What's Going On?

Checking In F.F.M.

Minds on $f(x) = b^x$

Action! Transforming Exponential Functions

Consolidation $g(x) = a \times b^{k(x-d)} + c$

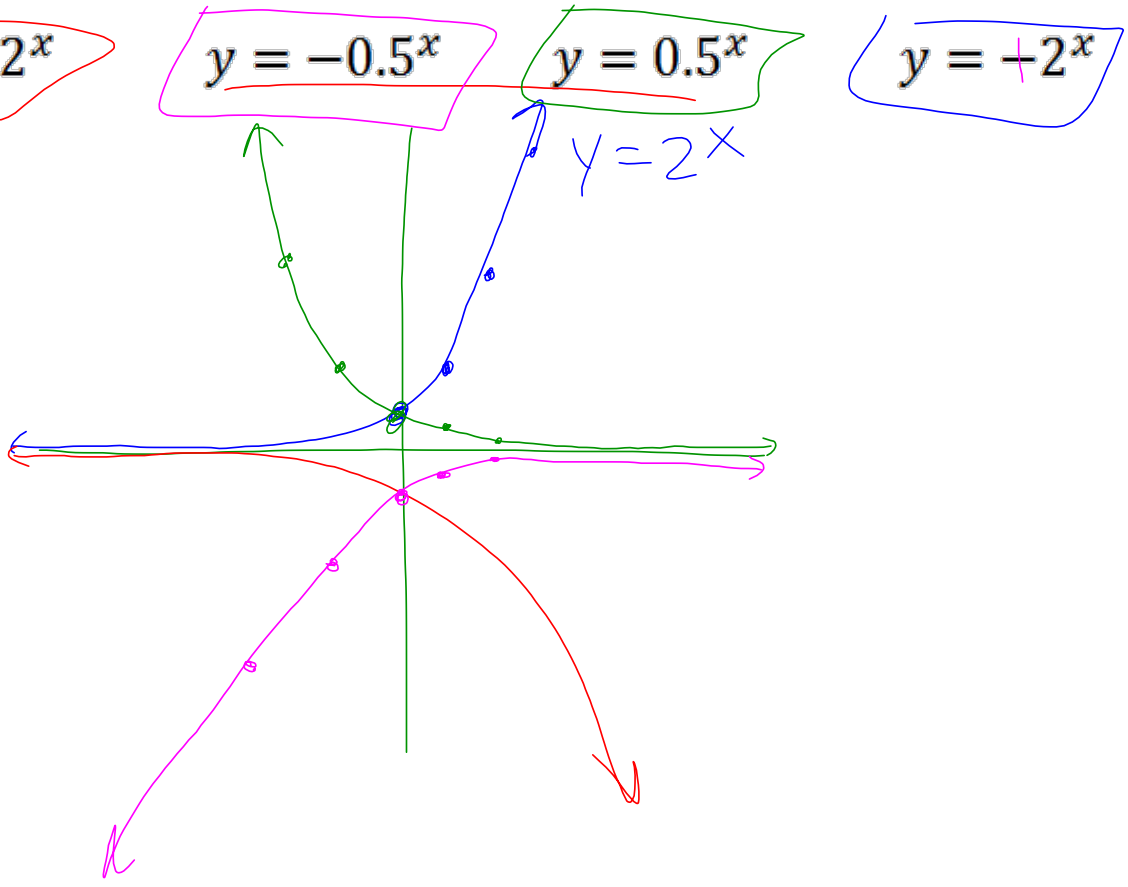
Learning Goal - I will be able to graph transformations of exponential functions.

Checking In

F.F.M.

Explain why these four equations are all 'equally steep'

$y = -2^x$ $y = -0.5^x$ $y = 0.5^x$ $y = +2^x$



Minds on

Graph It!

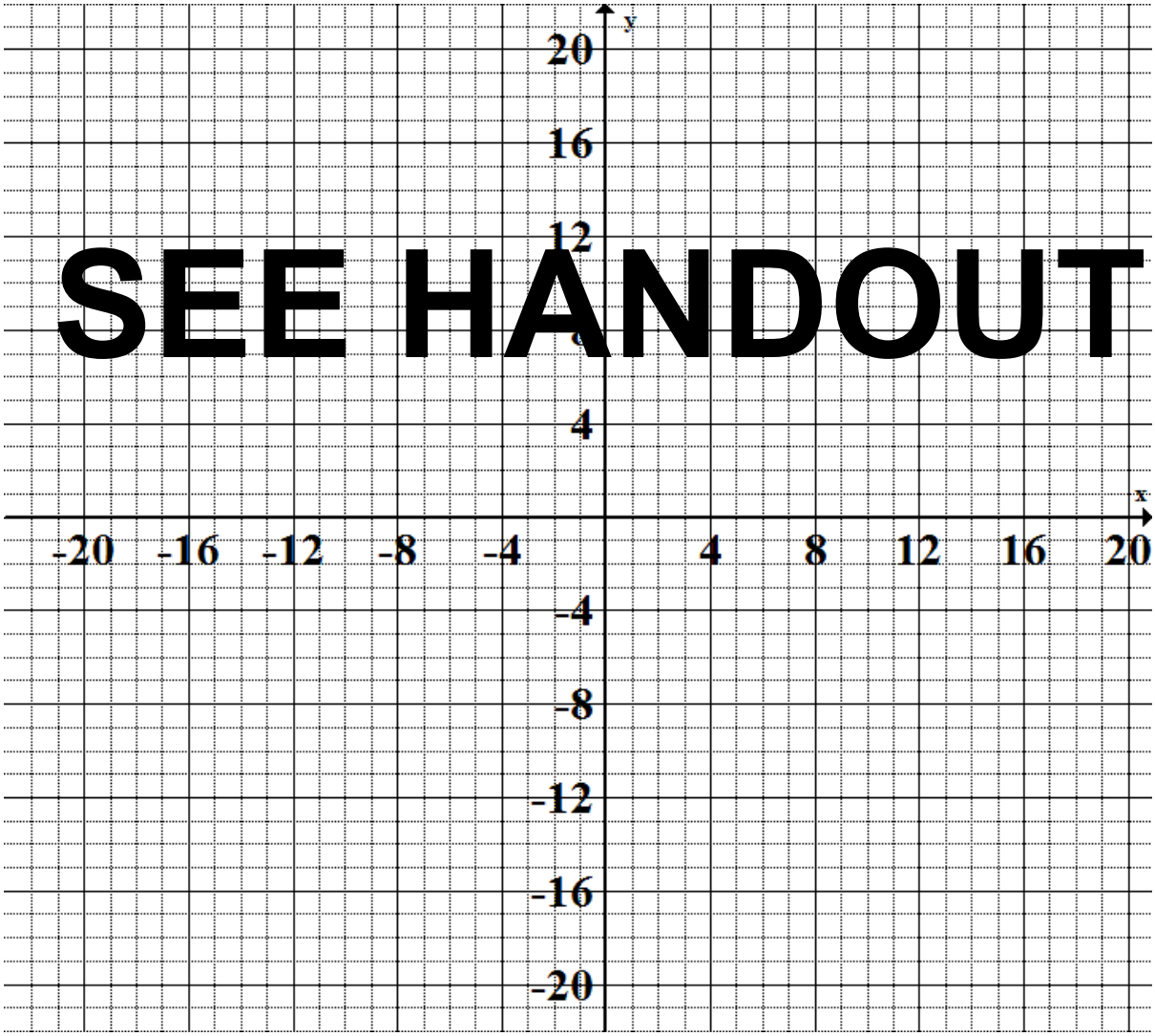
$f(x) = 0.5^x$ $f(x) = 2^x$

$f(x) = -0.5^x$ $f(x) = -2^x$

SEE HANDOUT

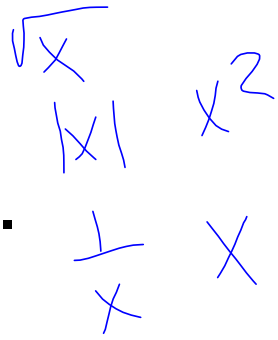
$f(x) = 0.5^x$ $f(x) = 2^x$

$f(x) = -0.5^x$ $f(x) = -2^x$



Minds on

$$f(x) = b^x$$



The 'base' exponential function.

- y-intercept = 1
- increasing when b > 1
- decreasing when 0 < b < 1
- asymptote at y = 0

Action!

Remember this... $g(x) = af[k(x-d)] + c$

$$g(x) = a \times b^{k(x-d)} + c$$

always > 0

Action!

$$g(x) = a \times b^{k(x-d)} + c$$

What did the a, k, d and c do?

The effects of the parameters *a*, *k*, *d* and *c*	
a: reflection in the x-axis - when a is negative vertical stretch or compression - stretch when |a| > 1 - compression when |a| < 1	**k**: reflection in the y-axis* - when k is negative horizontal stretch or compression - compression when |k| > 1 - stretch when |k| < 1 exponentials are never symmetrical *If already ~~symmetrical about y-axis~~, reflection does nothing!
c: vertical translation - up when c is positive - down when c is negative	**d**: horizontal translation - to the right when d is positive - to the left when d is negative

Action!

$$g(x) = a \times b^{k(x-d)} + c$$

Graph:

$f(x) = 2^x$

$g(x) = 2^x - 20$

$g(x) = -0.5(2^x)$

$g(x) = 2^{x-10}$

$g(x) = 2^{3x}$

$g(x) = 3(2^x)$

SEE HANDOUT

Consolidation

Graphing $g(x) = a \times b^{k(x-d)} + c$

Graph:

$$g(x) = -0.25\left(2^{-2(x+12)}\right) + 16$$

Steps to Graphing:

Homework

Pg. 251

1 - 4, 6