Sunday, September 30, 2018
4:49 PM

KEY

Precalculus — 1.5A Analyze Graphs of Functions

Obj: To analyze graphs to find domain, range, zeros; to apply vertical line test to det. if function

Hwk: 1.5A; sketch graph for #27, 29; Check answers!

1.4 - 1.5 Quiz on FRI 9/28

Do Now:

1. Find the domain of each. Express in interval notation.

a. $g(x) = \sqrt{x-9}$ ← pos

$x - 9 \geq 0$

$x \geq 9$

$\boxed{[9, \infty)}$

b. $f(x) = \sqrt[3]{x+4}$ *

$\boxed{(-\infty, \infty)}$

* ODD root

* can have a negative radicand

c. $h(x) = \dfrac{\sqrt{x+1}}{x^2 - 2x}$ ← pos, $\neq 0$

$x + 1 \geq 0$

$x \geq -1$

$x^2 - 2x \neq 0$

$x(x-2) \neq 0$

$x \neq 0 \quad x \neq 2$

$\boxed{[-1, 0) \cup (0, 2) \cup (2, \infty)}$

2. If $f(x) = x^2 - x + 1$, find $f(x + h)$ and $f(x)$

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

$= (x+h)(x+h) - x - h + 1$

$= x^2 + 2xh + h^2 - x - h + 1$

$\dfrac{f(x+h) - f(x)}{h}, h \neq 0$

Diff QUOT:

$\dfrac{\cancel{x^2} + 2xh + h^2 \cancel{- x} - h \cancel{+ 1} \cancel{- x^2} \cancel{+ x} \cancel{- 1}}{h}$

$= \dfrac{2xh + h^2 - h}{h} = \dfrac{h(2x + h - 1)}{h}$

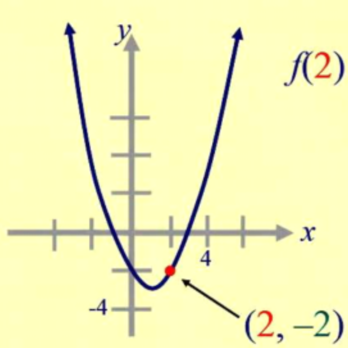
$= \boxed{2x + h - 1 \quad h \neq 0}$

Class Notes:

Analyzing Graphs of functions:

The graph of a function f is the collection of ordered pairs $(x, f(x))$ where x is in the domain of f.

(2, –2) is on the graph of $f(x) = (x - 1)^2 - 3$.



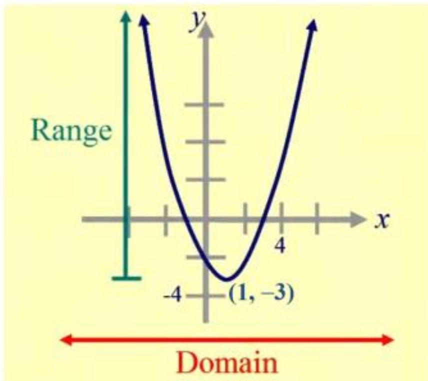
$f(2) = (2 - 1)^2 - 3$

$= 1^2 - 3$

$= -2$

To find the domain and range from a graph:

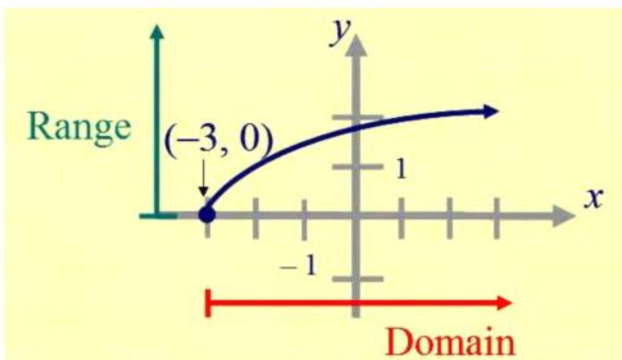
- Domain: find the leftmost → rightmost x values.
- Range: find the bottommost → topmost y values.



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

Range: $[-3, \infty)$

Ex. 1: Find the domain & range of $f(x) = \sqrt{x+3}$ from its graph.

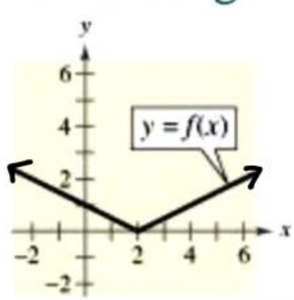


D: $[-3, \infty)$

R: $[0, \infty)$

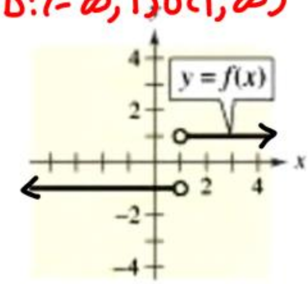
Ex. 2:

Use the graph to determine the domain and range of f. Write using interval notation.

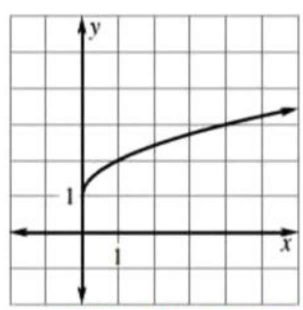


D: $(-\infty, \infty)$ R: $[0, \infty)$

D: $(-\infty, 1) \cup (1, \infty)$



R: -1 and 1



D: $[0, \infty)$ R: $[1, \infty)$

Vertical Line Test: a set of points in a coordinate plane is a function of x iff no <u>vertical line</u> intersects the graph at more than one point.

Zeros of a function: the x values for which f(x) = 0, aka *x-intercepts*, *solutions, roots.*

- To find zeros: set f(x) = 0 & solve

Ex. 3: $f(x) = 2x^2 + 13x - 24$

$2x^2 + 13x - 24 = 0$

$(2x-3)(x+8) = 0$

$2x - 3 = 0$ | $x + 8 = 0$

$2x = 3$ | $\boxed{x = -8}$

$\boxed{x = 3/2}$

Ex. 4: $g(x) = \sqrt{10 - x^2}$

$(\sqrt{10-x^2})^2 = (0)^2$

$10 - x^2 = 0$

$\sqrt{10} = \sqrt{x^2}$

$\sqrt{10} = |x|$

$\boxed{x = \pm\sqrt{10}}$

Ex. 5: $h(x) = \frac{2x-3}{x+5}$

$\frac{2x-3}{x+5} = \frac{0}{1}$

$2x - 3 = 0$

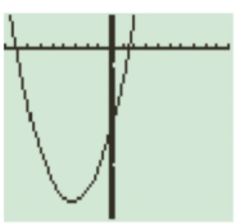
$2x = 3$

$\boxed{x = 3/2}$

How do you check using a graphing calculator?

- where the function crosses the x-axis.

3)



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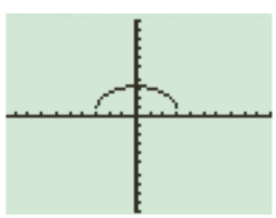

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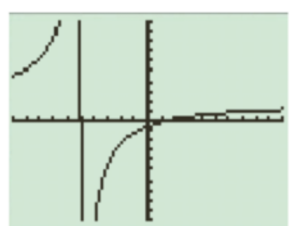
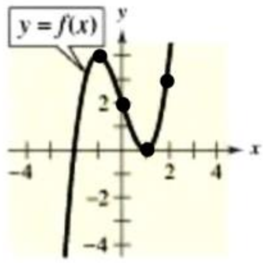
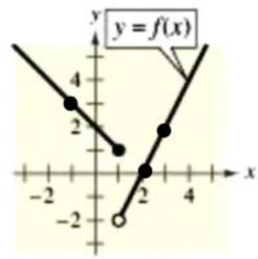


Ex. 6: Use the graph of the function to find the indicated values.





(a) $f(-1) = 4$ (b) $f(2) = 3$

(c) $f(0) = 2$ (d) $f(1) = 0$

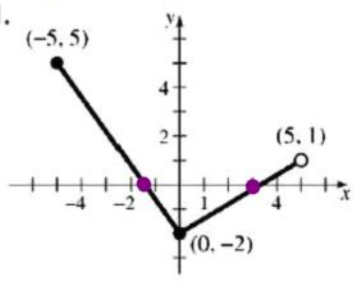
(e) $f(2) = 0$ (f) $f(1) = 1$

(g) $f(3) = 2$ (h) $f(-1) = 3$

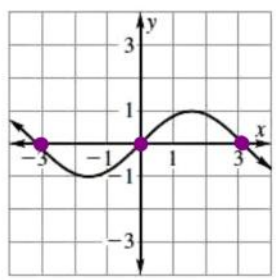
Closure:

Determine if the graph represents a function, the domain & range using interval notation, and the zeros of the function

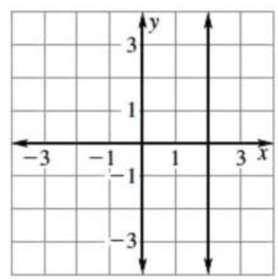
1\.



2\.



3\.



1\. Function

D: $[-5, 5)$

R: $[-2, 5]$

zeros: $x = 3$

$x = -1.5$

2\. Function

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

R: $[-1, 1]$

zeros: $x = -3$

$x = 0$

$x = 3$

3\. Not a function