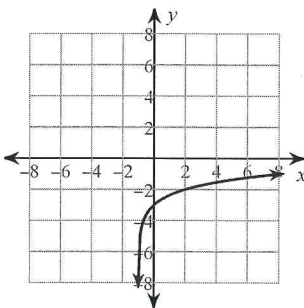
A)



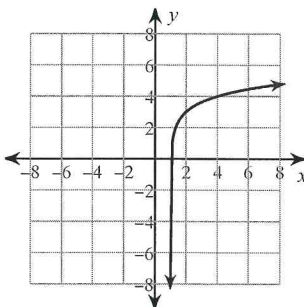
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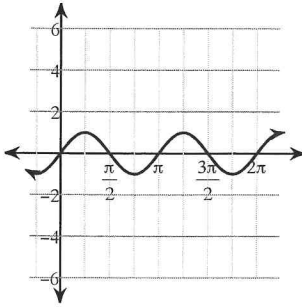




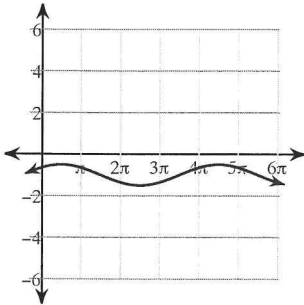
Graph each function using radians.

69)  $y = \frac{1}{2} \cdot \sin\left(\frac{\theta}{2} + \frac{\pi}{4}\right) - 1$

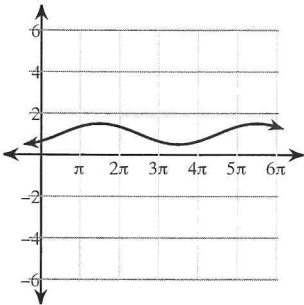
A)



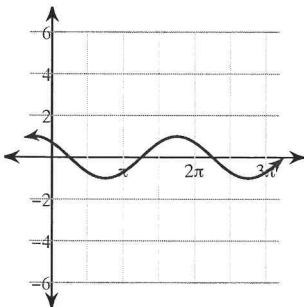
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C)

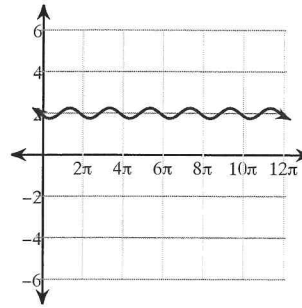


D)

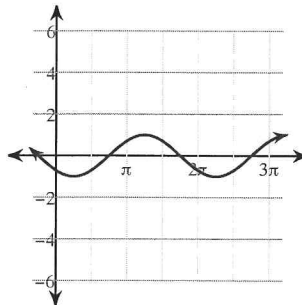


70)  $y = \cos\left(\frac{\theta}{4} + \frac{2\pi}{3}\right) + 2$

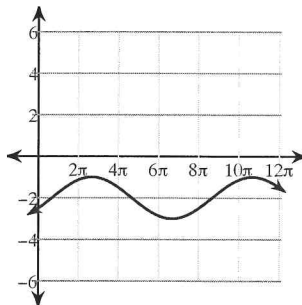
A)



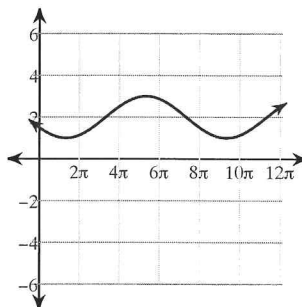
B)



C)



D)



For exercises 71-76, either complete the table of function values or find the function values.

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

x	-2	-1	0	1	2
f(x)					

72.  $g(x) = \sqrt{x-3}$

x	3	4	5	6	7
g(x)					

73.  $h(t) = \frac{1}{2}|t+3|$

t	-5	-4	-3	-2	-1
h(t)					

74.  $f(s) = \frac{|s-2|}{s-2}$

s	0	1	$\frac{3}{2}$	$\frac{5}{2}$	4
f(s)					

75.  $f(x) = \begin{cases} x^2 + 2, & x \leq 1 \\ 2x^2 + 2, & x > 1 \end{cases}$

- (a)  $f(-2)$       (b)  $f(1)$       (c)  $f(2)$

76.  $f(x) = \begin{cases} 3x - 1, & x < -1 \\ 4, & -1 \leq x \leq 1 \\ x^2, & x > 1 \end{cases}$

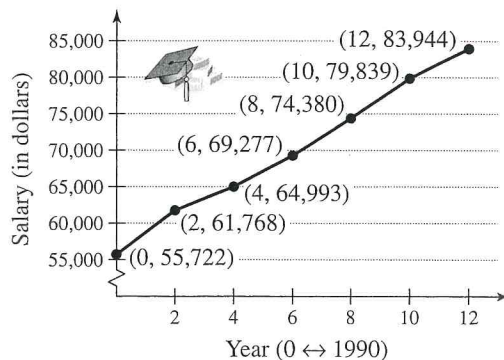
- (a)  $f(-2)$       (b)  $f(-\frac{1}{2})$       (c)  $f(3)$

For exercises 77 and 78, calculate the difference quotient, a.k.a. the average rate of change or the slope.

77.  $f(x) = x^2 - x + 1, \quad \frac{f(2+h) - f(2)}{h}, h \neq 0$

78.  $f(x) = 5x - x^2, \quad \frac{f(5+h) - f(5)}{h}, h \neq 0$

79. **Average Salary** The graph shows the average salaries for senior high school principals from 1990 through 2002. (Source: Educational Research Service)

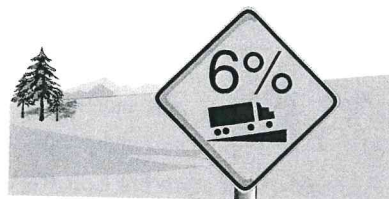


a. Calculate the average rate of change <sup>of salaries</sup> for senior high school principals over the first decade. Include proper units.

b. Interpret the average rate of change found in part (a).

c. Write the equation of the secant line over the first decade.

80.



**Road Grade** From the top of a mountain road, a surveyor takes several horizontal measurements  $x$  and several vertical measurements  $y$ , as shown in the table ( $x$  and  $y$  are measured in feet).

x	300	600	900	1200	1500	1800	2100
y	-25	-50	-75	-100	-125	-150	-175

a. Calculate the average rate of change of the vertical height when the horizontal height is 1200 feet by using  $x=300$  and  $x=1200$ . Include proper units.

b. Repeat part (a) using  $x=900$  and  $x=1200$ . Include proper units.