Before we begin, are there any questions from last day's work?

p.387 #1, 2a, 3a, 5, 6
Worksheet 1.5.3

c) $3^{3x+1} = 27(9^x)$ d) $(2^{x+2})(4^{x-1})(8^{2x-3}) = 256^x$

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

$= 3^3 \cdot 3^{2x}$

$3^{3x+1} = 3^{3+2x}$

$\therefore 3x+1 = 2x+3$

$3x-2x = 3-1$

$x = 2$

$(2^{x+2})(2^2)^{x-1}(2^3)^{2x-3} = (2^8)^x$

$2^{x+2} \cdot 2^{2x-2} \cdot 2^{6x-9} = 2^{8x}$

$2^{x+2+2x-2+6x-9} = 2^{8x}$

$2^{9x-9} = 2^{8x}$

$\therefore 9x-9 = 8x$

$9x-8x = 9$

$x = 9$

Today's Learning Goal(s):

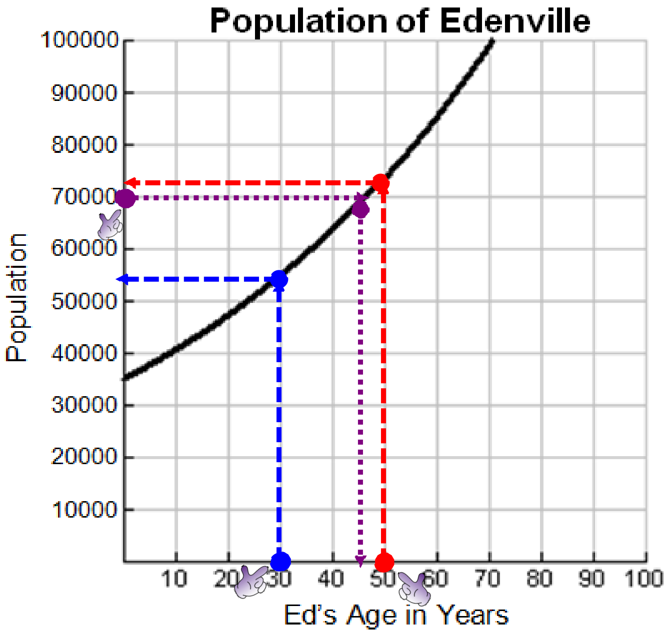
By the end of the class, I will be able to:

a) draw upon prior knowledge of interpreting graphs
b) recognize the logarithm of a number to a given base
as the exponent to which the base must be raised to get the number
c) determine the approximate logarithm of a number to any base
by using systematic trial

1.6.1 Interpreting Graphs

Date: Sept. 12 /19

When Ed was born, his town of Edenville had a population of 35 000.
The average yearly growth rate since then has been 1.5%. The population of the town is recorded in the graph below.



1. Using the graph, what was the population of Edenville on Ed's 30th birthday?

   tap above the blue dot (first)

   $\doteq$ 55 000 (half way between 50 000 and 60 000)

2. Using the graph, what was the population of Edenville on Ed's 50th birthday?

   tap above the red dot (next)

   $\doteq$ 72 250 (about $\frac{1}{4}$ way between 70 000 and 80 000)

3. How old will Ed be when the population of the town doubles in size from the time he was born?

   tap to the right of the purple dot (3rd)

   $\doteq$ Use 70 000 $\therefore$ between 45 and 47 years old

4. Explain how the characteristics of the graph may indicate exponential growth.

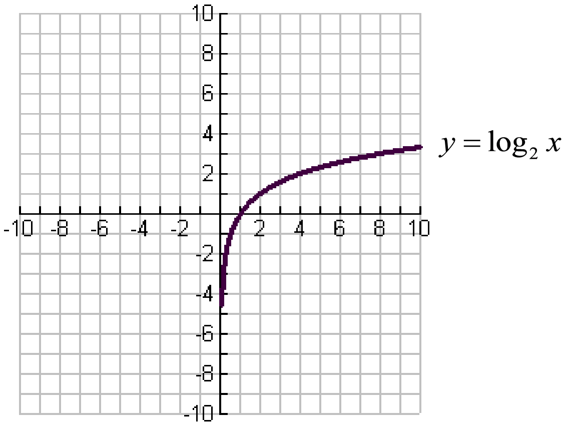
   -it is non-linear

   -it is increasing in steepness from left to right

1.6.2 Approximate Logarithms of a Number

Date: ____________________

Consider the graph of $y = \log_2 x$



1. Using the graph of $y = \log_2 x$, if $x = 2$ determine the value of y.

$y = \log_2 2$

$\therefore y = 1$

2. Using the graph of $y = \log_2 x$, if $x = 4$ determine the value of y.

$y = \log_2 4$

$\therefore y = 2$

3. Using the graph of $y = \log_2 x$, if $x = 8$ determine the value of y.

$y = \log_2 8$

$\therefore y = 3$

4. How would you evaluate $\log_2 32$, without using the graph? Explain your reasoning.

The log function is "exponential". $y = \log_2 32$

$\therefore 2^y = 32$

$\therefore y = 5$

5. In your groups, discuss how you would evaluate $\log_2 6$, both with and without the graph.

With the graph: $x = 6$ (between 2.5 & 2.7) $\therefore y \doteq 2.6$

Without the graph, $\because 2^y = 6$ (then use trial and error)

(See next slide)

Read pp.336-337, then complete p.338 #4, 6, 7

Complete 1.6.3 "Breaking Logs" activity.
If away, then begin tomorrow's lesson with it.

Review the learning goals. Were we successful today?

Homework: **Read pp.336-337**

p. 338 # 4, 6, 7

Answer any remaining homework questions
Students ask for "at desk" clarification.

$\text{Base}^{\text{Exponent}} = \text{Answer}$ $\quad \text{Log}_{\text{BASE}} \text{Answer} = \text{Exponent}$

$2^3 = 8$ $\quad \text{Log}_2 8 = 3$