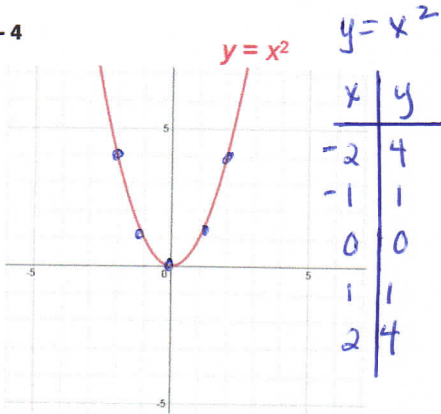


Page 240 #8 b)

Given  $f(x) = x^2$ , sketch the graph of each of the following, and state the domain and range.

$y = 2(x+5)^2 - 4$



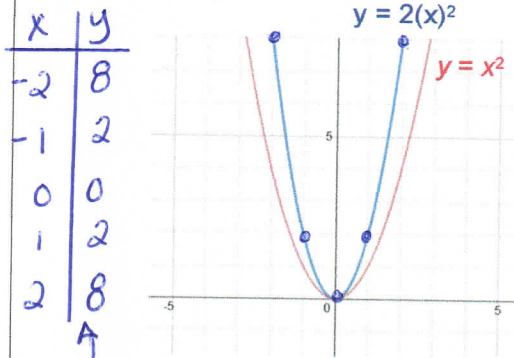
+ start  $\bar{c}$   
Key points

Page 240 #8 b)

Given  $f(x) = x^2$ , sketch the graph of each of the following, and state the domain and range.

$y = 2(x+5)^2 - 4$

Transformation 1: vertical stretch by factor of 2



y-values are multiplied by 2 from  $y = x^2$

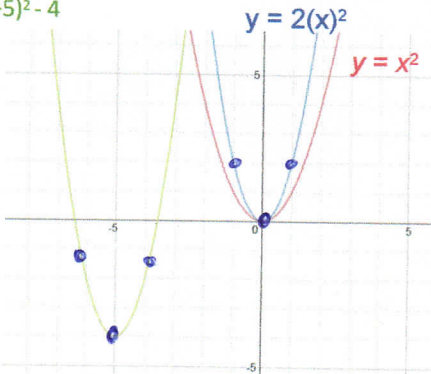
Page 240 #8 b)

Given  $f(x) = x^2$ , sketch the graph of each of the following, and state the domain and range.

$y = 2(x+5)^2 - 4$

Transformations 2&3: shift left 5 units and down 4 units

$y = 2(x+5)^2 - 4$



Page 240 #8 b)

Given  $f(x) = x^2$ , sketch the graph of each of the following, and state the domain and range.

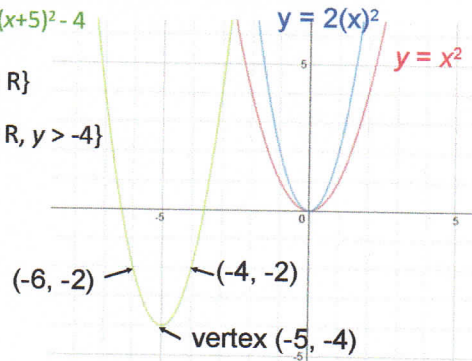
$y = 2(x+5)^2 - 4$

Transformations 2&3: shift left 5 units and down 4 units

$y = 2(x+5)^2 - 4$

D:  $\{x \mid x \in \mathbb{R}\}$

R:  $\{y \mid y \in \mathbb{R}, y > -4\}$



**Page 240 #9 c)**  
 Given  $f(x) = \sqrt{x}$  sketch the graph of each of the following, and state the domain and range.  
 $y = \frac{1}{2}f(2(x-1)) - 2 \rightarrow y = \frac{1}{2}\sqrt{2(x-1)} - 2$

**Start with base graph.**

**Page 240 #9 c)**  
 Given  $f(x) = \sqrt{x}$  sketch the graph of each of the following, and state the domain and range.  
 $y = \frac{1}{2}\sqrt{2(x-1)} - 2$

**Transformation 1: Vertical compression by 1/2**

\*Start with key points

$y = \sqrt{x}$

x	y
0	0
1	1
4	2

$y = \frac{1}{2}\sqrt{x}$

x	y
0	0
1	0.5
4	1

y-values cut in half

**Page 240 #9 c)**  
 Given  $f(x) = \sqrt{x}$  sketch the graph of each of the following, and state the domain and range.  
 $y = \frac{1}{2}\sqrt{2(x-1)} - 2$

**Transformation 2: Horizontal compression by 1/2**

**Page 240 #9 c)**  
 Given  $f(x) = \sqrt{x}$  sketch the graph of each of the following, and state the domain and range.  
 $y = \frac{1}{2}\sqrt{2(x-1)} - 2$

**Transformation 3 & 4: Shift right 1 and down 2 units**

D:  $\{x \mid x \in \mathbb{R}, x \geq 1\}$   
 R:  $\{y \mid y \in \mathbb{R}, y \geq -2\}$

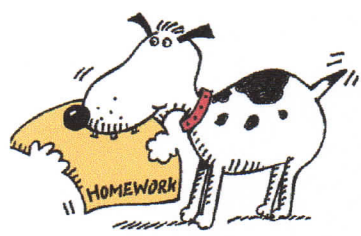
$y = \frac{1}{2}\sqrt{2x}$

x	y
0	0
0.5	0.5
2	1

\*Keep y-values, cut x-values in half.

**HOMWORK TAKE-UP**

Page 240 #3, 7, 8, 9, 16, 17



**UNIT #4: Inverses and Transformations of Functions**  
**Transformations of Exponential Functions**

**Learning Goal:**  
I will learn how to describe and sketch the transformations of exponential functions.



**Lesson: Transformations of Exponential Functions**

Exponential functions can be transformed by:

- 1. Stretches and Compressions
- 2. Reflections
- 3. Vertical and Horizontal Translations

Recall the transformation equation:

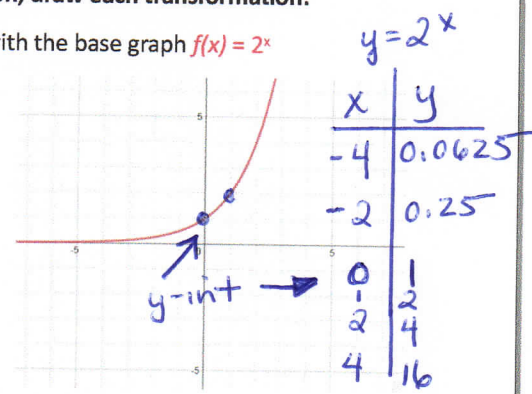
$y = af(k(x - h)) + q$

Given:  $f(x) = 2^x$ , write the equation and draw the graph for a reflection in the  $y$ -axis, a reflection in the  $x$  axis, and a translation of 4 units to the right and 1 unit down.

$y = -(2^{-(x-4)}) - 1$

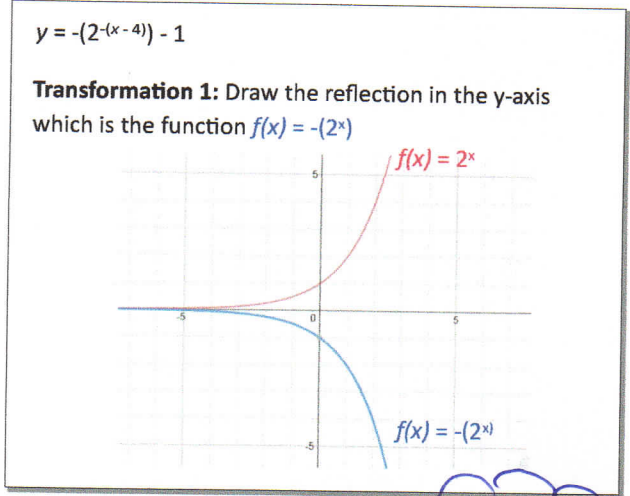
To graph, draw each transformation:

Start with the base graph  $f(x) = 2^x$



\* need a few key points

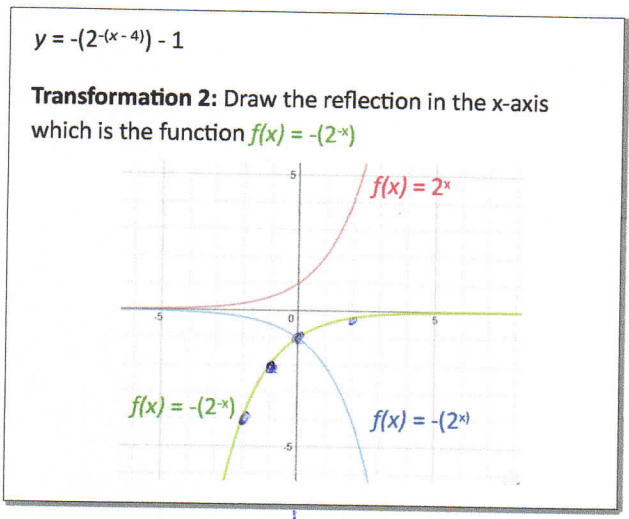
Exponential Transformations (Lesson).notebook



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

x	y
-4	-0.0625
-2	-0.25
0	-1
1	-2
2	-4
4	-16

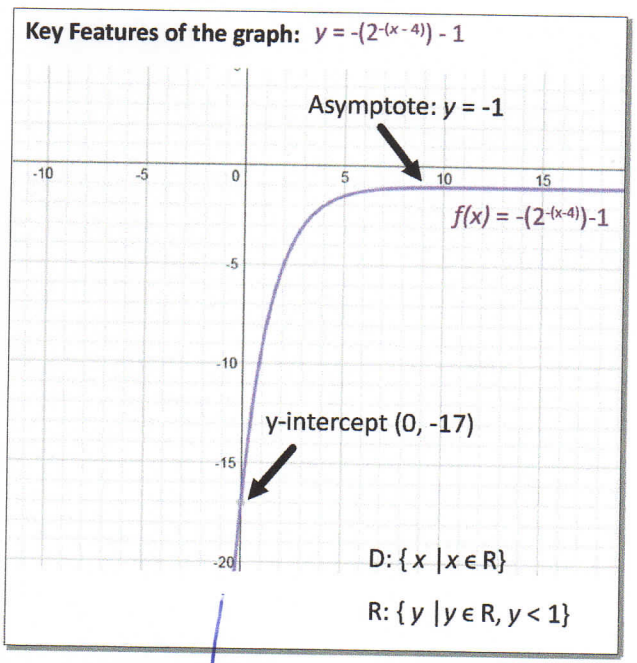
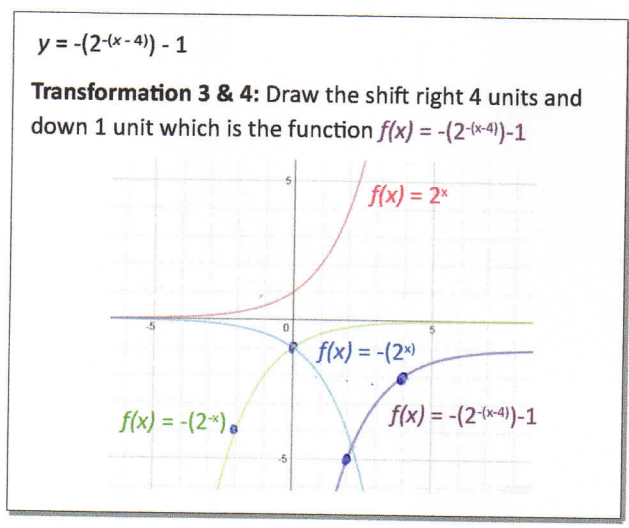
*y-values change signs*



$f(x) = -2^x$

x	y
4	-0.0625
2	-0.25
0	-1
-1	-2
-2	-4
-4	-16

*x-values change signs*



to find y-intercept, let  $x=0$

$$y = -(2^{-(0-4)}) - 1 = -(2^{-(-4)}) - 1 = -(2^4) - 1 = -16 - 1 = -17$$

# Exponential Transformations (Lesson).notebook

## UNT 4: Inverses and Transformation of Functions Transformations of Exponential Functions

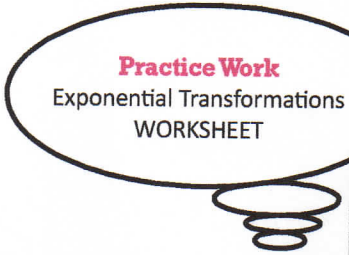
### Learning Goal:

I will learn how to describe and sketch the transformations of exponential functions.

### Success Criteria:

To be successful, I must be able to...

- Interpret transformations from an exponential function
- Sketch transformations of an exponential function



## UNIT TEST REVIEW

### Review Questions:

- p. 254 #1 - 13
- p. 248 #15, 20 - 22, 24 - 26, 30, 32, 35, 36, 38, 39, 44
- p. 218 #20, 21, 24 (Inverse word problems)

### Outline of Test:

- Understanding the definition of a function
- Evaluate functions (Eg. Given  $f(x) = x^2 + 4$ , evaluate  $f(x + 2)$  or  $-f(x)$ )
- Graphing all functions and showing all their transformations: quadratic, rational, root, exponential
- Determining the transformations occurring between graphs
- Finding the domain the range from an equation and from a graph
- Determining the inverse of a function and what it represents (this will also include a word problem)
- Sketch a graph and its inverse