

P.3

p. 27, # 1, 3, 4, 7, 13, 14, 17-19, 21, 25, 30, 33, 37-49, 57, 64, 71, 73, 84, 95-97

1. a)  $D: [-4, 4]$   $R: [-3, 5]$   
j)  $D: [-3, 3]$   $R: [-4, 4]$

b)  $f(-2) = -1$   $g(3) = -4$

c)  $f(x) = g(x)$  when  $x = -1$

d)  $f(x) = 2$  when  $x = 1$

e)  $g(x) = 0$  when  $x = -1, 1, 2$

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

a)  $f(0) = -3$

b)  $f(-3) = 2(-3) - 3 = -6 - 3 = -9$

c)  $f(b) = 2b - 3$

d)  $f(x-1) = 2(x-1) - 3 = 2x - 2 - 3 = \boxed{2x - 5}$

4.  $f(x) = \sqrt{x+3}$

a)  $f(-2) = \sqrt{-2+3} = \sqrt{1} = 1$

b)  $f(6) = \sqrt{9} = 3$

c)  $f(-5) = \sqrt{-5+3} = \sqrt{-2} = \underline{\sqrt{-2}}$  undefined

d)  $f(x+\Delta x) = \sqrt{x+\Delta x+3}$

(cosine)

$\frac{1}{2}$

$\frac{\pi}{3}$

7.  $f(x) = \cos 2x$

a)  $f(0) = \cos 0 = 1$

b)  $f(-\frac{\pi}{4}) = \cos 2(-\frac{\pi}{4}) = \cos(-\frac{\pi}{2}) = 0$

c)  $f(\frac{\pi}{3}) = \cos(\frac{2\pi}{3}) = -\frac{1}{2}$

13.  $h(x) = -\sqrt{x+3}$

domain:  $\frac{x+3 \geq 0}{x \geq -3}$

$x \geq -3$   $[-3, +\infty)$

range =  $(-\infty, 0]$

14.  $g(x) = x^2 - 5$

domain:  $(-\infty, +\infty)$  range:  $[-5, +\infty)$

p. 27

17-19, 21, 25, 30, 33

17.  $f(x) = \frac{1}{x}$

domain:  $(-\infty, 0) \cup (0, +\infty)$  range:  $(-\infty, 0) \cup (0, +\infty)$

18.  $g(x) = \frac{2}{x-1}$   $\frac{x-1 \neq 0}{x=1}$

domain:  $(-\infty, 1) \cup (1, +\infty)$  range:  $(-\infty, 0) \cup (0, +\infty)$

\* 19.  $f(x) = \sqrt{x} + \sqrt{1-x}$

$x \geq 0$   $\frac{1-x \geq 0}{-x \geq -1}$  domain:  $[0, 1]$   $x \leq 1$

21.  $g(x) = \frac{2}{1-\cos x}$   $1-\cos x \neq 0$

$x \neq 2\pi n, n \text{ an integer}$

25.  $f(x) = \begin{cases} 2x+1, & x < 0 \\ 2x+2, & x \geq 0 \end{cases}$

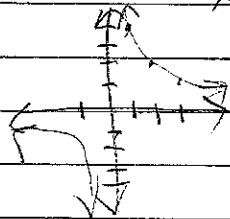
a)  $f(-1)$   
 $2(-1)+1$   
 $-2+1 = -1$

b)  $f(0)$   
 $2(0)+2$   
 $2$

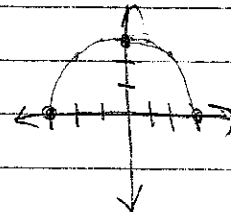
c)  $f(2)$   
 $2(2)+2$   
 $6$

d)  $f(t^2+1)$   
 $2(t^2+1)+2$   
 $2t^2+2+2 = 2t^2+4$

30.  $g(x) = \frac{4}{x}$  D:  $(-\infty, 0) \cup (0, +\infty)$   
R:  $(-\infty, 0) \cup (0, +\infty)$



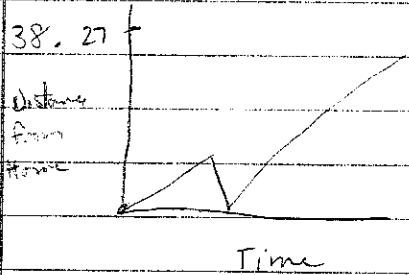
33.  $f(x) = \sqrt{9-x^2}$   
 $9-x^2 \geq 0$   
 $9 \geq x^2$   
 $x^2 \leq 9$



$-3 < x < 3$  Range  
Domain:  $[-3, 3]$   $[0, 3]$

37-49

37. Drive 3mph for 2 min, then they stop driving for 2 minutes, then they drive faster than before (6mph) for the last 4 miles.



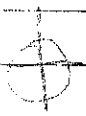
39. No

40. yes

41. yes

42. no

43. no (circle)  
2 y's for some x



44. yes

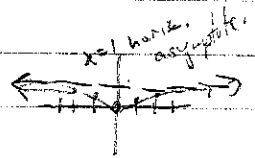
$$y = -x^2 + 4$$



45.  $y = \pm \sqrt{x^2 - 1}$   
no



46.  $x^2y - x^2 + 4y = 0$   
yes  $x^2y + 4y - x^2 = 0$   
 $y(x^2 + 4) = x^2$   
 $y = \frac{x^2}{x^2 + 4}$

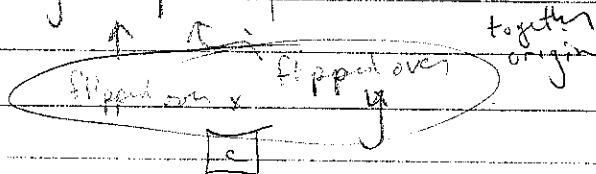


left 5

47.  $y = f(x+5)$   $y = |x-3|$   
 $y = |x+5-3|$   
 $y = |x+2|$  [d]

48.  $f(x) - 5$   $y = |x-3| - 5$   
[b] down 5

49.  $y = -f(-x) - 2$   
 $y = -|-x-3| - 2$  2 down



P.3

p.29, # 57, 64, 71, 73, 84, 95-98

57.  $f(x) = \sqrt{x}$  and  $g(x) = x^2 - 1$

a)  $f(g(1))$

b)  $g(f(1))$

c)  $g(f(0))$

$g(1) = 1^2 - 1 = 0$

$f(1) = \sqrt{1} = 1$

$f(0) = \sqrt{0} = 0$

$f(0) = \sqrt{0} = \boxed{0}$

$g(1) = 1^2 - 1 = \boxed{0}$

$g(0) = 0^2 - 1 = \boxed{-1}$

d)  $f(g(-4))$

$g(-4) = (-4)^2 - 1 = 15$

$f(15) = \boxed{\sqrt{15}}$

e)  $f(g(x))$

$\sqrt{x^2 - 1}$

f)  $g(f(x))$

$(\sqrt{x})^2 - 1 = \boxed{x - 1}$

64.  $r(t) = 0.6t$   $t$  is time in sec.  
after pebble strikes water.

$A = \pi r^2$   $(A = r)(t)$

so  $r(t)$  gives radius that you input in area formula to find the area of the circle of ripples after  $t$  sec.

$A(r(t)) = \pi(0.6t)^2$

$A(r(t)) = 36\pi t^2$

71.  $(-\frac{3}{2}, 4)$

a)  $(\frac{3}{2}, 4)$  even

b)  $(\frac{3}{2}, -4)$  odd

73.  $f = \text{even}$

$g = \text{neither}$

$h = \text{odd}$

84. a)  $d$  is a function of  $t$

because, since the water is flowing at a constant rate, the depth of water will be

95. false ex:  $f(-2) = f(2)$  for  $f(x) = x^2$  different at every point of  $t$ .

96. true

b)  $d: 0 \leq t \leq 30$

(for each time there's a depth  $d$ )

97. true

c)

98. False say  $f(x) = x^2 + 1$

$f(5x) = (5x)^2 + 1 = 25x^2 + 1$

$5(f(x)) = 5(x^2 + 1) = 5x^2 + 5$

depths

