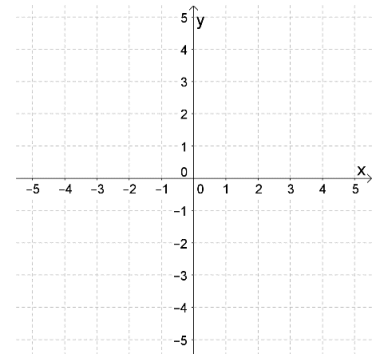
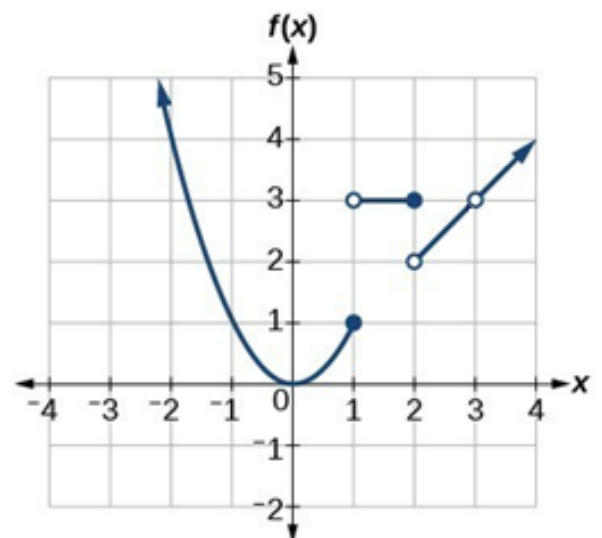


## Tools for Limits (Part 1)

Notes

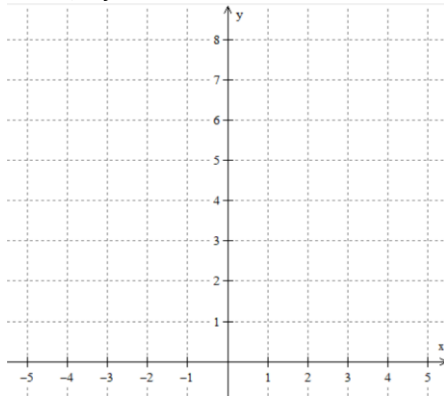
ex:  $f(x) = \frac{1}{x-1}$

Evaluating Functions1. Given the function  $f(x) = 2x^2 - 5x - 3$ a) Evaluate  $f(0)$ b) Evaluate  $f(1)$ c) Evaluate  $f(-2)$ d) Write the coordinates on the graph of  $f(x)$  that correspond to parts a-c2. Given the graph of  $f(x)$ , find the following.a)  $f(-2) =$ b)  $f(0) =$ c)  $f(1) =$ d)  $f(2) =$ e)  $f(3) =$ f) For what  $x$ -values does  $f(x) = 1$ ?

**Graphs of Basic Functions (These graphs are all very important and need to be memorized).**

3. Graph the following functions. Label intercepts and asymptotes. Find the domain and range.

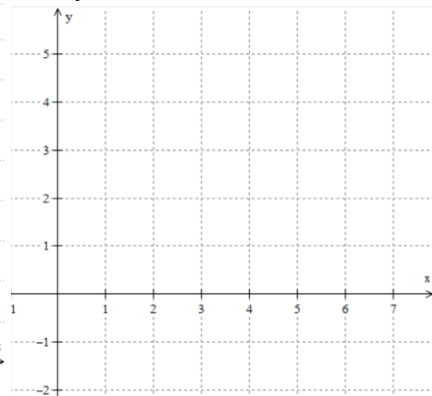
a)  $y = e^x$



Domain:

Range:

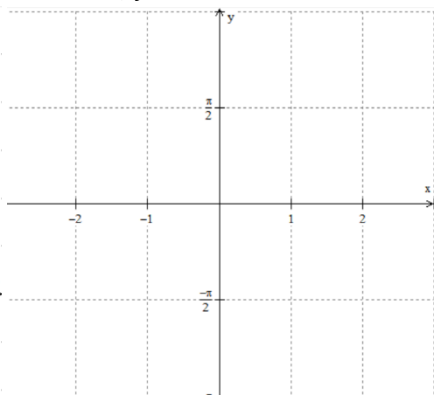
b)  $y = \ln x$



Domain:

Range:

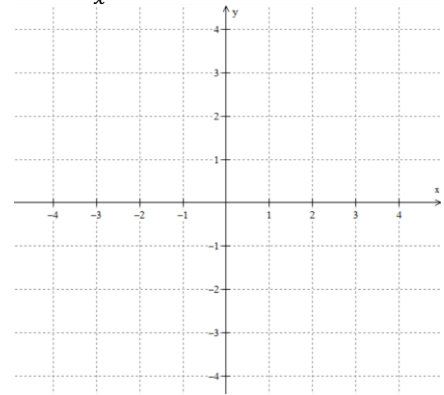
c)  $y = \arctan x$



Domain:

Range:

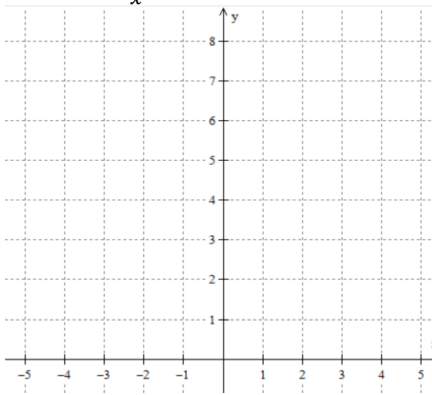
d)  $y = \frac{1}{x}$



Domain:

Range:

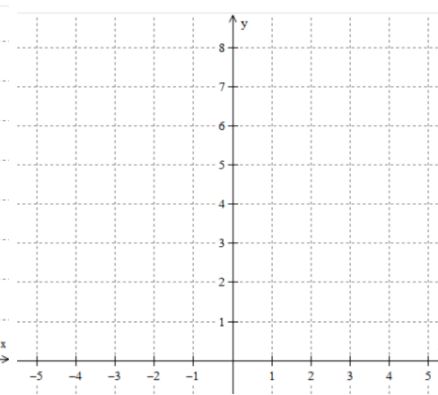
e)  $y = \frac{1}{x^2}$



Domain:

Range:

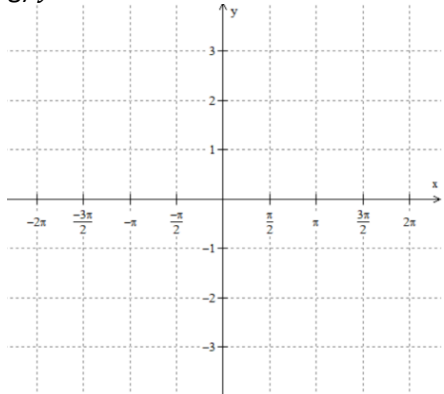
f)  $y = |x|$



Domain:

Range:

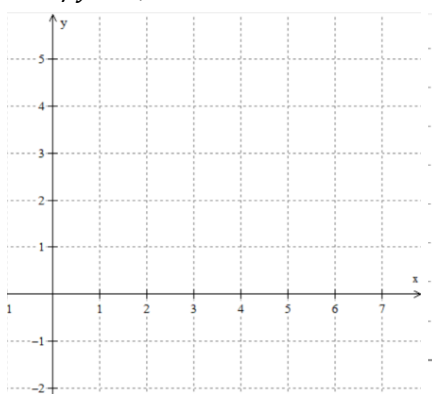
g)  $y = \sin x$



Domain:

Range:

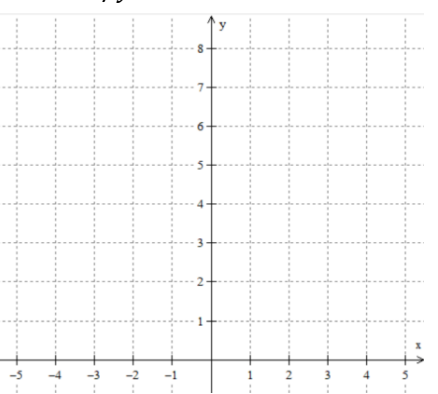
h)  $y = \sqrt{x}$



Domain:

Range:

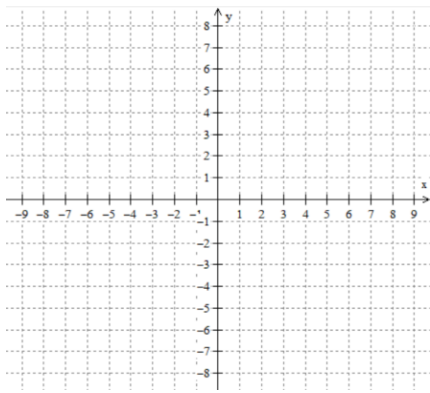
i)  $y = x^2$



Domain:

Range:

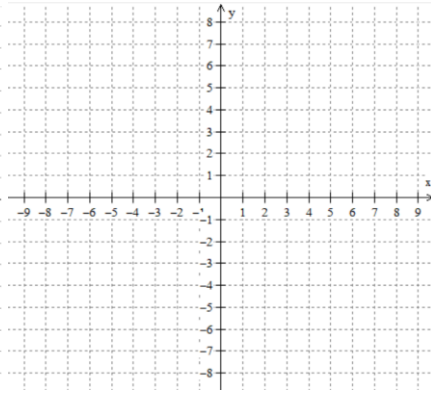
j)  $y = x^3$



Domain:

Range:

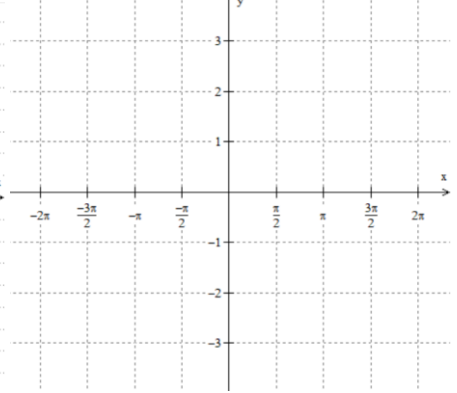
k)  $y = \sqrt[3]{x}$



Domain:

Range:

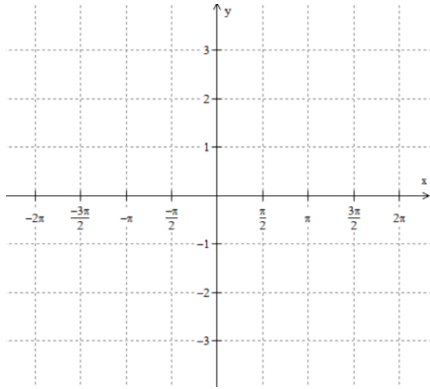
l)  $y = \cos x$



Domain:

Range:

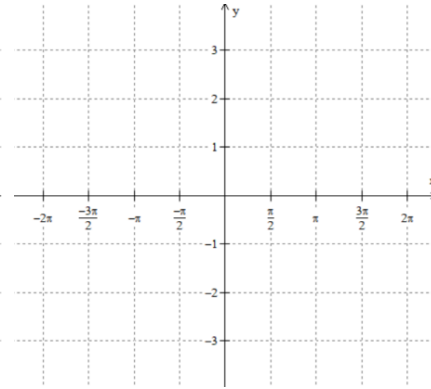
m)  $y = \tan x$



Domain:

Range:

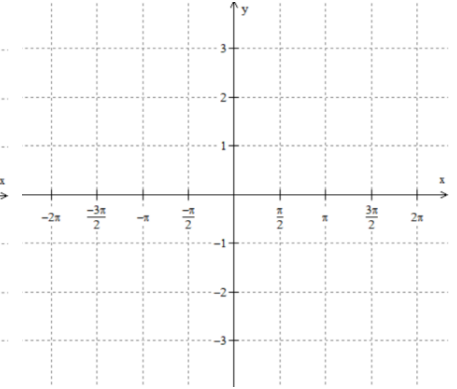
n)  $y = \sec x$



Domain:

Range:

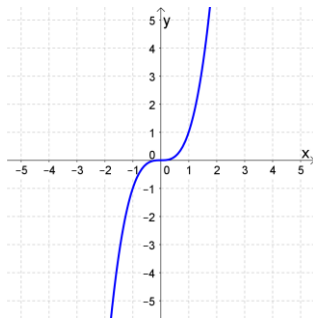
o)  $y = \csc x$



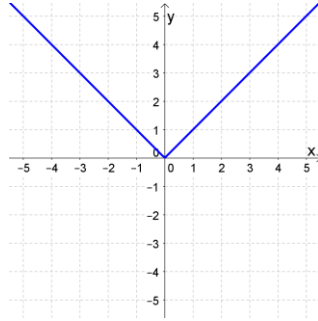
Domain:

Range:

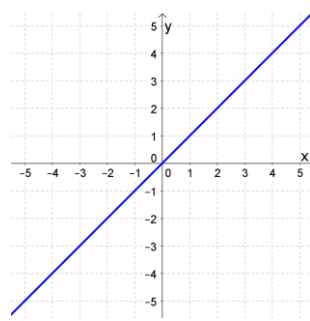
4. Write formulas for the following common graphs.



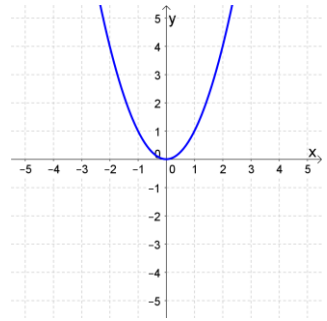
$f(x) = \underline{\hspace{2cm}}$



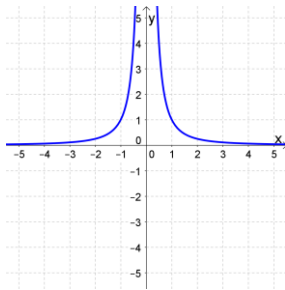
$f(x) = \underline{\hspace{2cm}}$



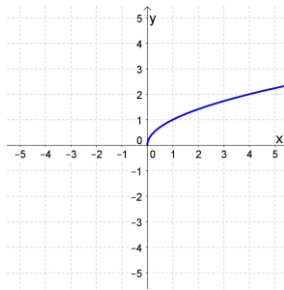
$f(x) = \underline{\hspace{2cm}}$



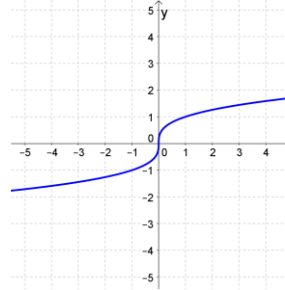
$f(x) = \underline{\hspace{2cm}}$



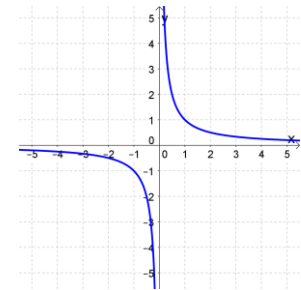
$f(x) = \underline{\hspace{2cm}}$



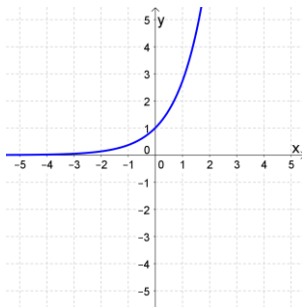
$f(x) = \underline{\hspace{2cm}}$



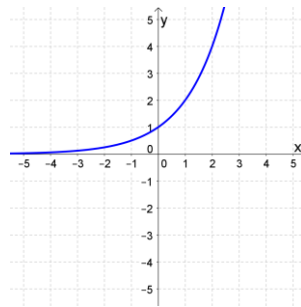
$f(x) = \underline{\hspace{2cm}}$



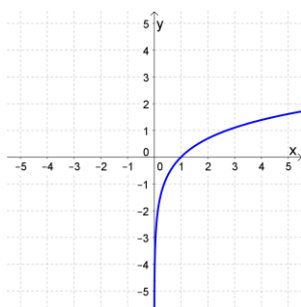
$f(x) = \underline{\hspace{2cm}}$



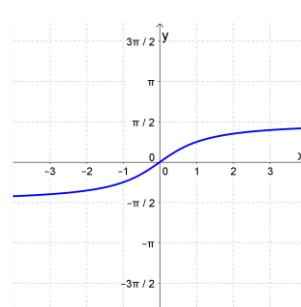
$f(x) = \underline{\hspace{2cm}}$



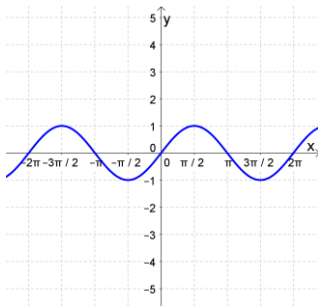
$f(x) = \underline{\hspace{2cm}}$



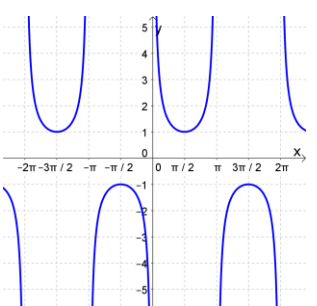
$f(x) = \underline{\hspace{2cm}}$



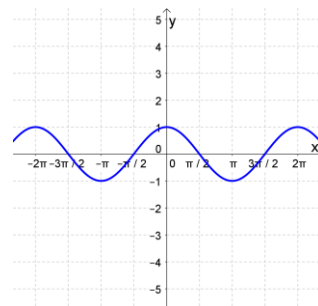
$f(x) = \underline{\hspace{2cm}}$



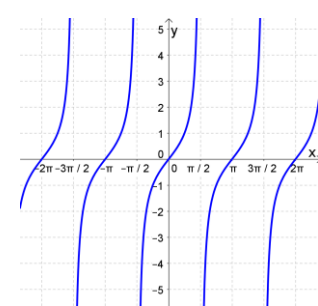
$f(x) = \underline{\hspace{2cm}}$



$f(x) = \underline{\hspace{2cm}}$



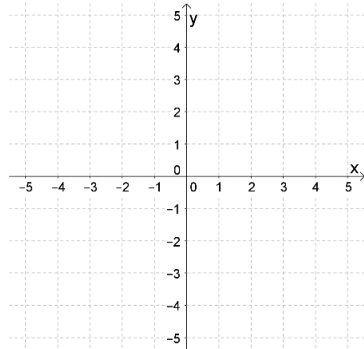
$f(x) = \underline{\hspace{2cm}}$



$f(x) = \underline{\hspace{2cm}}$

**Notes**

ex:  $f(x) = -|x - 2| + 3$



**Function Transformations**

For a function  $f(x)$ , and  $c > 0$ ,

$f(x) + c$  shifts up

$f(x) - c$  shifts down

$cf(x)$  stretches vertically (if  $c > 1$ ),  
or shrinks vertically (if  $0 < c < 1$ )

$-f(x)$  reflects about  $x$ -axis

$f(x - c)$  shifts right

$f(x + c)$  shifts left

$f(cx)$  stretches horizontally (if  $0 < c < 1$ ),  
or shrinks horizontally (if  $c > 1$ )

$f(-x)$  reflects about  $y$ -axis

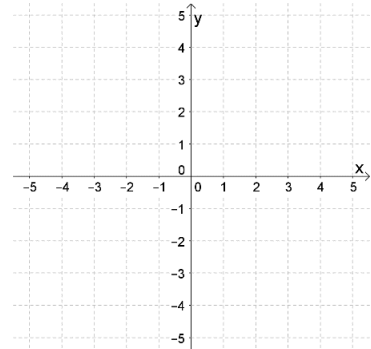
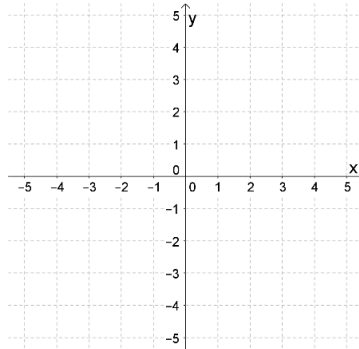
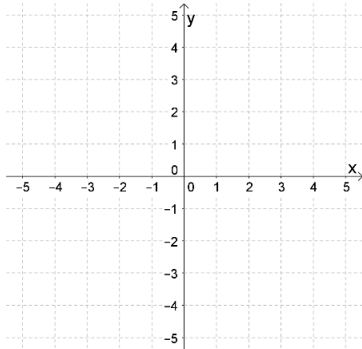
**Graphing with transformations**

5. Graph each function and find its domain and range.

$h(x) = \frac{1}{x} + 2$

$m(x) = \frac{-1}{(x+1)^2}$

$f(x) = -\sqrt{x-2}$



Domain:

Domain:

Domain:

Range:

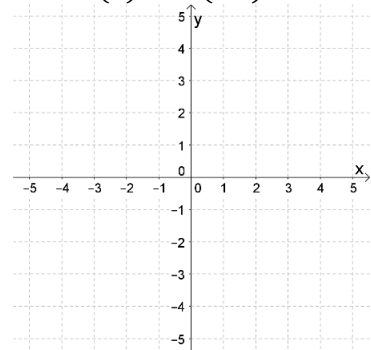
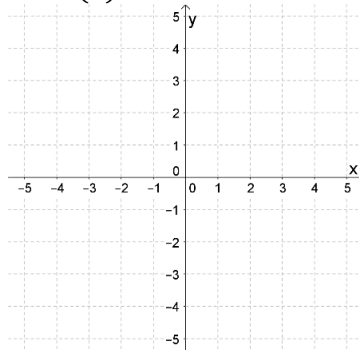
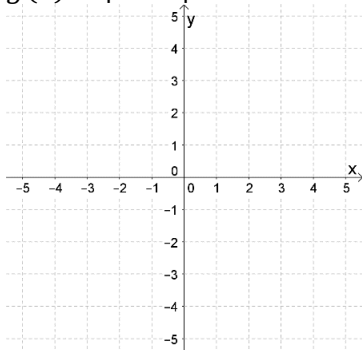
Range:

Range:

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

$n(x) = -2^{x-1}$

$r(x) = \ln(-x) + 1$



Domain:

Domain:

Domain:

Range:

Range:

Range:

6. Match each exponential function to its graph.

(a)  $f(x) = 3^x$

(b)  $g(x) = 2^{-x}$

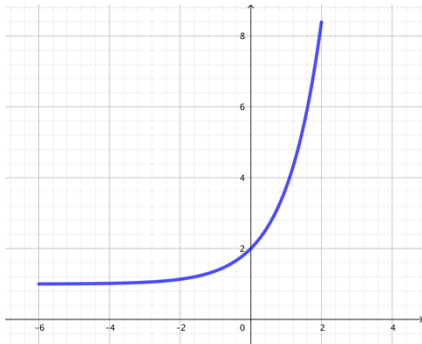
(c)  $f(x) = e^x + 1$

(d)  $h(x) = 2^{x+1} - 3$

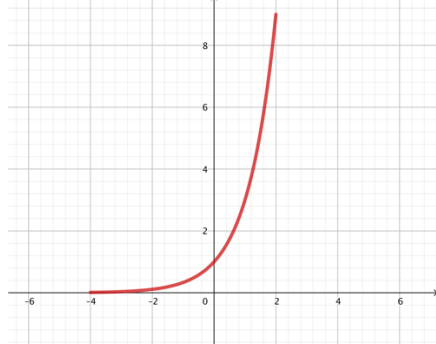
(e)  $n(x) = 3^x + 4$

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

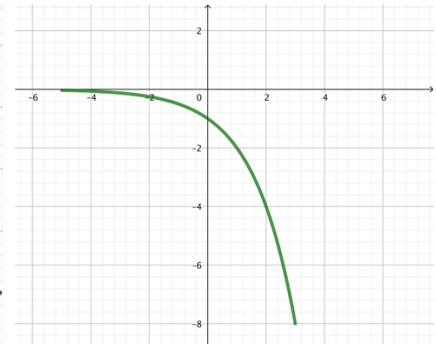
I. \_\_\_\_\_



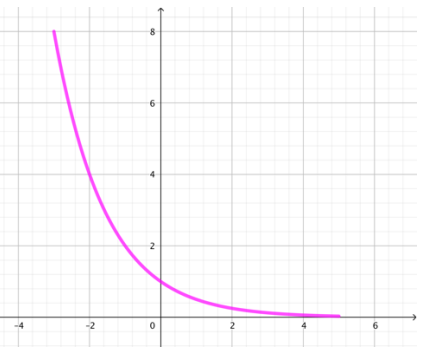
II. \_\_\_\_\_



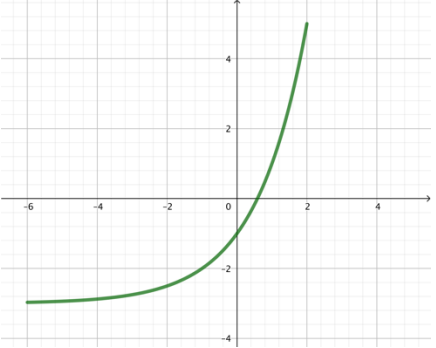
III. \_\_\_\_\_



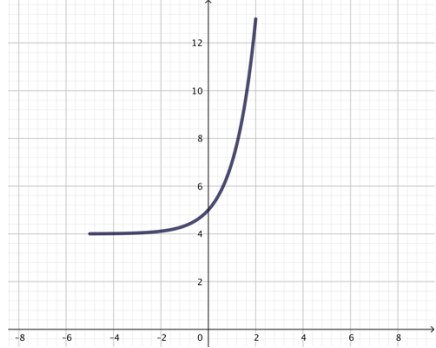
IV. \_\_\_\_\_



V. \_\_\_\_\_

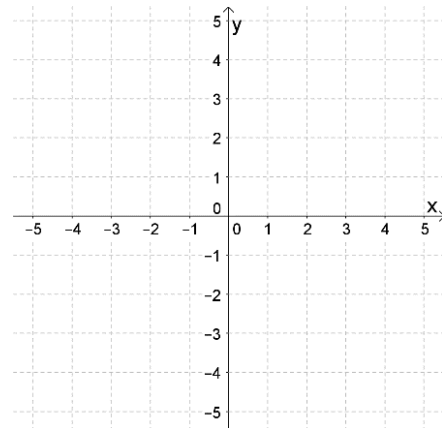


VI. \_\_\_\_\_



**Notes**

ex:  $f(x) = \begin{cases} x - 2, & x < 1 \\ 2^{x-1}, & x \geq 1 \end{cases}$



**Piecewise Functions**

7. Given  $f(x) = \begin{cases} 5 & \text{if } x \leq -2 \\ 2x - 1 & \text{if } x > -2 \end{cases}$ , find:

a)  $f(-5)$

b)  $f(-3)$

c)  $f(-2.001)$

d)  $f(-2)$

e)  $f(-1.999)$

f)  $f(0)$

g)  $f(1)$

h) Domain of  $f(x)$

8. Find the following function values and then graph each of the following piecewise functions

$$f(x) = \begin{cases} x^2 - 1, & x < 0 \\ \cos x, & x \geq 0 \end{cases}$$

$$g(x) = \begin{cases} 3 - x, & x < 1 \\ 3, & x = 1 \\ \sqrt{x}, & x > 1 \end{cases}$$

$f(-2) =$

$f(0) =$

$g(-1) =$

$g(4) =$

