Today's Learning Goal(s):

Date: _____

By the end of the class, I will be able to:

a) describe the characteristics of the graphs and equations of exponential functions.

Last day's work:

pp. 235-237 #(1 – 2)ace, 3, (4 – 9)ace [14]

Review p. 239

5c
6ace
8ac
7c
9c

3UI – 4.5 Exploring Properties of Exponential Functions

P. 240 Investigate – students complete A – E individually (or in pairs).

A. $g(x) = x$

x	y
-3	-3
-2	-2
-1	-1
0	0
1	1
2	2
3	3
4	4
5	5

1st Diff.
$-2-(-3) = 1$
$-1-(-2) = 1$
$1-0 = 1$

$h(x) = x^2$

x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9
4	16
5	25

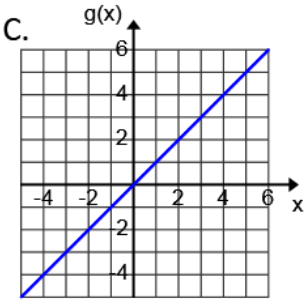
$k(x) = 2^x$

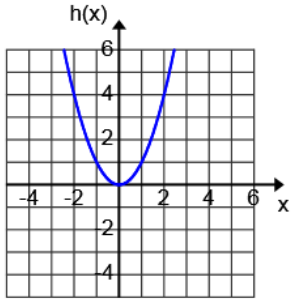
x	y
-3	1/8
-2	¼
-1	½
0	1
1	2
2	4
3	8
4	16
5	32

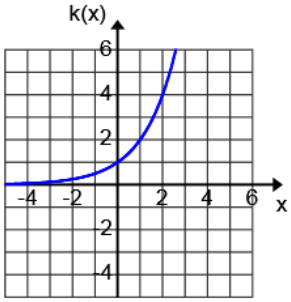
y Ratios
$\frac{1}{4} \div \frac{1}{8}$
$\frac{1}{4} \times \frac{8}{1}$
$= 2$
$\frac{1}{2} \div \frac{1}{4}$
$\frac{1}{2} \times \frac{4}{1}$
$= 2$
$2 \div 1 = 2$

B. g(x) → first differences are equal
h(x) → second differences are equal
k(x) → ratio of successive y-values are equal

C.







D.

D = {x∈R}	D = {x∈R}	D = {x∈R}
R = {y∈R}	R = {y∈R | y≥0}	R = {y∈R | y>0}

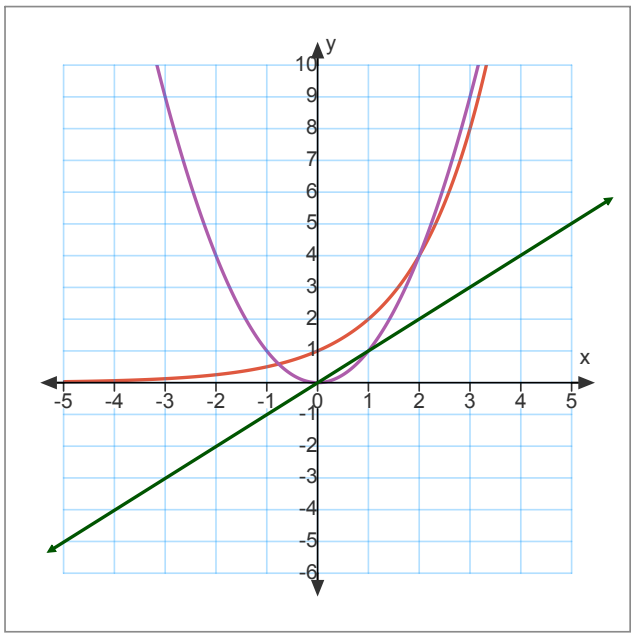
E. g(x) → as independent variable (x) increases, the dependent variable (y) also increases at a consistent rate

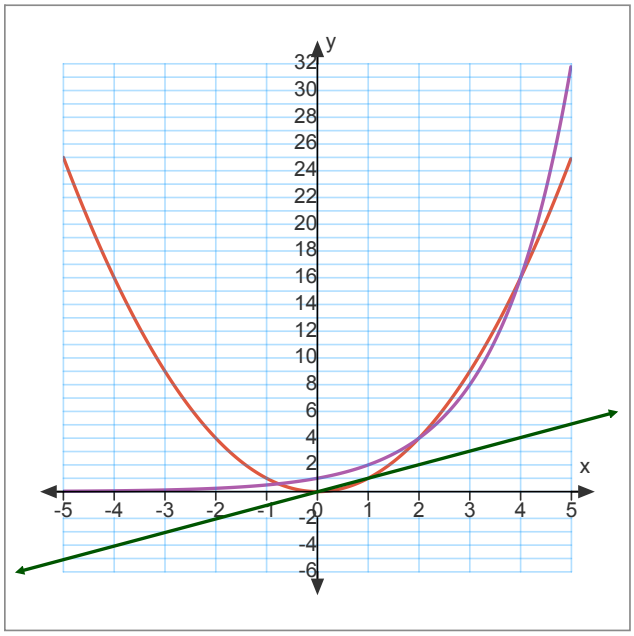
h(x) → as independent variable (x) increases, the dependent variable (y) decreases until x = 0 and then increases

k(x) → as independent variable (x) increases, the dependent variable(y) also increases, slowly at first and then quickly.

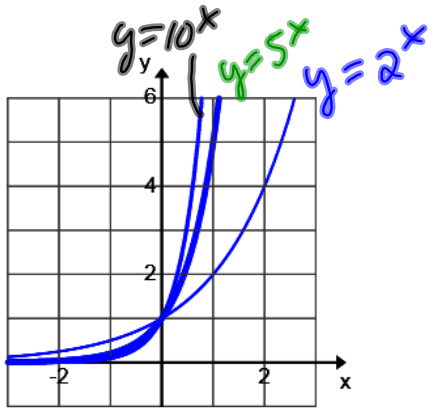
$y = x$ $y = x^2$ $y = x^2$ $y = 2^x$

$y = 2^x$





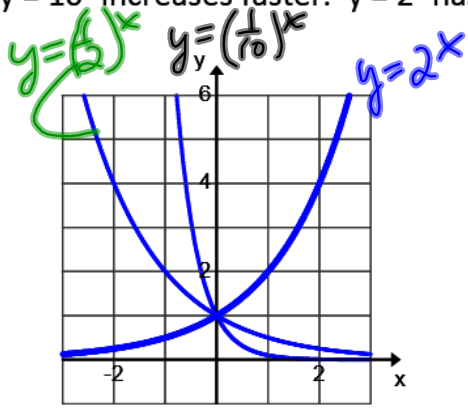
F.



G. For all 3 functions, D = {xεR} and R = {yεR|y>0}. The y-intercept = 1, there are no x-intercepts and there is a HASM at y = 0 (x-axis).

H. $y = 10^x$ increases faster. $y = 2^x$ has the slowest rate of increase.

I.



J. All properties remain the same as G.

K. As the values of x increase the graphs with fractional bases decrease (decay).

Summary: Properties of $y = b^x$

- $b > 0$
- y-int = 1
- HASM: y = 0 (x-axis)
- D = {xεR}
- R = {yεR|y>0}
- Increasing when $b > 1$ (growth)
- The greater the value of b, the faster the growth
- Decreasing when $0 < b < 1$ (decay)
- Equal ratios of successive y-values

For tomorrow, think about the general form of $y = a(b^x) + c$ and how the values of *a* and *c* relate to the graphs we drew today.

Are there any Homework Questions you would like to see on the board?

Last day's work:

pp. 235-237 #(1 – 2)ace, 3, (4 – 9)ace [14]

Review p. 239

Today's Homework Practice includes:

pp. 240-241 A - P

p. 243 #1, 2