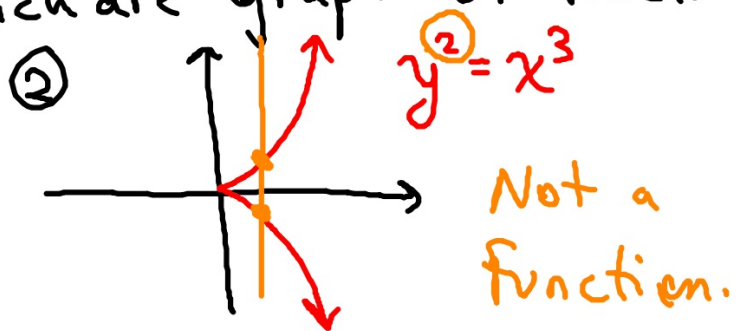
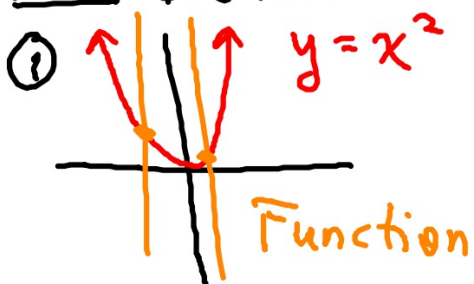


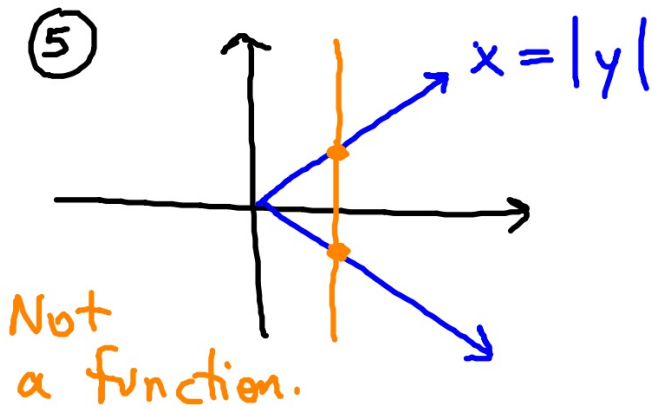
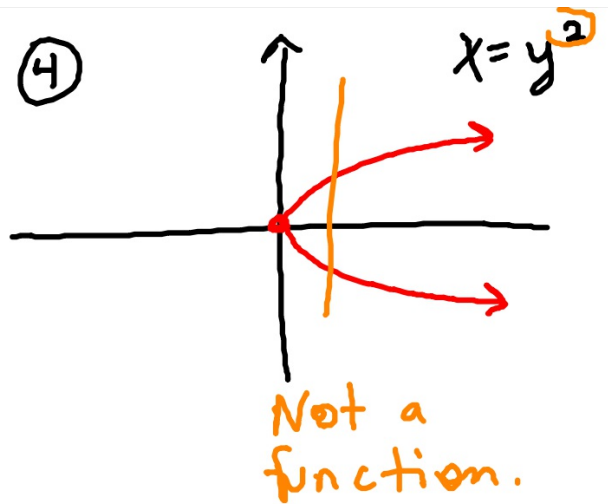
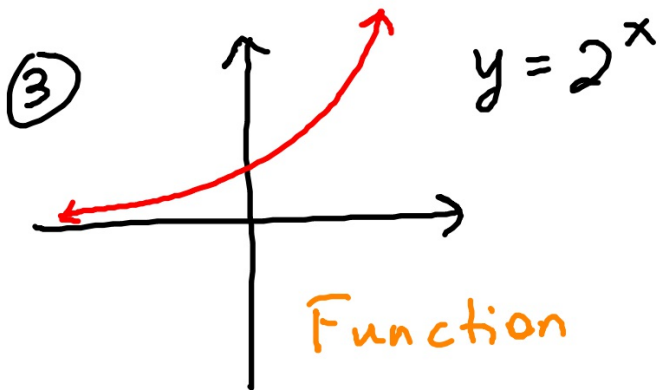
## 3.2 Graph of a function

I. Identify the graph of a function.

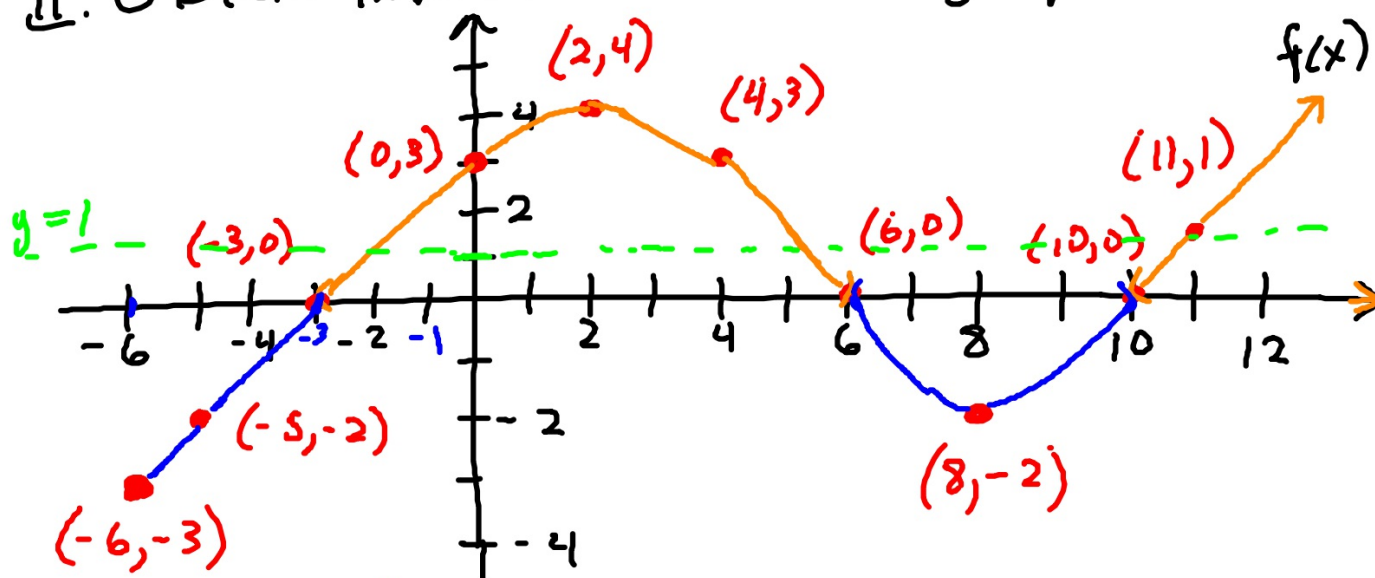
Vertical line test: A set of points in the  $xy$  plane is the graph of a function if and only if every vertical line intersects the graph in at most one point.

Ex: Determine which are graphs of functions.





II. Obtain information from a graph



- a) Find  $f(0) = 3$   
Find  $f(-6) = -3$   
Find  $f(11) = 1$

- b) Is  $f(-1)$  positive or negative?  
positive.

c) For what values of  $x$  is  $f(x) = 0$ ?  
 $y = 0$   
 $-3, 6, \text{ and } 10$

d) For what values of  $x$  is  $f(x) \geq 0$ ?  
 $y \geq 0$   
 $[-3, 6] \cup [10, \infty)$

$$-3 \leq x \leq 6, \quad x \geq 10$$

e) For what values of  $x$  is  $f(x) < 0$ ?  
 $y < 0$   
 $[-6, -3) \cup (6, 10)$

f) What is the domain:  
 $[-6, \infty)$

g) what is the range?

$$[-3, \infty)$$

h) What are the x-intercepts?

$$(-3, 0), (6, 0), \text{ and } (10, 0)$$

i) What is the y-intercept?

$$(0, 3)$$

j) How often does the line  $y=1$  intersect the graph? **three times**

k) For what values of  $x$  does  $f(x) = -2$ ? **-5 and 8.**

Ex: Given:  $f(x) = \frac{3x+6}{x+5}$

① Find the domain of  $f(x)$ .

$$\begin{aligned}x+5 &= 0 & D: x &\neq -5 \\x &= -5\end{aligned}$$

② Find the intercepts.

$$\begin{aligned}y\text{-Int: } & \frac{(3(0)+6)}{0+5} = \frac{6}{5} \\0 = & (0, \frac{6}{5})\end{aligned}$$

$$(x+5) \cdot 0 = \frac{3x+6}{\cancel{x+5}} \cdot \cancel{(x+5)}$$

$$0 = 3x + 6 \quad || -6$$

$$\frac{-6}{3} = 3x \quad \boxed{(-2, 0)}$$

③ If  $x=4$ , what is  $f(x)$ ?  
What point is on the graph of  $f$ ?

$$f(4) = \frac{3(4)+6}{4+5} = \frac{12+6}{9} = \frac{18}{9} = 2$$

$$(4, 2)$$

④ If  $f(x) = -3$ , what is  $x$ ?  
What point is on the graph of  $f$ ?

$$\frac{3x+6}{x+5} = f(x)$$

$$-3 = \frac{3x+6}{x+5}$$



$$-3 = \frac{3x+6}{x+5}$$

$$-3x-15 = 3x+6$$

$$-6x = 21$$

$$x = -2\frac{1}{6}$$

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

$$(-\frac{7}{2}; 3)$$

