A.P. Calc. Hw
Section 1.1 / page 23/ 2, 5-9, 11, 15, 19-23, 26, 27-35 odd, 41 – 49 odd

2) a) $f(-4) = -2$ $g(3) = 3$

b) $f(x) = g(x)$ at $x = -2$ and $x = 2$

c) $f(x) = -1$ when $x = -3$ and $x = 4$

d) f is decreasing from [0,4]

e) f domain = [-4,4]
f range = [-2,3]

f) f domain = [-4,3]
f range = [0.5,4] approx.

Yes, it is a function
D = [-2,2]
R = [-2,2]

6) No, it is not a function
It fails the vertical line test

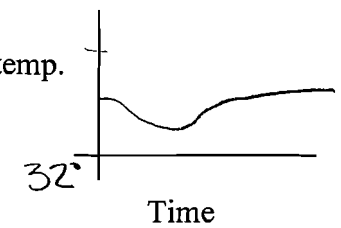
7) No, it is not a function
It fails the vertical line test

8) Yes, it is a function
D = [-3,2]
R = [-2] ∪ (0,3]

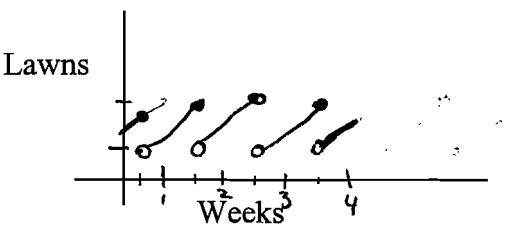
The person's weight increases to about 150 pounds at age 20 and ten slightly to age 30. At age 30 the person went on a diet and lost weight. They kept the weight off for a few years but gained it all back plus more. The person's weight kept going up slightly until he / she was 70 years old.

11) The temperature would chill and then eventually level off

Graph:
Room temp.



15) Graph:



19) $f(x) = 2x^2 + 3x - 4$

$f(0) = -4$

$f(2) = 2(2)^2 + 3(2) - 4 = 10$
$8 + 6 - 4$

$f(\sqrt{2}) = 2(\sqrt{2})^2 + 3\sqrt{2} - 4 = -4$
$2(2) + 3\sqrt{2} - 4$

$f(1+\sqrt{2}) = 2(1+\sqrt{2})^2 + 3(1+\sqrt{2}) - 4$
$2(1 + 2\sqrt{2} + 2) + 3 + 3\sqrt{2} - 4$
$6 + 4\sqrt{2} + 3 + 3\sqrt{2} - 4$
$5 + 7\sqrt{2}$

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

$f(x+1) = 2(x+1)^2 + 3(x+1) - 4$
$2(x^2 + 2x + 1) + 3x + 3 - 4$
$2x^2 + 4x + 2 + 3x + 3 - 4$
$2x^2 + 7x + 1$

$2f(x) = 2(2x^2 + 3x - 4) = 4x^2 + 6x - 8$

$f(2x) = 2(2x)^2 + 3(2x) - 4 = 8x^2 + 6x - 4$

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20-23,

(20) $V(r) = \frac{4}{3}\pi r^3$

new volume − original volume = the change in volume

$V(r+1) - V(r)$

$\frac{4}{3}\pi(r+1)^3 - \frac{4}{3}\pi r^3$

$\frac{4}{3}\pi\left[(r+1)^3 - r^3\right] = \frac{4}{3}\pi\left[r^3+3r^2+3r+1-r^3\right]$

$\boxed{\frac{4}{3}\pi(3r^2+3r+1)}$

$(r+1)(r^2+2r+1)$

r^3+2r^2+r

r^2+2r+1

r^3+3r^2+3r+1

(21) $f(x) = x - x^2$

$f(2+h) = (2+h) - (2+h)^2$

$(2+h) - (4+4h+h^2)$

$2+h-4-4h-h^2$

$-h^2-3h-2$

$f(2+h) = -(h^2+3h+2)$

$\frac{f(x+h)-f(x)}{h} =$

$f(x+h) = (x+h) - (x+h)^2$

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

$f(x+h)-f(x)/h$

$\frac{f(x+h)-f(x)}{h} = \frac{(x+h)-(x^2+2xh+h^2)-(x-x^2)}{h}$

$\frac{f(x+h)-f(x)}{h} = \frac{x+h-x^2-2xh-h^2-x+x^2}{h} = \frac{h(1-2x-h)}{h} = \boxed{1-2x-h}$

(22) $f(2+h) = \frac{2+h}{2+h+1} = \boxed{\frac{2+h}{3+h}}$

$\frac{f(x+h)-f(x)}{h} = \frac{\frac{x+h}{x+h+1} - \frac{x}{x+1}}{h} = \frac{(x+h)(x+1)-x(x+h+1)}{(x+h+1)(x+1)h} = \frac{x^2+xh+x+h-x^2-xh-x}{(x+h+1)(x+1)h}$

$\frac{h}{(x+h+1)(x+1)h} = \boxed{\frac{1}{(x+h+1)(x+1)}}$

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(23) $f(x) = \frac{x^4}{x^2 + x - 6}$

$(x-2)(x+3)$

$x \neq 2 \quad x \neq -3$

$D = \{x \in \mathbb{R} \mid x \neq -3, 2\}$

OR

$(-\infty, -3) \cup (-3, 2) \cup (2, \infty)$

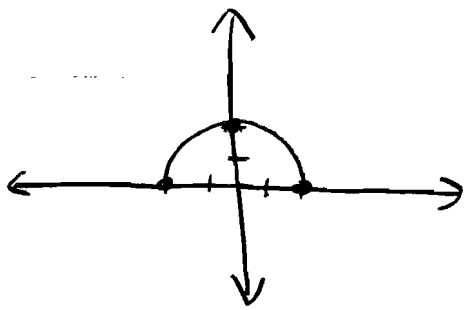
(26) $\sqrt{4 - x^2}$

$x^2 = 4$

$x = \pm 2$

$D = [-2, 2]$

$R = [0, 2]$

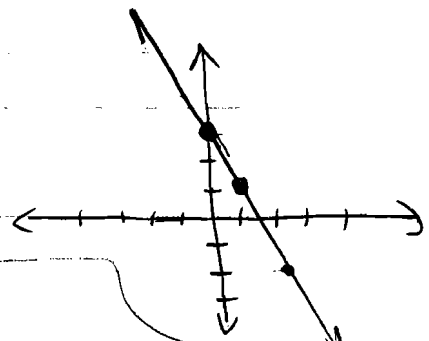


(27) $f(x) = 3 - 2x$

$\{x \in \mathbb{R}\}$

OR

$(-\infty, \infty)$

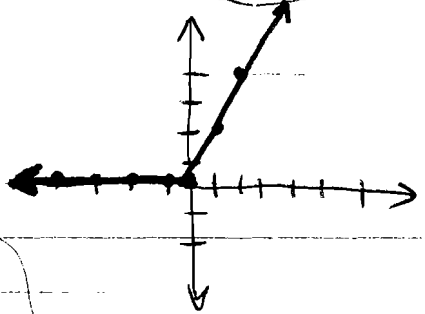


(29) $G(x) = |x| + x$

$D = (-\infty, \infty)$

or

$\{x \in \mathbb{R}\}$



x	G(x)
-3	0
-2	0
-1	0
0	0
1	2
2	4

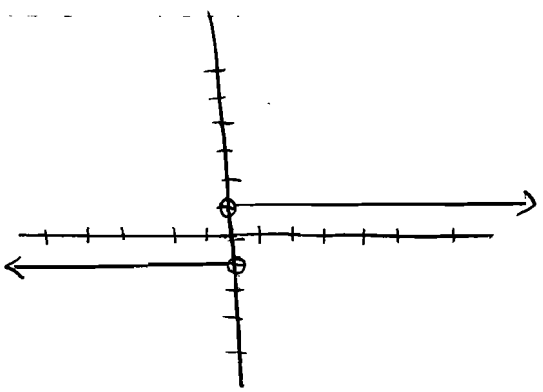
(31) $f(x) = \frac{x}{|x|}$

$D = \{x \in \mathbb{R} \mid x \neq 0\}$

OR

$(-\infty, 0) \cup (0, \infty)$

x	f(x)
-3	-1
-2	-1
-1	-1
0	∅
1	1
2	1
3	1



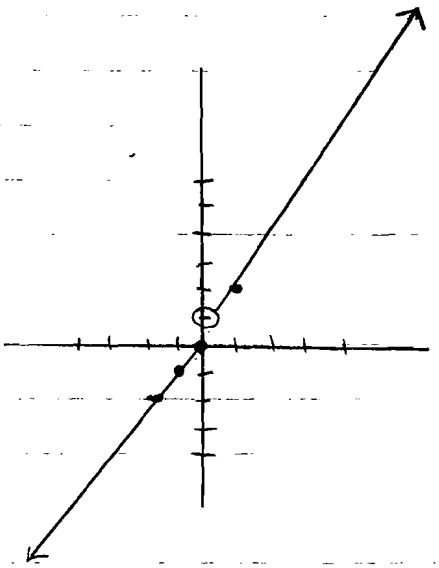
(33) $f(x) = \begin{cases} x & \text{if } x \le 0 \\ x+1 & \text{if } x > 0 \end{cases}$

$f(x) = x$

x	$f(x)$
0	0
-1	-1
-2	-2
-3	-3

$f(x) = x+1$

x	$f(x)$
1	2
2	3
3	4
4	5



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

$f(x) = x+2$

x	$f(x)$
-1	1
-2	0
-3	-1
-4	-2

$f(x) = x^2$

x	$f(x)$
0	0
1	1
2	4