Today's Plan:

Learning Target (standard): I will find the inverse of a function and verify that it is indeed the inverse function. I will graph exponential 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.

Graph. State the domain and range.

$$f(x) = -2\underline{|x+1|} - 3$$

$x+1=0$

$x=-1$

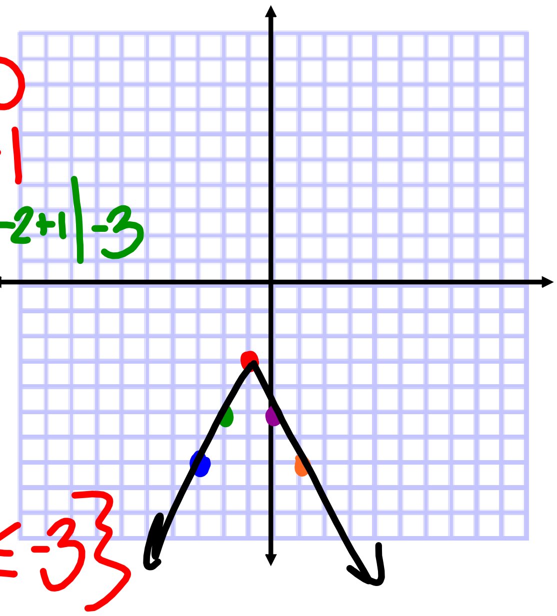
$f(-2)=-2|-2+1|-3$

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

x	y
-3	-7
-2	-5
-1	-3
0	-5
1	-7

D: $\mathbb{R}$

R: $\{y \mid y \leq -3\}$



Graph. State the domain and range.

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

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

$f(-2) = 8 - 4$

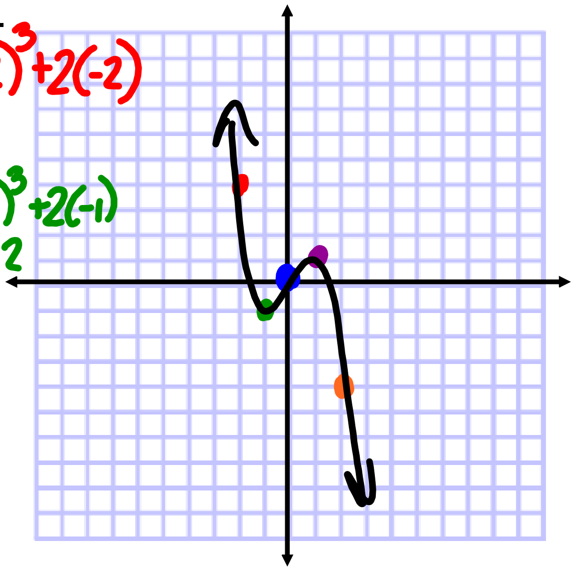
$f(-1) = -(-1)^3 + 2(-1)$

$f(-1) = 1 - 2$

x	y
-2	4
-1	-1
0	0
1	1
2	-4

D: $\mathbb{R}$

R: $\mathbb{R}$



Graph. State the domain and range.

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

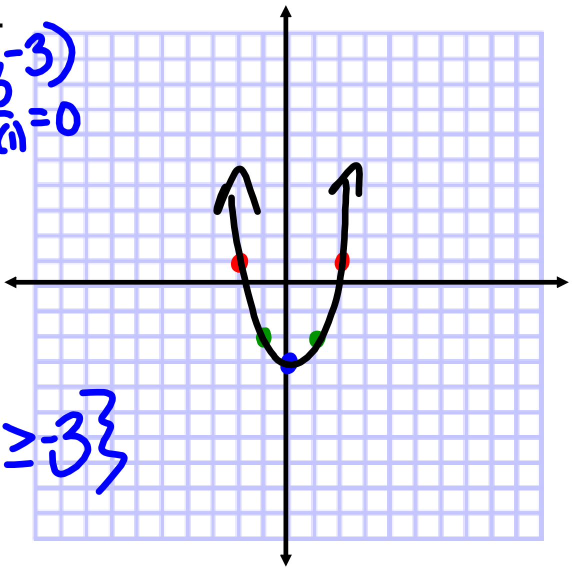
vertex: $(0, -3)$

$x = \frac{-b}{2a} = \frac{-0}{2(1)} = 0$

x	y
-2	1
-1	-2
0	-3
1	-2
2	1

D: $\mathbb{R}$

R: $\{y \mid y \geq -3\}$



Evaluate the function.

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

$\boxed{f(2) =}$

$\boxed{f(a+h) =}$

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

$= -8 + 6 - 1$

$f(2) = -3$

$f(a+h) = -2(a+h)^2 + 3(a+h) - 1$

$= -2(a+h)(a+h) + 3a + 3h - 1$

$= -2(a^2 + ah + ah + h^2) + 3a + 3h - 1$

$= -2a^2 - 2ah - 2ah - 2h^2 + 3a + 3h - 1$

$f(a+h) = -2a^2 + 3a - 4ah - 2h^2 + 3h - 1$

Exponential Functions:

"base" exponent

- a function of the form $f(x) = a^x \quad (a > 0, a \neq 1)$
- exponential growth: $a > 1$ $f(x) = 2^x$
- exponential decay: $0 < a < 1$ $f(x) = \left(\frac{1}{3}\right)^x$

Evaluate the function.

$$f(x)=\left(\frac{1}{2}\right)^x$$

$\boxed{f(2)=}$

$\boxed{f(-3)=}$

$$f(2)=\left(\frac{1}{2}\right)^2$$
$$f(2)=\frac{1}{4}$$

$$f(-3)=\left(\frac{1}{2}\right)^{-3}$$
$$f(-3)=2^3$$
$$f(-3)=8$$

Evaluate the function.

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

$\boxed{f(3)=}$

$\boxed{f(-2)=}$

$$f(3)=\left(\frac{2}{3}\right)^3$$
$$=\frac{2}{3}\cdot\frac{2}{3}\cdot\frac{2}{3}$$
$$f(3)=\frac{8}{27}$$

$$f(-2)=\left(\frac{2}{3}\right)^{-2}$$
$$f(-2)=\frac{2^{-2}}{3^{-2}}$$
$$f(-2)=\frac{3^2}{2^2}$$
$$f(-2)=\frac{9}{4}$$

Evaluate the function.

$$f(x)=2^{3x-1}$$

$f(1)=$

$f(-1)=$

$$f(1)=2^{3(1)-1}$$
$$=2^{3-1}$$
$$=2^{2}$$
$$f(1)=4$$

$$f(-1)=2^{3(-1)-1}$$
$$=2^{-3-1}$$
$$=2^{-4}$$
$$=\frac{1}{2^4}$$
$$f(-1)=\frac{1}{16}$$

Evaluate the function.

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

$f(0)=$

$f(-2)=$

$$f(0)=3^{2(0)+1}$$
$$=3^{1}$$
$$f(0)=3$$

$$f(-2)=3^{2(-2)+1}$$
$$=3^{-4+1}$$
$$=3^{-3}$$
$$=\frac{1}{3^3}$$
$$f(-2)=\frac{1}{27}$$

Definition:

A number that is frequently used in applications of exponential functions is an irrational number designated by *e*.

$e \approx 2.718$

$f(x) = e^x$

$f(1) = e^1 \approx 2.718$

$f(-2) = e^{-2} \approx 0.135$

$f(2) = e^2 \approx 7.389$

Assignment:

p.538 #2-38 even