Function Notation

- Must understand the notation associated with determing the values of functions

I. From a graph

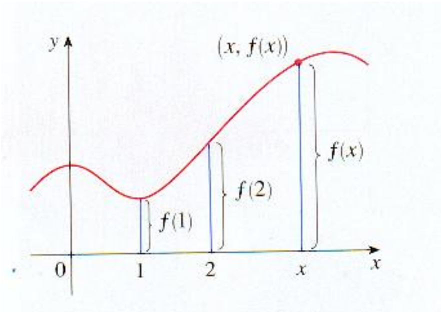


FIGURE 4

II. From a table of values

x	$f(x)$

III. From an explicit formula (Equation)

$f(x) = -2x^2 + 5x - 3$ ← Explicit formula !

$f(-3) = ?$

$f(\$) = ?$

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

$-2(-h)^2+5(-h)-3-2(-2(-1+3h)^2+5(-1+3h)-3)$

$-2h^2-5h-3-2(-2(1-6h+9h^2)-5+15h-3)$

$-2h^2-5h-3-2(-2+12h-18h^2-5+15h-3)$

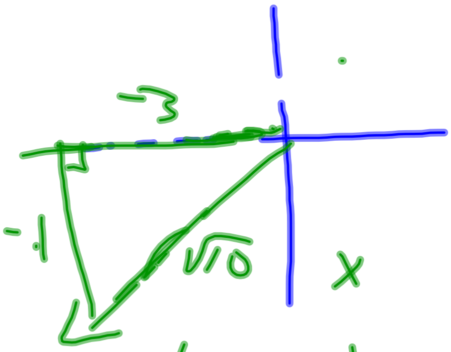
$-2h^2-5h-3+4-24h+36h^2+10-30h+6$

$\boxed{34h^2-59h+17}$

Check-Up # 2

1. If $\sin\theta = -\frac{1}{\sqrt{10}}$ and $\cos\theta < 0$ find $\tan\theta$

Sin θ → Negative
Cos θ → Negative



$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

$\tan\theta = \frac{1}{3}$

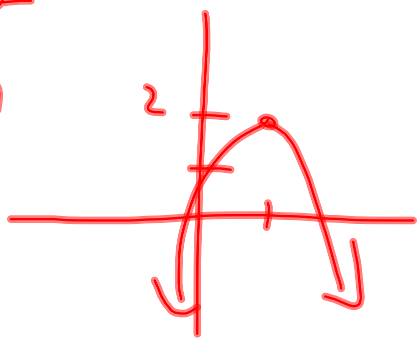
Sin ⟹ y
Cos ⟹ x

2. Determine the domain and range of the quadratic $f(x) = -5x^2 + 10x - 3$.

$f(x) = -5(x^2 - 2x + 1) - 3 + 5$

$f(x) = -5(x-1)^2 + 2$

V(1,2) opens down



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

R: $[2, -\infty)$ or $\{y \mid y \leq 2, y \in R\}$

Warm Up

Select the best response for each of the following:

1. Find the domain of $f(x)=\sqrt{2x+3}$.

a) $[0,\infty)$ b) $(0,\infty)$ c) $[-\frac{3}{2},\infty)$
d) $(-\frac{3}{2},\infty)$ e) $[0,\frac{3}{2})$

$2x+3\geq 0$
$2x\geq -3$
$x\geq -\frac{3}{2}$

$x\neq 3$

2. Find the range of the function $y=\dfrac{1}{x-3}$.

a) $(3,\infty)$ b) $(-\infty,3)$
c) $(-\infty,\frac{1}{3}),\ (\frac{1}{3},\infty)$ d) $(-\infty,3),\ (3,\infty)$
e) $(-\infty,0),\ (0,\infty)$

3. If $f(x)=2x^3+Ax^2+Bx-5$ and if $f(2)=3$ and $f(-2)=-37$, what is the value of $A+B$?

(A) -6 (B) -3 (C) -1 (D) 2

(E) It cannot be determined from the information given.

$3=2(2)^3+A(2)^2+B(2)-5$

$3=16+4A+2B-5$

$\boxed{-8=4A+2B}$

$-37=2(-2)^3+A(-2)^2+B(-2)-5$

$-37=-16+4A-2B-5$

$\boxed{-16=4A-2B}$

$$\oplus\begin{cases}4A+2B=-8\\4A-2B=-16\end{cases}$$

$8A=-24$

$\frac{8A}{8}=\frac{-24}{8}$

$A=-3$

$4(-3)+2B=-8$

$-12+2B=-8$

$2B=4$

$B=2$

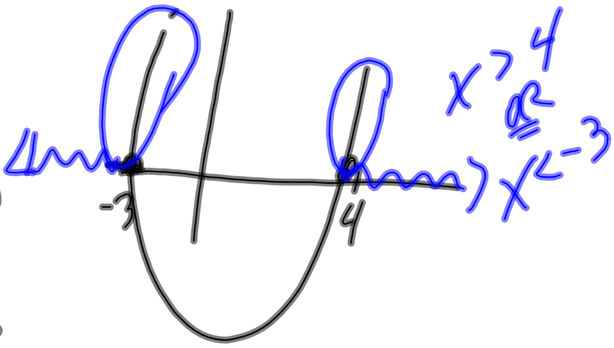
4. Solve: $x^2-x>12$

a) $x<-6$ or $x>1$ $*$b) $x<-3$ or $x>4$
c) $x<-2$ or $x>3$ d) $-6<x<1$
e) $-2<x<3$

$x^2-x-12>0$

$(x-4)(x+3)>0$

Zeros: $x=4,-3$

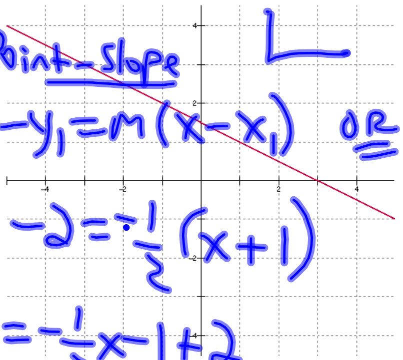


Functions continued...

$\cdot\ (-1,2) \quad m = -\frac{1}{2}$

1. Determine the equation that describes each of the following:

(a)



Point-slope

$y - y_1 = m(x - x_1)$ OR $y = mx + b$

slope y-intercept

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

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

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

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

$2 = -\frac{1}{2}(-1) + b$

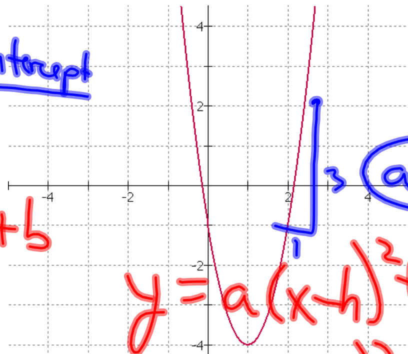
$2 = \frac{1}{2} + b$

$2 - \frac{1}{2} = b$

$\frac{3}{2} = b$

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

(b)



3

1

$a = 3$

$y = a(x-h)^2 + k$

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

$y = 3(x-1)^2 - 4$

2. Sketch each of the following:

(a) $f(x) = 3x - 1$, $x > -1$ $x \in R$

(b) $f(x) = -2(x+2)^2 + 3, -3 \le x < 0, x \in R$