Section 3.1 Notes

What is a Function?

Evaluating Functions:

$f(x) = 3x - 2$; $\quad$ *Evaluate* $f(0)$

14. $f(x) = x^2 + 2x$; $\quad$ *Evaluate* $f(0), f(3), f(-3), f(a), f(-x), f\left(\frac{1}{a}\right)$

Evaluate a Piecewise Function:

22. $f(x) = \begin{cases} 5 & \text{if } x \leq 2 \\ 2x - 3 & \text{if } x > 2 \end{cases}$

$f(-3), f(0), f(2), f(3), f(5)$

26. $f(x) = 3x - 1$; $\quad$ *Evaluate* $f(2x), 2f(x),$

Finding the Domain of a Function:

1-

2-

Find the domain of the function:

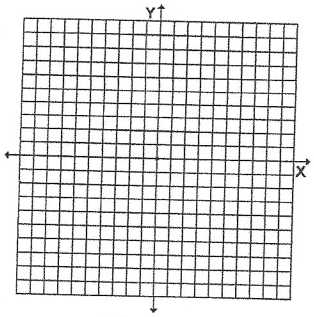
36. $f(x) = x^2 + 1$

44. $f(x) = \sqrt[4]{x + 9}$

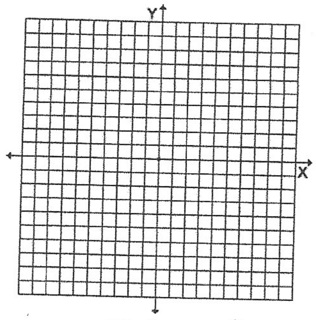
50. $g(x) = \frac{\sqrt{x}}{2x^2 + x - 1}$

Section 3.2 Notes

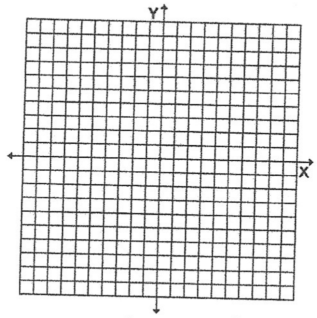
Identify a graph from an equation:



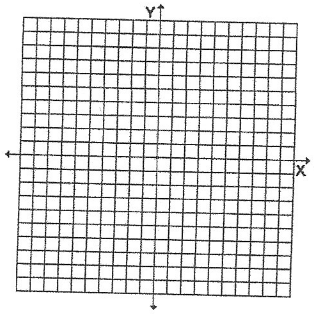
$f(x) = x$



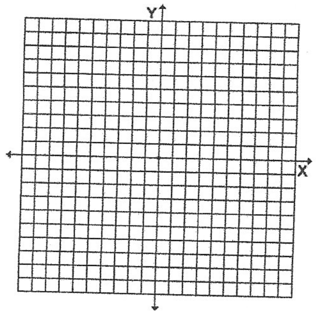
$f(x) = x^2$



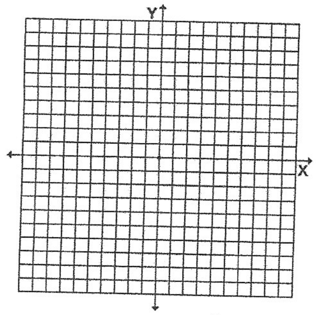
$f(x) = x^3$



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



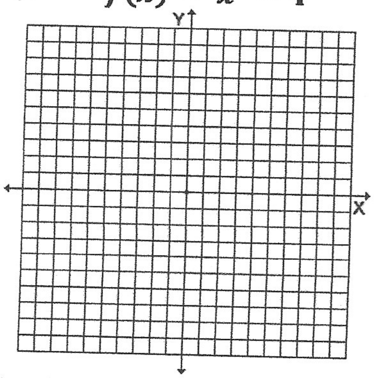
$f(x) = |x|$



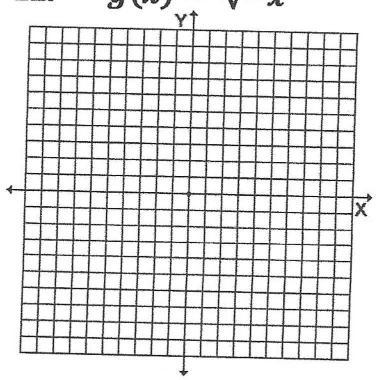
$f(x) = \frac{1}{x}$

Graph different types of functions:

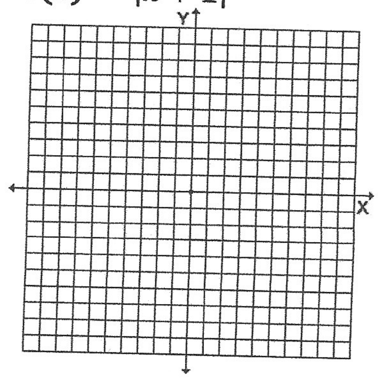
8. $f(x) = x^2 - 4$



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



16. $H(x) = |x + 1|$

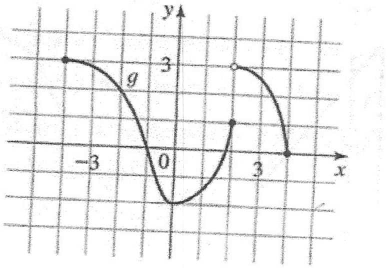


Evaluate a function given a graph:

24. The graph of a function g is given.

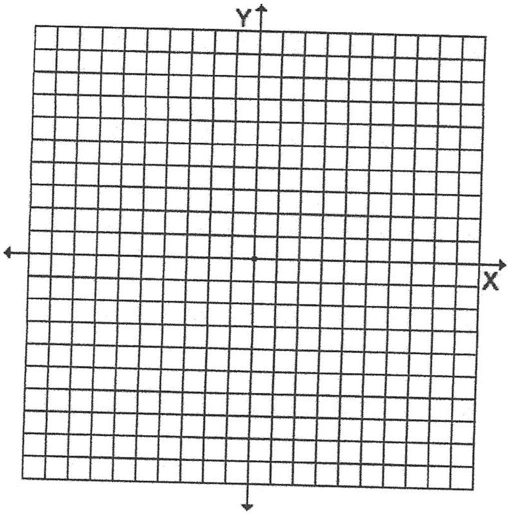
(a) Find $g(-4)$, $g(-2)$, $g(0)$, $g(2)$, and $g(4)$.

(b) Find the domain and range of g.

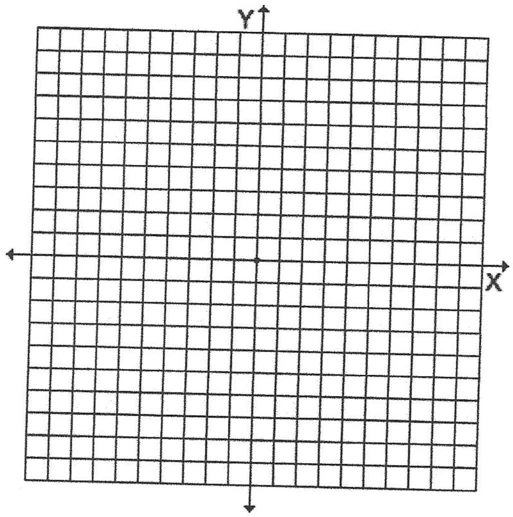


Find the domain and range of a function:

32. $f(x) = x^2 + 4$

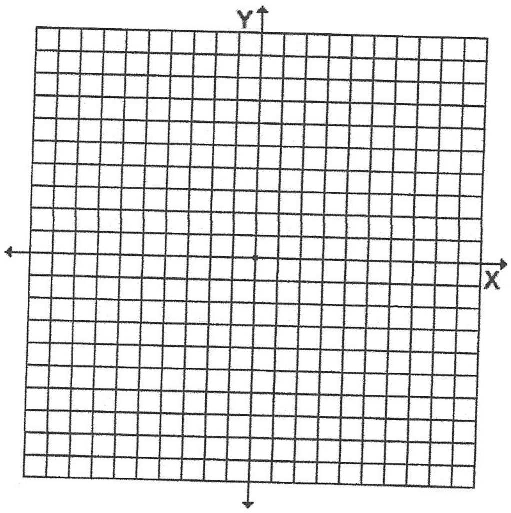


33. $f(x) = \sqrt{16 - x^2}$

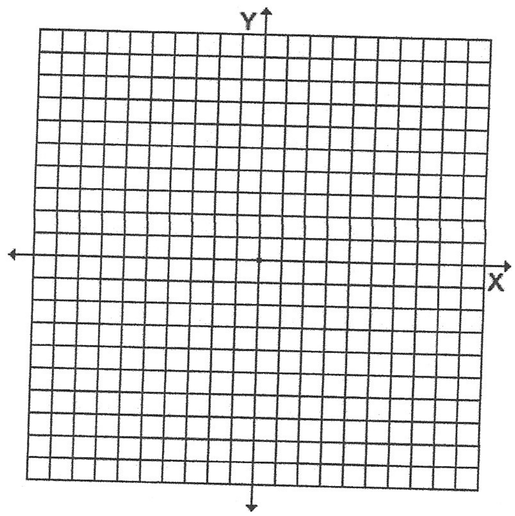


Graph a piecewise function:

50. $f(x) = \begin{cases} -x & \text{if } x \leq 0 \\ 9 - x^2 & \text{if } 0 < x \leq 3 \\ x - 3 & \text{if } x > 3 \end{cases}$

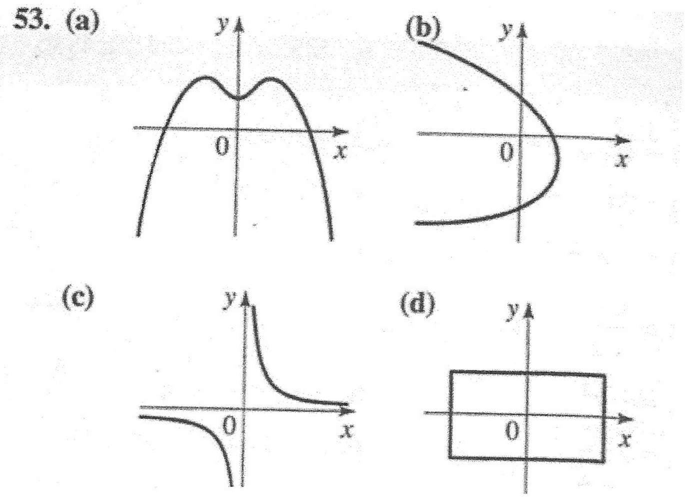


40. $f(x) = \begin{cases} 1 - x & \text{if } x < -2 \\ 5 & \text{if } x \geq -2 \end{cases}$



Using the vertical line test:

53.



Equations that define functions:

Does the equation define y as a function of x?

1-

2-

Does the equation define y as a function of x?

62. $x^2 + (y - 1)^2 = 4$

68. $2x + |y| = 0$

Section 3.1 Notes

What is a Function?

a set of ordered pairs in which no two ordered pairs have the same first Coordinate & different second coordinate

Evaluating Functions:

$f(x) = 3x - 2$; *Evaluate* $f(0)$

$f(0) = 3(0) - 2 = -2$

14. $f(x) = x^2 + 2x$; *Evaluate* $f(0), f(3), f(-3), f(a), f(-x), f\left(\frac{1}{a}\right)$

$f(0) = 0$

$f(3) = 3^2 + 2(3) = 15$

$f(-3) = 3$

$f(a) = a^2 + 2a$

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

$f\left(\frac{1}{a}\right) = \frac{1}{a^2} + \frac{2}{a}$

Evaluate a Piecewise Function:

22. $f(x) = \begin{cases} 5 & if\ x \leq 2 \\ 2x - 3 & if\ x > 2 \end{cases}$

$f(-3), f(0), f(2), f(3), f(5)$

$f(-3) = 5$

$f(0) = 5$

$f(2) = 5$

$f(3) = 3$

$f(5) = 7$

26. $f(x) = 3x - 1$; *Evaluate* $f(2x), 2f(x)$,

$f(2x) = 3(2x) - 1 = 6x - 1$

$2(f(x)) = 2(3x - 1) = 6x - 2$

Finding the Domain of a Function: (what values can't x be)

1- The domain is not defined when the denominator is 0.

2- We can't take the square root of a negative number.

Find the domain of the function:

36. $f(x) = x^2 + 1$

$(-\infty, \infty)$

44. $f(x) = \sqrt[4]{x + 9}$

$x + 9 \geq 0$

$x \geq -9$

$[9, \infty)$

50. $g(x) = \frac{\sqrt{x}}{2x^2 + x - 1}$

$\sqrt{x} \rightarrow x \geq 0$

$2x^2 + x - 1 = 0$

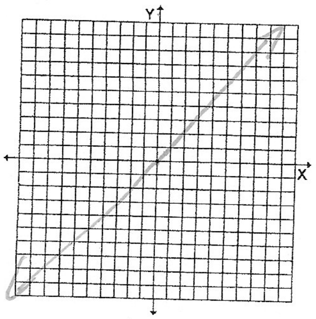
$(2x - 1)(x + 1) = 0$

$x = 1/2 \quad x = -1$

$[0, 1/2) \cup (\frac{1}{2}, \infty)$

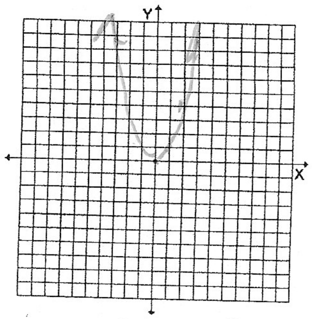
Section 3.2 Notes

Identify a graph from an equation:



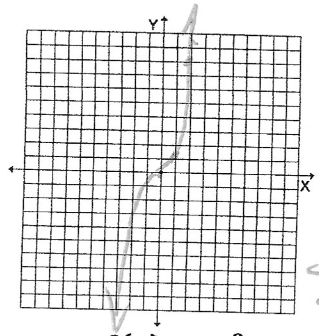
$f(x) = x$

D: $(-\infty, \infty)$
R: $(-\infty, \infty)$



$f(x) = x^2$

D: $(-\infty, \infty)$
R: $[0, \infty)$



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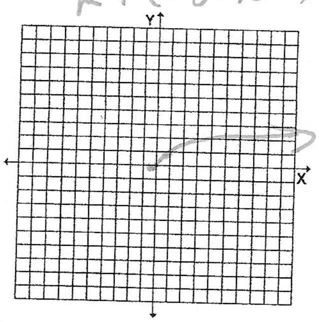
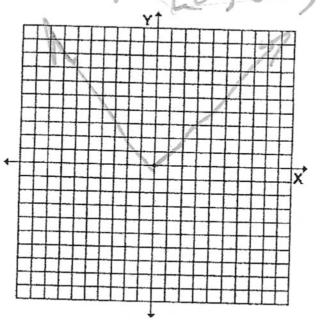


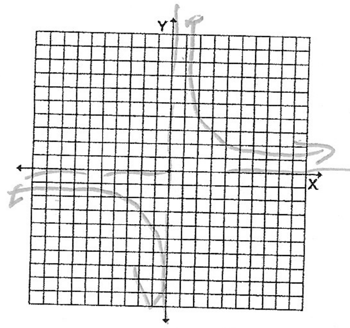
$f(x) = \sqrt{x}$

D: $[0, \infty)$ R $[0, \infty)$



$f(x) = |x|$

D: $(-\infty, \infty)$
R: $[0, \infty)$

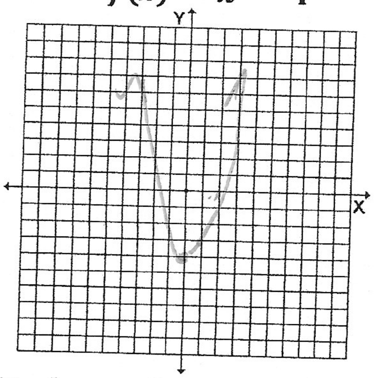


$f(x) = \frac{1}{x}$

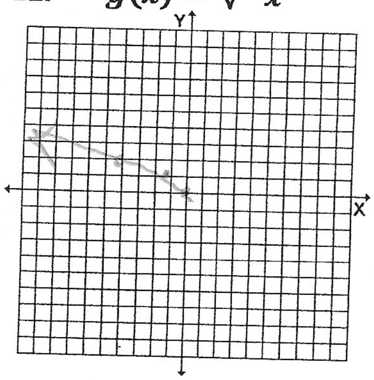
D: $(-\infty, 0) \cup (0, \infty)$
R: $(-\infty, 0) \cup (0, \infty)$

Graph different types of functions:

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



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



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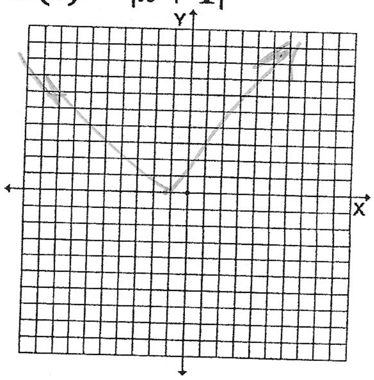
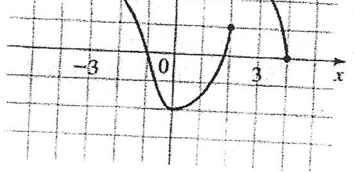


Evaluate a function given a graph:

24. The graph of a function g is given.

(a) Find $g(-4)$, $g(-2)$, $g(0)$, $g(2)$, and $g(4)$.

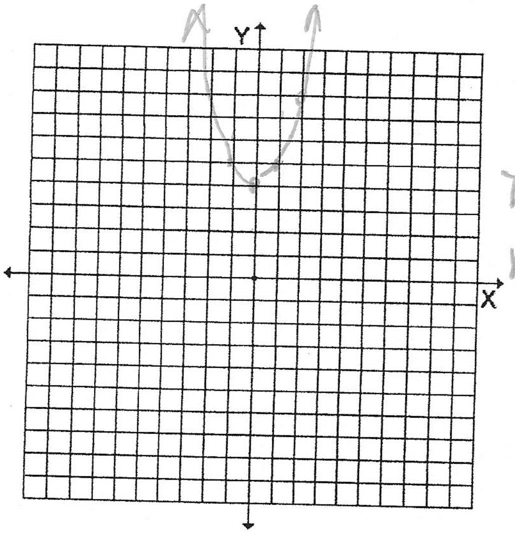
(b) Find the domain and range of g.



$g(-4) = 3$
$g(-2) = 2$
$g(0) = -2$
$g(2) = 1$
$g(4) = 0$

Find the domain and range of a function:

32. $f(x) = x^2 + 4$



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

R: $[4, \infty)$

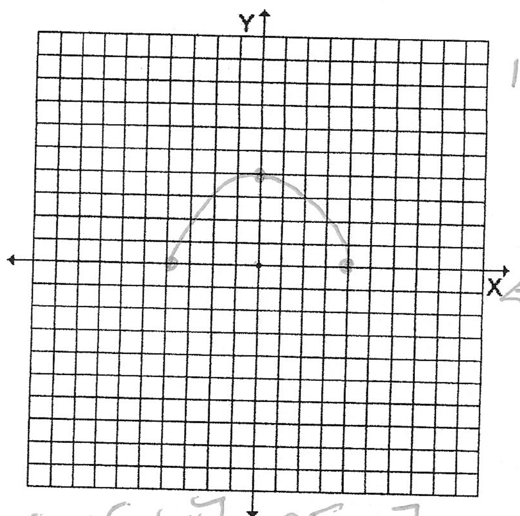
33. $f(x) = \sqrt{16 - x^2}$

D: $[-4, 4]$

$16 - x^2 \geq 0$

$-x^2 \geq -16$

$x^2 \leq 16$



-4 4

x	y
-4	0
0	4
4	0

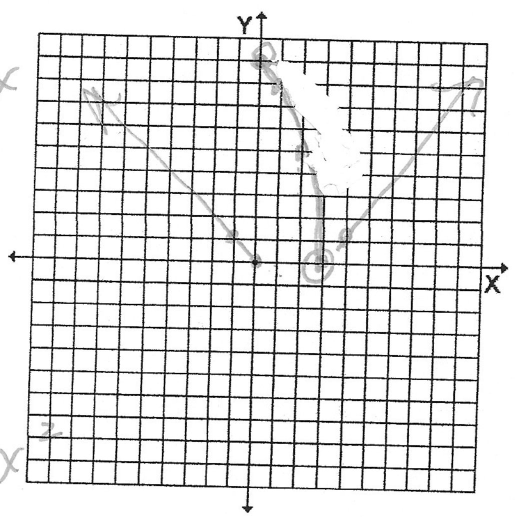
D: $[-4, 4]$ R $[0, 4]$

Graph a piecewise function:

50. $f(x) = \begin{cases} -x & if\ x \leq 0 \\ 9 - x^2 & if\ 0 < x \leq 3 \\ x - 3 & if\ x > 3 \end{cases}$

$f(x) = -x$

x	y
0	0
-1	1



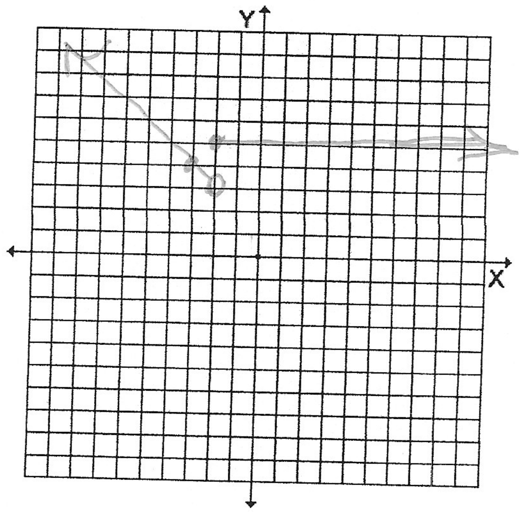
$f(x) = 9 - x^2$

x	y
0	9
3	0

$f(x) = x - 3$

3	0
4	1

40. $f(x) = \begin{cases} 1 - x & if\ x < -2 \\ 5 & if\ x \geq -2 \end{cases}$



$f(x) = 1 - x$

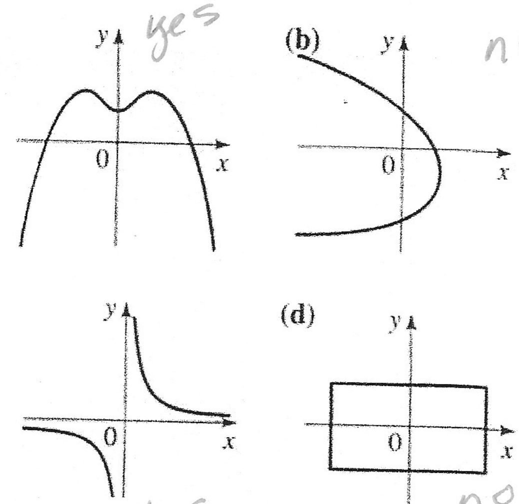
x	y
-2	3
-3	4

$f(x) = 5$

-2	5
-1	5

Using the vertical line test:

53. (a) yes (b) no (c) yes (d) no



Equations that define functions:

Does the equation define y as a function of x?

1- Solve for y in terms of x

2- If you have exactly one solution then y is a function of x.

Does the equation define y as a function of x?

62. $x^2 + (y-1)^2 = 4$

$(y-1)^2 = 4 - x^2$

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

$\boxed{\text{not a function of } x}$

68. $2x + |y| = 0$

$|y| = -2x$

$y = -2x$ or $y = 2x$

Not a function of x