Today's Plan:

Learning Target (standard): I will evaluate composite functions.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

p.396 #34-54 even * Be sure to know why on these! *

34) *no*

36) *yes*

38) *no*

40) *yes*

42) *yes*

$D: \{x \mid x \neq 0\}$

$R: \{y \mid y \neq 0\}$

44) *yes*

$D: \{x \mid x \neq 0\}$

$R: \mathbb{R}$

46) *no*

48) *yes*

$D: \mathbb{R}$

$R: \mathbb{R}$

50) *no*

52) *yes*

$D: \mathbb{R}$

$R: \mathbb{R}$

54) *no*

Function or Relation??? Why?

$\{(2,3),(4,2),(-2,6),(2,7)\}$

Relation – the x-value of 2 has more than one y-value

$\{(3,4),(2,4),(5,29),(6,5)\}$

Function – every x-value has only one y-value

One-to-One Function? Why?

$\{(2,1),(1,3),(3,-2),(4,11),(6,5),(-1,2),(5,29),(1,0)\}$

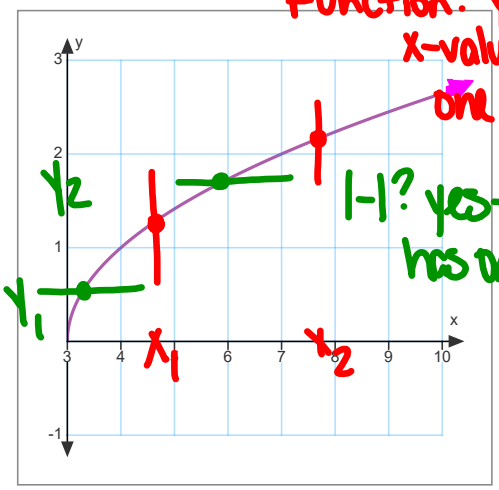
Not a function – the x-value of 1 has more than one y-value

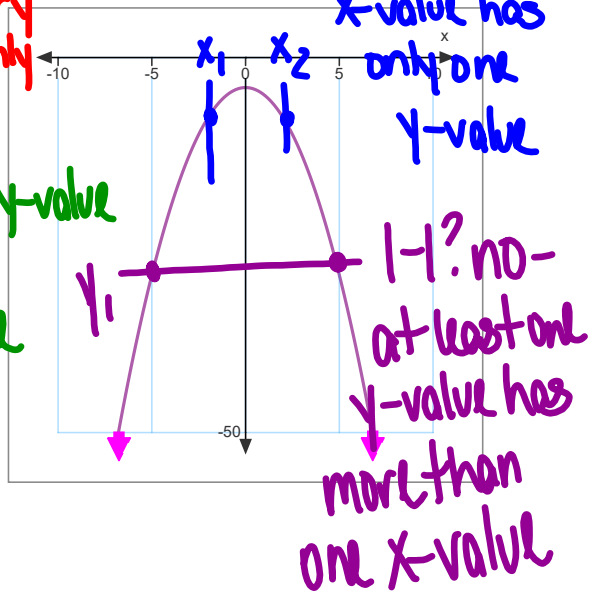
$\{(-1,2),(2,4),(-3,5),(7,8),(10,6),(12,24),(9,21)\}$

Function? yes – every x-value has only one y-value

1-1? yes – every y-value has only one x-value

One-to-One Function? Why?





Graph. Find the domain and range.

$$f(x) = -4|3-x|+2$$

vertex: (3,2)

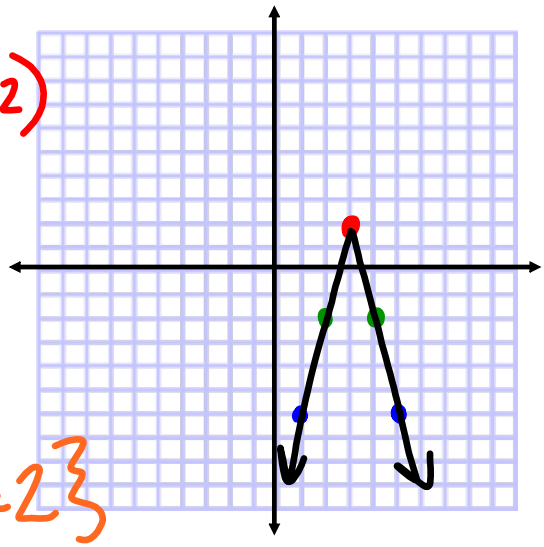
$3-x=0$

$3=x$

x	y
1	-6
2	-2
3	2
4	-2
5	-6

D: $\mathbb{R}$

R: $\{y \mid y \leq 2\}$



Graph. Find the domain and range.

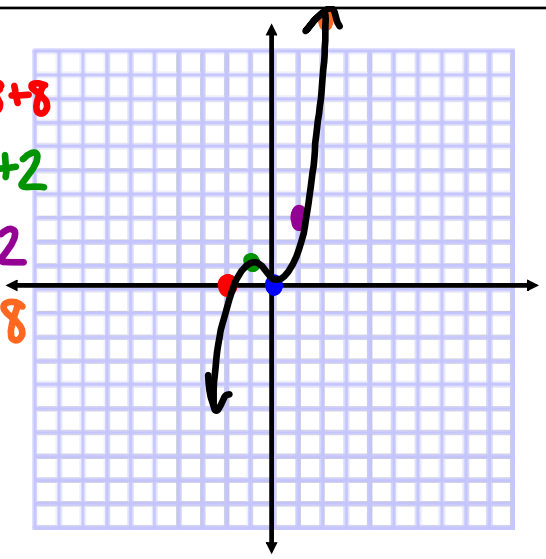
$$f(x) = x^3 + 2x^2$$

x	y
−2	0
−1	1
0	0
1	3
2	16

f(-2) = -8+8
f(-1) = -1+2
f(1) = 1+2
f(2) = 8+8

D: ℝ

R: ℝ



Composite Functions:

- functions evaluated at another function
- used to determine whether functions are inverses of one another
- notation for composite functions is based on those functions used
  - $f \circ g = f(g(x))$ "f composed with g"
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Evaluate each composite function:

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

① $f(g(2)) =$

② $g(f(-3)) =$

① $f(g(2))$

$g(2) = 3(2) - 2$

$= 6 - 2$

$g(2) = 4$

$\rightarrow f(4) = 2(4)^2 - 5(4) + 1$

$= 32 - 20 + 1$

$f(4) = 13$

$\rightarrow f(g(2)) = 13$

Evaluate each composite function:

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

$f(g(2)) =$

② $g(f(-3)) =$

② $g(f(-3))$

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

$= 18 + 15 + 1$

$f(-3) = 34$

$\rightarrow g(34) = 3(34) - 2$

$= 102 - 2$

$g(34) = 100$

$\rightarrow g(f(-3)) = 100$

Evaluate each composite function:

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

① $f(g(x)) =$

$g(f(x)) =$

① $f(g(x)) = f(3x-2)$

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

$= 2(3x-2)(3x-2) - 15x + 10 + 1$

$= 2(9x^2 - 6x - 6x + 4) - 15x + 10 + 1$

$= 18x^2 - 12x - 12x + 8 - 15x + 10 + 1$

$f(g(x)) = 18x^2 - 39x + 19$

Assignment:

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