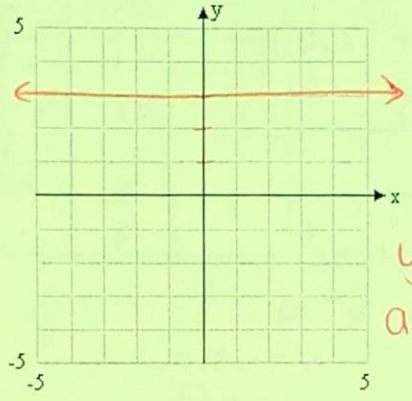
NAME Key
DATE _____

Pre calc Review 1.1 – 1.5
Period _____

1. For each determine whether the relation is a function.
Also give the domain and the range.

$f(x) = 3$

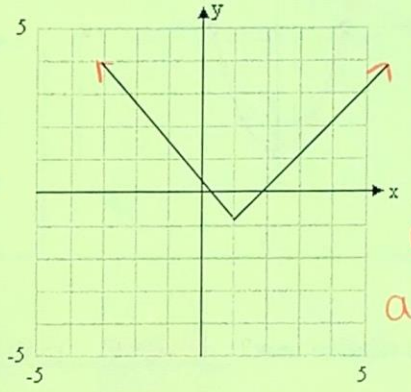


f(x) = 3

YES
a function

D $(-\infty, \infty)$ or $\mathbb{R}$

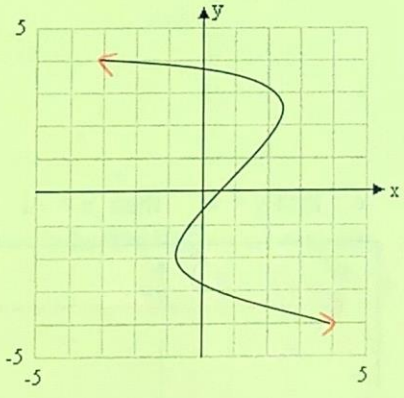
R $\{3\}$ or $[3,3]$



YES
a function

D $(-\infty, \infty)$ or $\mathbb{R}$

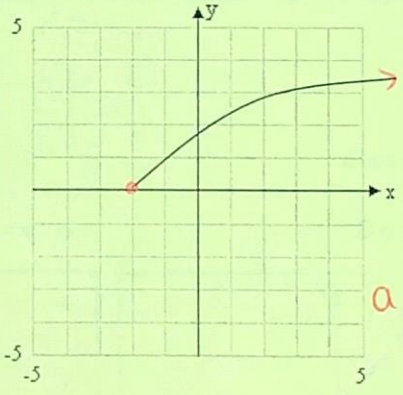
R $[-0.8, \infty)$



NOT
A function

D $(-\infty, \infty)$ or $\mathbb{R}$

R $(-\infty, \infty)$ or $\mathbb{R}$



YES
a function

D $[-2, \infty)$

R $[0, \infty)$

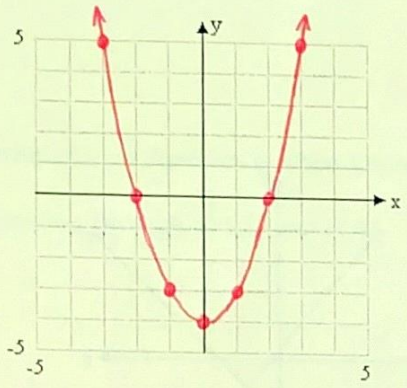
2. Determine whether each equation determines y as a function of x. (yes or no)

a. $x^2 + y = 25$ b. $x^2 + y^2 = 25$ c. $x + y^2 = 25$ d. $y = x^3$ e. $y = |x| - 4$

$y = -x^2 + 25$ $y = \pm\sqrt{25 - x^2}$ $y = \pm\sqrt{25 - x}$

YES NO NO YES YES

3. Graph $f(x) = x^2 - 4$ and answer the following questions. Where possible, answer using interval notation.



odd, even, or neither even

D $(-\infty, \infty)$ or $\mathbb{R}$

R $[-4, \infty)$

x intercept $(-2,0)$ & $(2,0)$

y intercept $(0,-4)$

increasing $(0, \infty)$

decreasing $(-\infty, 0)$

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

What is the relative max? there isn't one

What is the relative min? $(0,-4)$ or -4

$x^2 - 4 = -1$
$x^2 = 3$
$x = \pm\sqrt{3}$

Find f(−3) 5

For what value(s) of x is f(x) = −1 $\pm\sqrt{3}$ and f(x) = 0 −2 and 2

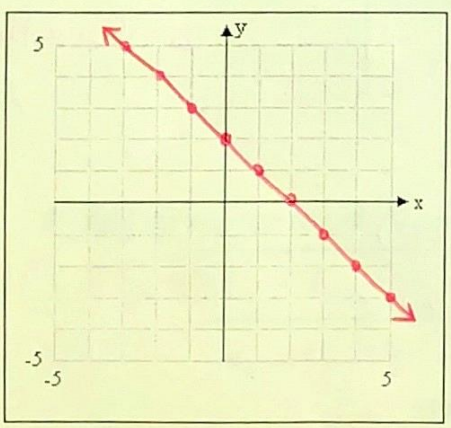
For what value(s) of x is f(x) > 0 $(-\infty, -2) \cup (2, \infty)$ f(x) < 0 $(-2, 2)$

Find average rate of change from $x_1 = -3$ to $x_2 = 2$ −1

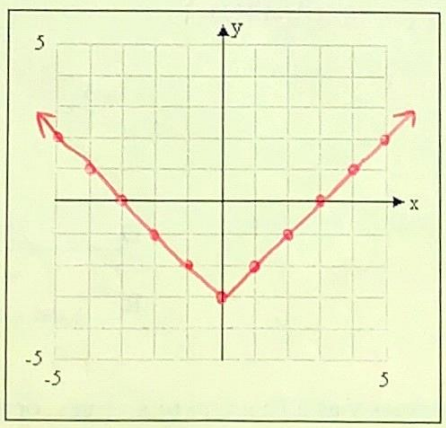
$(-3, 5)$
$(2, 0)$
$\frac{5-0}{-3-2} = \frac{5}{-5} = -1$

4. Graph each

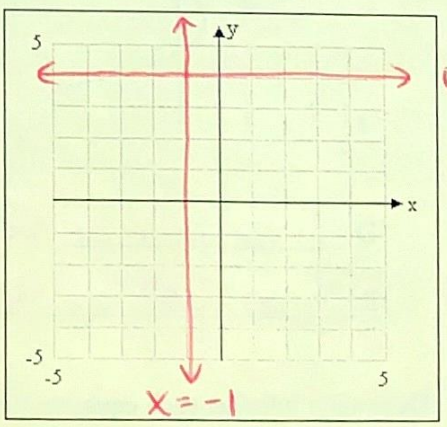
a. $y = -x + 2$



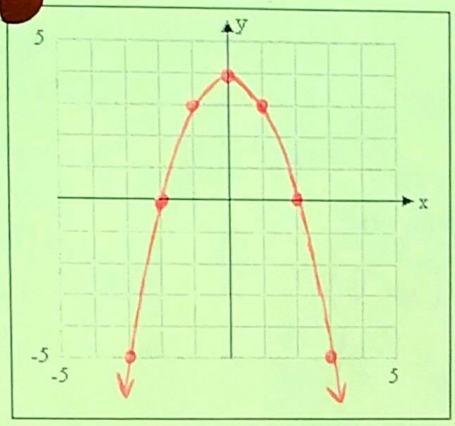
b. $y = |x| - 3$



c. first y = 4 then x = −1

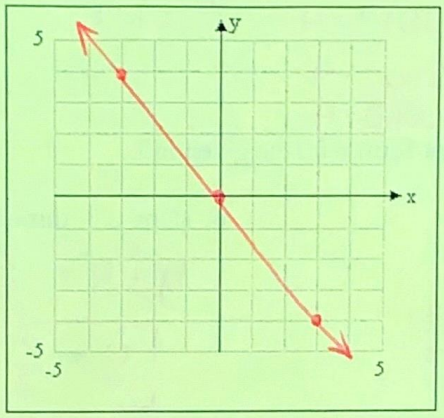


d. $f(x) = 4 - x^2$



e. $3y = -4x$

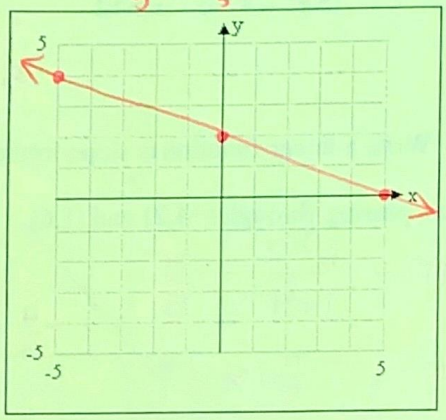
$y = -\frac{4}{3}x$



f. $2x + 5y = 10$

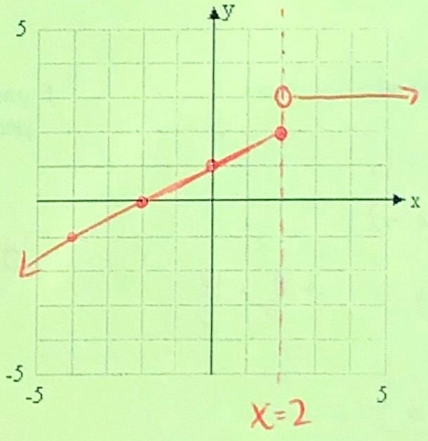
$5y = -2x + 10$

$y = -\frac{2}{5}x + 2$



g. $f(x) = \begin{cases} \frac{1}{2}x+1 & \text{if } x \le 2 \\ 3 & \text{if } x > 2 \end{cases}$

$f(x) = \frac{1}{2}x + 1$ $\quad$ $f(x) = 3$



5. a. Show whether $f(x) = x^2 + x - 3$ is odd, even or neither.

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

$= x^2 - x - 3$

neither (some signs changed, some didn't)

b. Find the difference quotient. $\frac{f(x+h) - f(x)}{h}$

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

$= \frac{x^2 + 2xh + h^2 + x + h - 3 - (x^2 + x - 3)}{h}$

$= \frac{x^2 + 2xh + h^2 + x + h - 3 - x^2 - x + 3}{h}$

$= \frac{2xh + h^2 + h}{h} = \frac{h(2x + h + 1)}{h} = 2x + 1 + h, \; h \neq 0$

6. $f(x) = \begin{cases} \frac{1}{2}x+1 & \text{if } 0 \le x \le 12 \\ 5x^3 - 4 & \text{if } x > 12 \end{cases}$

f(20) = 39996 f(0) = 1 f(−3) = und or NIA

$5(20)^3 - 4$ $\frac{1}{2}(0)+1$

$5 \cdot 8000 - 4$

$40000 - 4$

7. Write a linear function is slope intercept form with the given info.

a. passing through (−4,2) and (1,6)

$m = \frac{6-2}{1+4} = \frac{4}{5}$

$-\frac{4}{5} + \frac{30}{5}$

$y - 6 = \frac{4}{5}(x-1)$

$y = \frac{4}{5}x + \frac{26}{5}$

b. slope 2/3 through (6,−9)

$y + 9 = \frac{2}{3}(x-6)$

$y = \frac{2}{3}x - 13$

c. horizontal through (3,7)

$y = 7$

d. vertical through (5,2)

$x = 5$

e. passing through (2, −4) and parallel to 2x − 3y = 6

$3y = 2x - 6$

$y = \frac{2}{3}x - 2$

$y + 4 = \frac{2}{3}(x-2)$ $-\frac{4}{3} - \frac{12}{3}$

$y = \frac{2}{3}x - \frac{16}{3}$

f. passing through (2,−4) and perpendicular to 2x − 3y = 6

$y = \frac{2}{3}x - 2$

$y + 4 = -\frac{3}{2}(x-2)$

$y = -\frac{3}{2}x - 1$

g. Are these lines parallel perpendicular or neither? 2x + 7y = 14 and 7x − 2y = 7

perpendicular

$7y = -2x + 14$ $-2y = -7x + 7$

$y = -\frac{2}{7}x + 2$ $y = \frac{7}{2}x - \frac{7}{2}$

8. Find the average rate of change of $f(x) = -x^2 + 5x$ from x = −2 to x = 3

$f(-2) = -(-2)^2 + 5(-2)$

$= -4 - 10 = -14$

$f(3) = -(3)^2 + 5(3)$

$= -9 + 15 = 6$

(−2, −14)

(3, 6)

$\frac{-14-6}{-2-3} = \frac{-20}{-5} = 4$