Precalc Section 4-1 to 4-4 Name Key

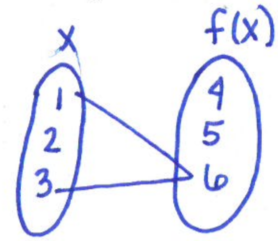
1) State whether each statement is true or false and ***EXPLAIN YOUR ANSWER!***

a) A function $(x, f(x))$ may have more than one x-value paired to each $f(x)$-value.

True

(1,6) and (3,6)

The f(x) value of 6 is paired to more than one x-value and is still a function.



b) Function composition is commutative, ie $(f \circ g)(x) = (g \circ f)(x)$

False

$f(x) = 3x$

$g(x) = x + 1$

Counterexample:

$(f \circ g)(x) = 3(x+1)$ $\qquad$ $(g \circ f)(x) = 3x+1$

$(f \circ g)(x) = 3x+3$ $\neq$ $(g \circ f)(x) = 3x+1$

c) The graph of a function is symmetric in the origin if $(-x, -y)$ yields the same equation as (x, y).

True

If a function is symmetric in the origin, then $(-x,-y)$ and (x,y) yield the same equation.

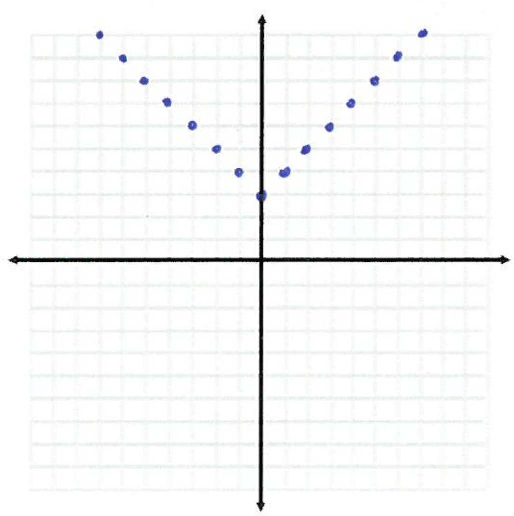
Give the a) domain, b) range, and c) zeros of each of the following functions.

2) $f(x) = |x| + 3$

a) $\mathbb{R}$

b) $y \geq 3$ $(f(x) \geq 3)$

c) none

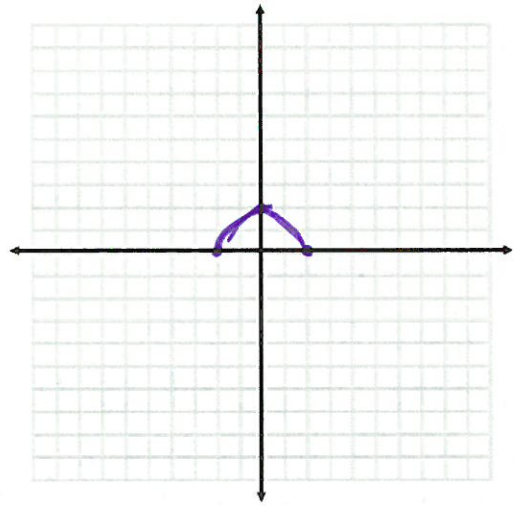


3) $f(t)=\sqrt{4-t^2}$

a) $-2 \le t \le 2$

b) $0 \le f(t) \le 2$

c) $t=2$ or $t=-2$



t	$f(t)$
-2	0
-1	$\sqrt{3}$
0	2
1	$\sqrt{3}$
2	0

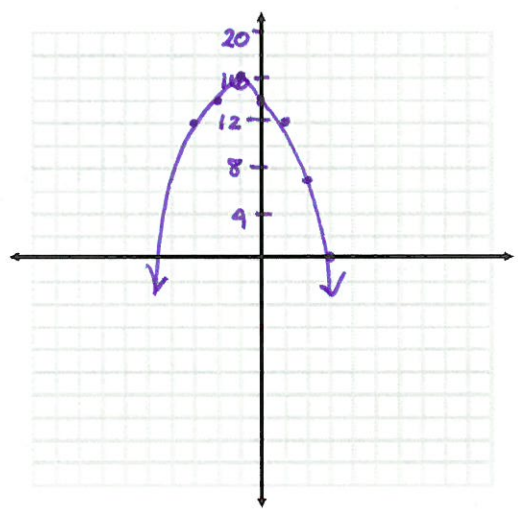
4) $f(x)=15-2x-x^2$

a) $\mathbb{R}$

b) $f(x) \le 16$

c) $x = -5, 3$

x	y
-3	12
-2	15
-1	16
0	15
1	12
2	7
3	0



If $f(x)=\dfrac{3-x}{x^2+4}$ and $g(x)=3x$ then evaluate each of the following.

5) $f(g(2))$ $g(2)=3(2)=6$

$f(6)=\dfrac{3-6}{6^2+4}=\dfrac{-3}{40}$

$\boxed{\dfrac{-3}{40}}$

6) $(f\cdot g)(2)$

$\left(\dfrac{3-2}{2^2+4}\right)(3\cdot 2)=\left(\dfrac{1}{8}\right)(6)=\dfrac{6}{8}=\dfrac{3}{4}$

$\boxed{\dfrac{3}{4}}$

7) $f(g(x))$

$\dfrac{3-3x}{9x^2+4}$

8) $g(f(x))$

$3\left(\dfrac{3-x}{x^2+4}\right)=\dfrac{9-3x}{x^2+4}$

For 9), 10), &11) test for symmetry about a) x-axis b) y-axis c) $y=x$ line d) origin
Label and show your work!

9) $x^3+y^3=4$

a. x-axis: $x^3+(-y)^3=4$ $x^3-y^3=4$
no

b. y-axis: $(-x)^3+y^3=4$ $-x^3+y^3=4$
no

c. y=x line: $y^3+x^3=4$ $x^3+y^3=4$
yes

d. origin: $(-x)^3+(-y)^3=4$ $-x^3+-y^3=4$
no

10) $x^2 + |x|y = 9$

a. x-axis: $x^2 + |x|(-y) = 9$
no

b. y-axis: $(-x)^2 + |-x|y = 9$
yes $x^2 + |x|y = 9$

c: y=x line: $y^2 + |y|x = 9$
no

d. origin: $(-x)^2 + |-x|(-y) = 9$
no $x^2 + |x|(-y) = 9$

11) $y = \frac{2x}{|x|}$

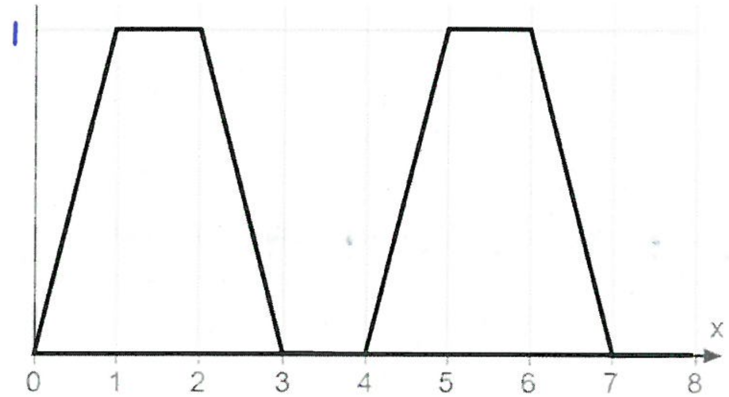
a. x-axis: $-y = \frac{2x}{|x|}$ $y = \frac{-2x}{|x|}$
no

b. y-axis: $y = \frac{2(-x)}{|-x|}$ $y = \frac{-2x}{|x|}$
no

c. y=x line: $x = \frac{2y}{|y|}$
no

d. origin: $-y = \frac{2(-x)}{|-x|}$ $y = \frac{2x}{|x|}$
yes

For rest of questions refer to the graph of $f(x)$ below



x	0	1	2	3	4	5	6	7
f(x)	0	1	1	0	0	1	1	0

12) a) What is the fundamental period of $f(x)$? 4

b) What is the amplitude of $f(x)$? 0.5

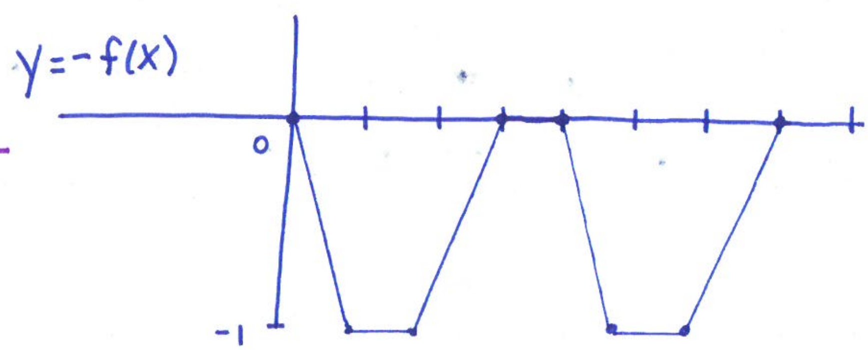
$\frac{25}{4}$ = 6R1 c) Find $f(25)$. $f(1) = 1$

d) Find $f(-25)$. $f(-1) = 0$

Sketch the graphs of each of the following.

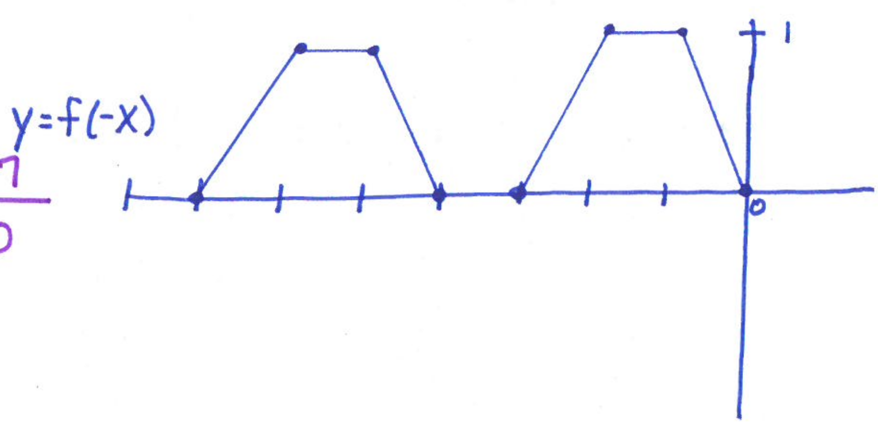
13) $y = -f(x)$

x	0	1	2	3	4	5	6	7
y	0	-1	-1	0	0	-1	-1	0



14) $y = f(-x)$

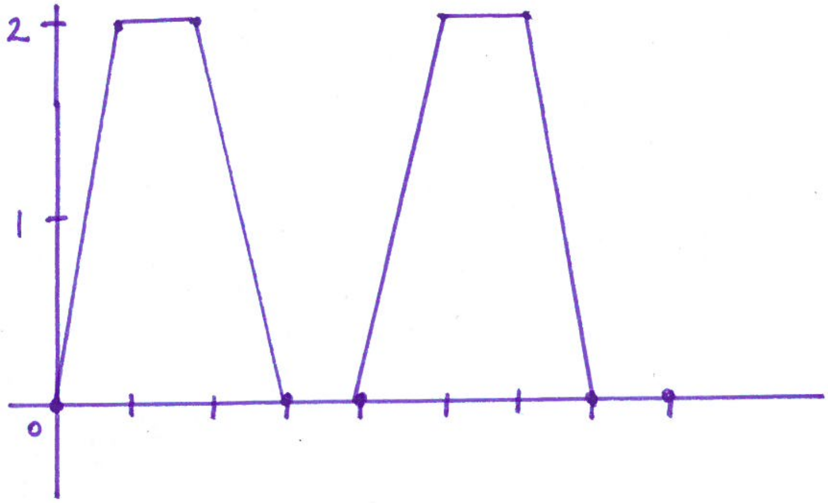
x	0	-1	-2	-3	-4	-5	-6	-7
y	0	1	1	0	0	1	1	0



15) $y = 2f(x)$

$y = 2f(x)$

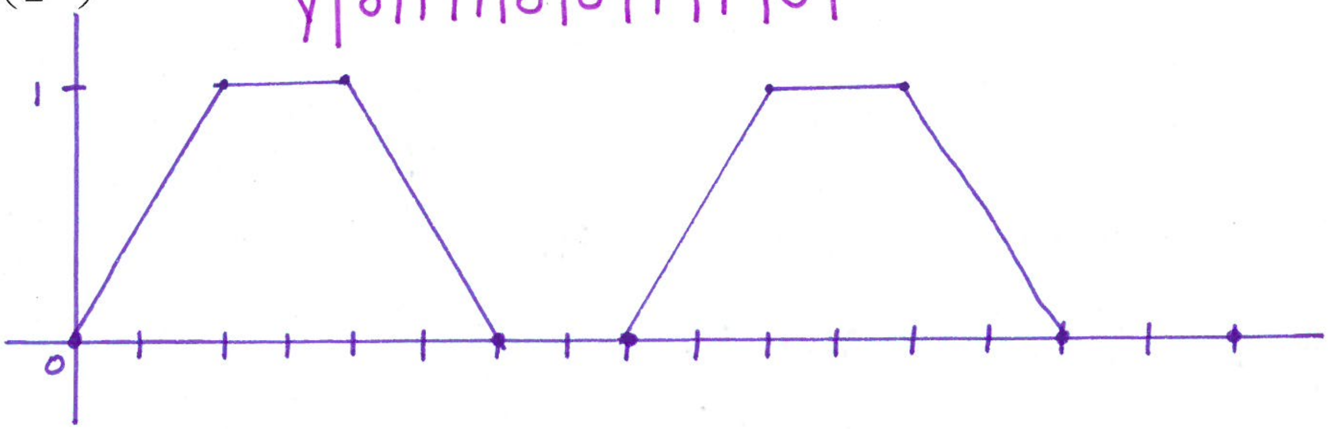
x	0	1	2	3	4	5	6	7
y	0	2	2	0	0	2	2	0



16) $y = f\left(\frac{1}{2}x\right)$

x	0	2	4	6	8	10	12	14
y	0	1	1	0	0	1	1	0

$y = f(\frac{1}{2}x)$



17) $y - 3 = f(x + 2)$

$y = f(x+2) + 3$

x	-2	-1	0	1	2	3	4	5
y	3	4	4	3	3	4	4	3