Review of Relations and Functions:

$R = \{(1,2),(2,4),(3,5)\}$

$S = \{(1,2),(1,3),(2,6)\}$

Domain of *R*?

Domain of *S*?

Range of *R*?

Range of *S*?

Is *R* a function? Explain.

Is *S* a function? Explain.

Relations and Functions from equations: ***The equation defines y as a function of x if when each domain value is substituted in for x, there is a unique value for y that makes the equation true.***

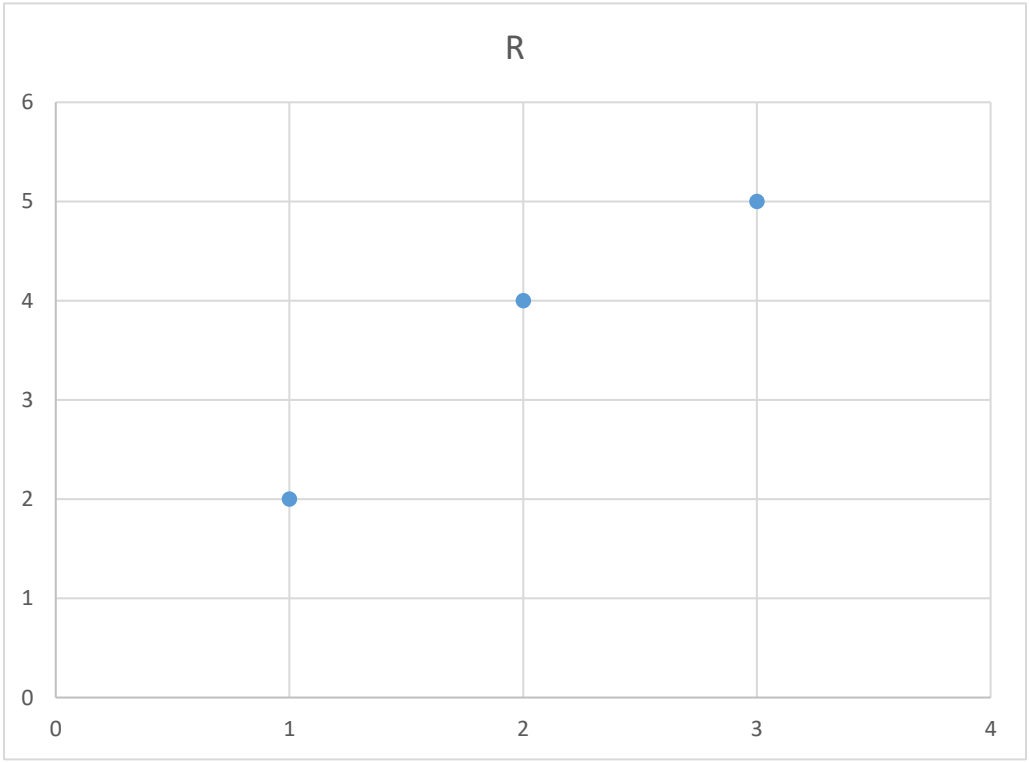
$x + y = 6$

$x = y^2$

$2x^2 + 3y^2 = 0$

$|y| = x$

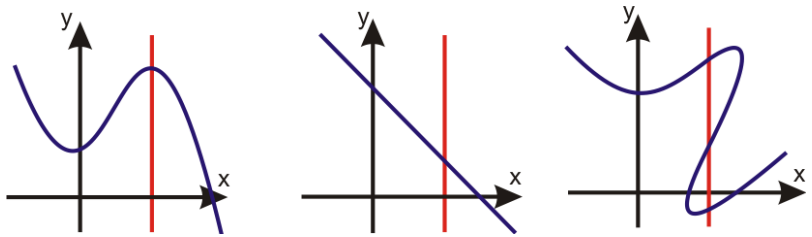
Relations and Functions from graphs:

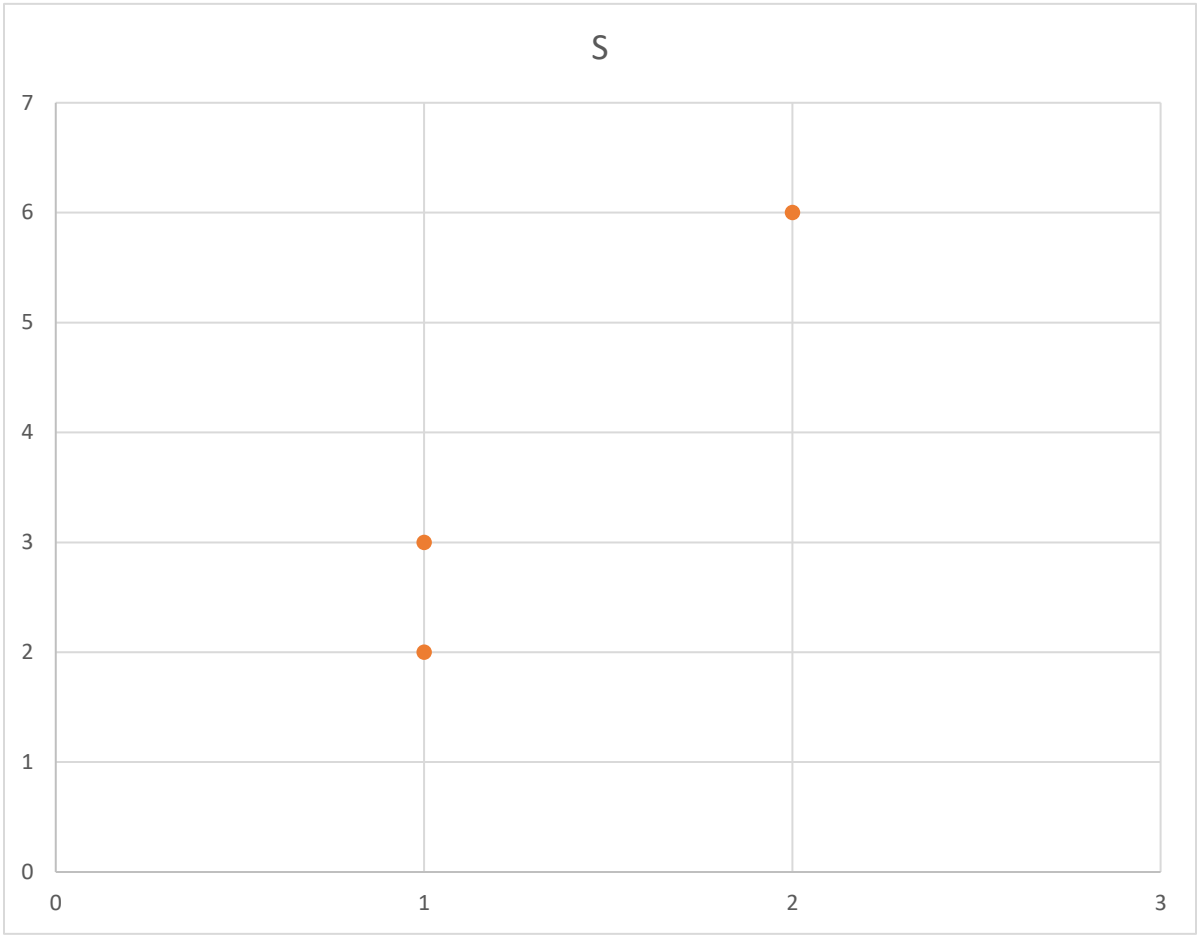


Domain?*(x-coordinates)*

Range? *(y-coordinates)*

Function?*(vertical line test)*

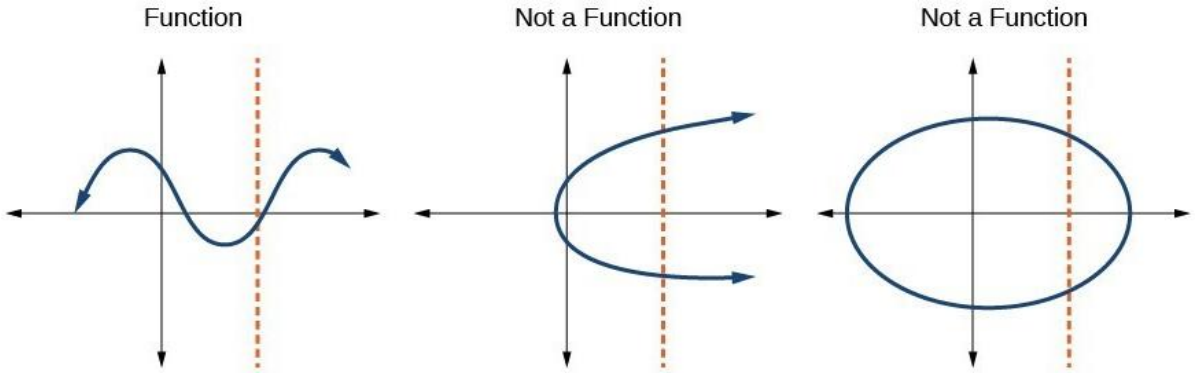




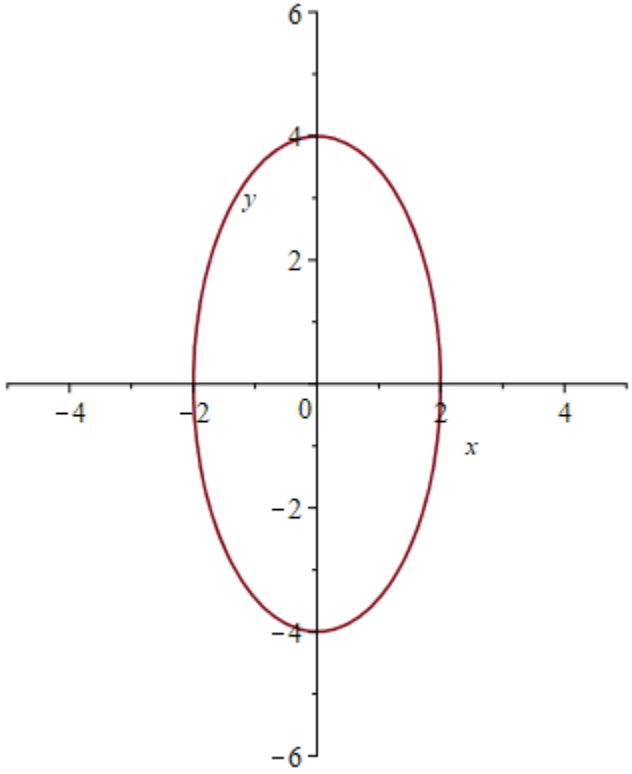
Domain?

Range?

Function?



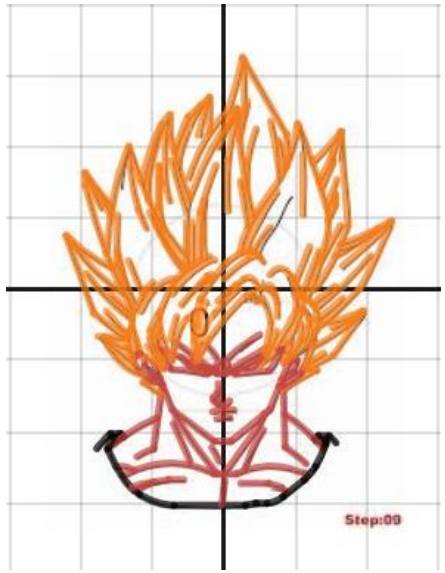
T



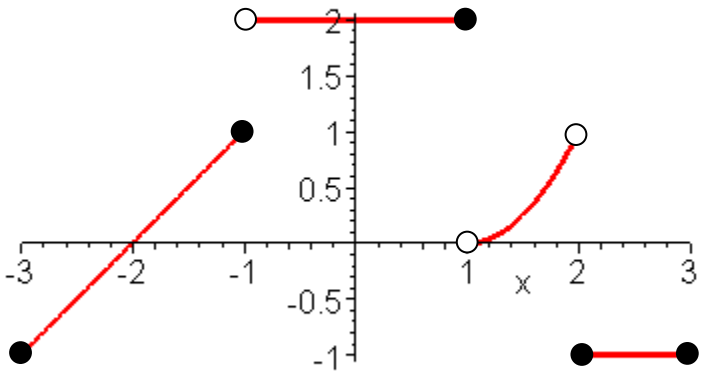
Domain?*(left to right)*

Range?*(bottom to top)*

Function?*(vertical line test)*



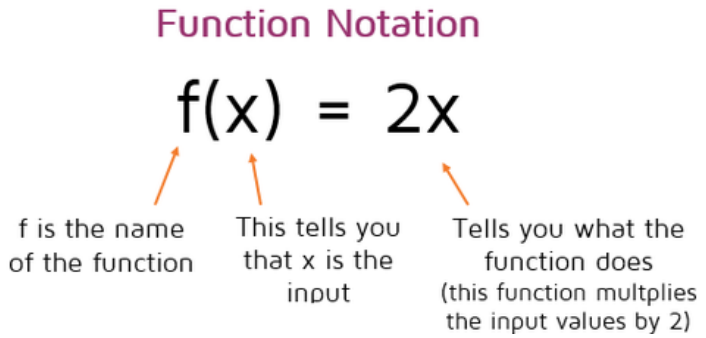
U



Domain?

Range?

Function?



Function Notation and Function Evaluation:

$f(x) = x^2 - 1$

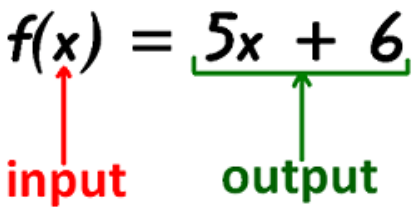
$f(-1)$

$f(-1) = (-1)^2 - 1 =$

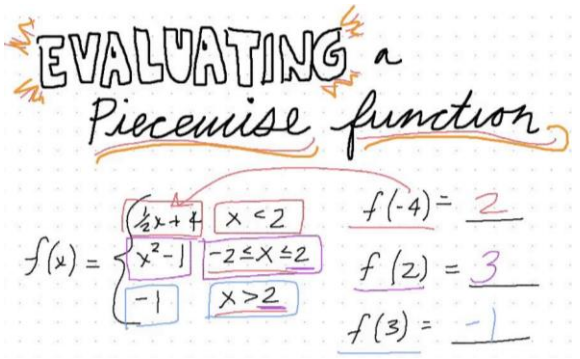
$f(0)$

$f(2)$

$f(\frac{1}{2})$



$$g(x)=\begin{cases} x & ;x\le -1 \\ 2x+1 & ;x>-1 \end{cases}$$



$g(-2)$

Which formula?

Is $-2\le -1$, or is $-2>-1$?

$g(-2)=-2$

$g(-1)$

Which formula?

Is $-1\le -1$, or is $-1>-1$?

$g(1)$

Which formula?

Is $1\le -1$, or is $1>-1$?

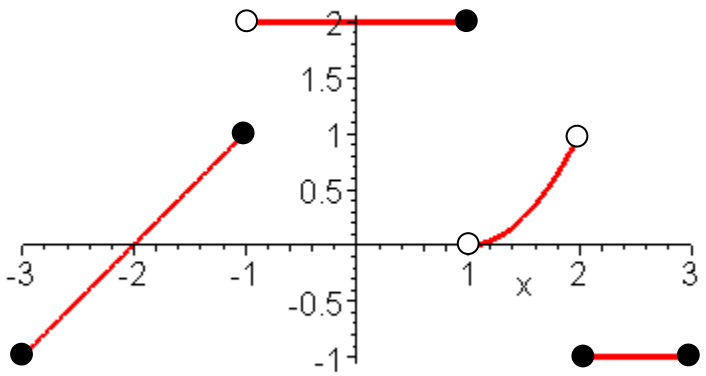
$g\left(\frac{1}{2}\right)$

Which formula?

Is $\frac{1}{2}\le -1$, or is $\frac{1}{2}>-1$?

Function values from graphs:

f

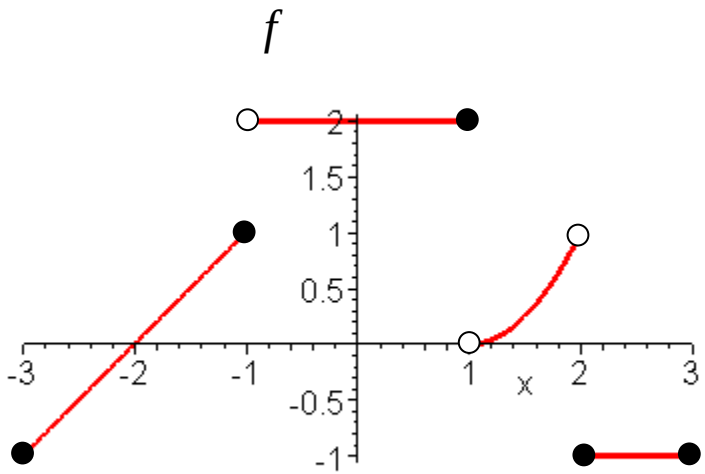


$f(-3)$ $f(-2)$ $f(-1)$

What is the y-coordinate of the point on the graph with x-coordinate -3?

$f(0)$ $f(1)$ $f\left(\frac{5}{2}\right)$

$f(-4)$



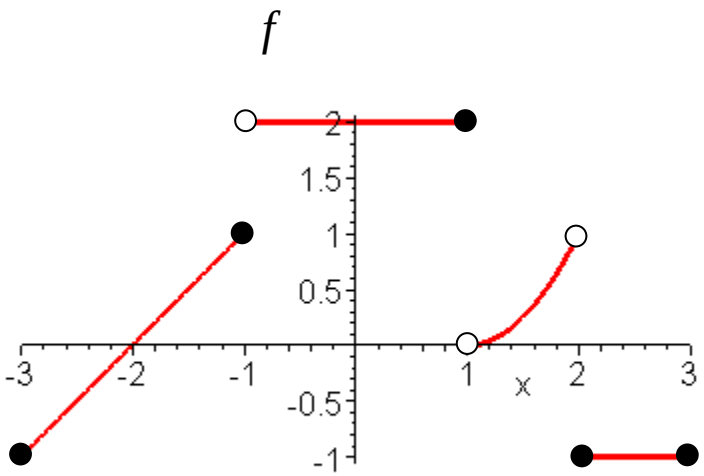
Solve the equations:

$f(x)=1$

$f(x)=2$

Find the *x*-coordinates of all the points on the graph with *y*-coordinate 1.

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



Solve the inequalities:

$f(x) > 1$

Find the *x*-coordinates of all the points on the graph with *y*-coordinates larger than 1.

$0 \le f(x) < 1$

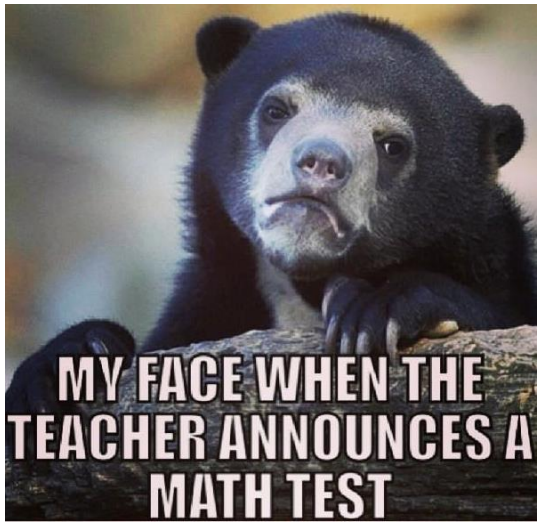
$f(x) \le -1$

Domains from function formulas: ***(Avoid division by zero and even roots of negative numbers.)***

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

$$g(x)=\sqrt{1-2x}$$

$$h(x)=\frac{\sqrt{x-2}}{x-3}$$



Combinations of functions:

$$f+g,\ \ f-g,\ fg,\ \frac{f}{g},\ f\circ g$$

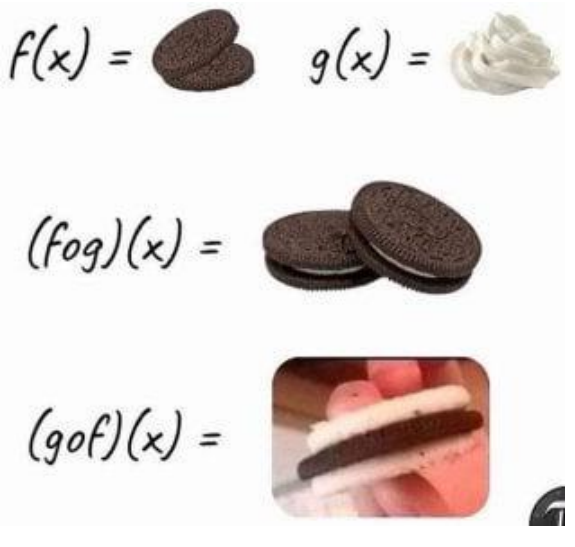
$$(f+g)(x)=f(x)+g(x)$$

$$(f-g)(x)=f(x)-g(x)$$

$$(fg)(x)=f(x)g(x)$$

$$\left(\frac{f}{g}\right)(x)=\frac{f(x)}{g(x)}$$

$$(f\circ g)(x)=f(g(x))$$



$$f(x)=x^2-2,\quad g(x)=\sqrt{x+1}$$

$(f+g)(0)$

$(f+g)(-1)$

$(g\circ f)(0)$

$(f-g)(3)$

$(f-g)(-2)$

$(f\circ f)(3)$

$(fg)(3)$

$\left(\frac{f}{g}\right)(-1)$

$\left(\frac{f}{g}\right)(3)$

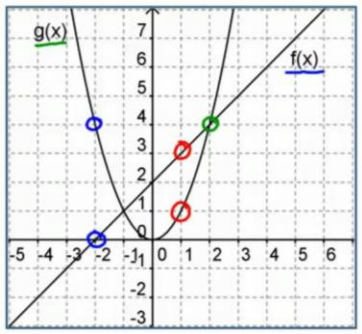
$\left(\frac{f}{g}\right)(-2)$

$(g\circ g)(3)$

$(f\circ g)(3)$

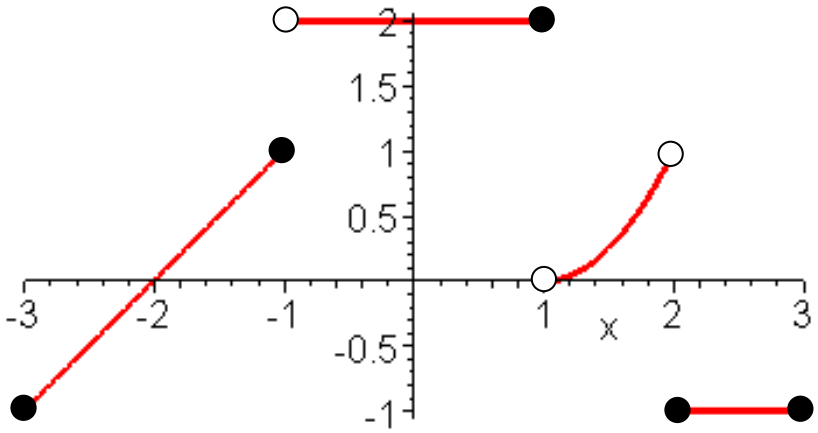
$(g\circ f)(3)$

$(f\circ g\circ f)\left(\sqrt{5}\right)$

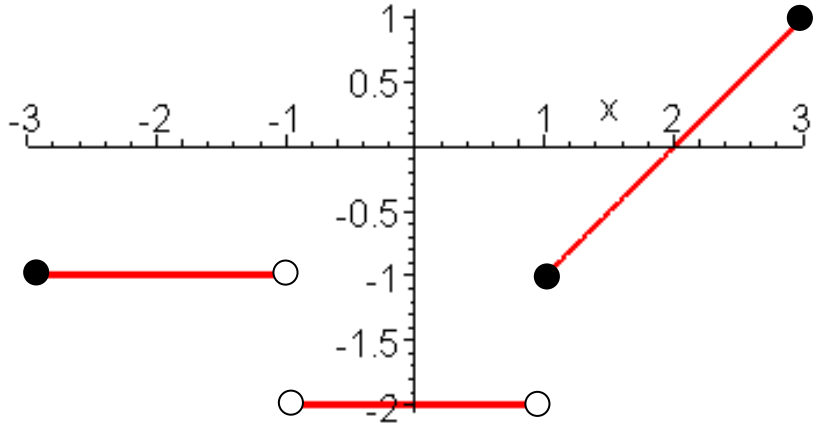


Combinations from graphs:

Graph of *f*



Graph of *g*



$(f+g)(0)$ $\left(\frac{f}{g}\right)(1)$ $(fg)(-3)$ $(f\circ g)(2)$

$(g\circ f)(2)$ $(g\circ g)(0)$ $(f\circ f)(-1)$ $(f\circ g\circ f)(1)$