

Day 72 exponential growth/decay

$y = a \cdot b^{x-c} + d$

If "a" is negative there is a reflection

if $b \geq 1$ Growth $y = -1 \cdot 3^x$
 $b < 1$ Decay $y = (\frac{1}{3})^x$

$x-c$: move right c
 $x+c$: move left c

$+d$: move up d
 asymptote at $y=d$

$-d$: move down d
 asymptote at $y=-d$

① Growth ↗

$y = 3^{x+1}$

Shifts: left 1

Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Asymptote: $y=0$

②

$y = 3^{x-3} + 5$

Growth ↗

Shifts: right 3, up 5

Domain: $(-\infty, \infty)$

Range: $(5, \infty)$

Asymptote: $y=5$

$3^{-7-3} + 5$
 $3^{-10} + 5 = \frac{1}{3^{10}} + 5$

$y = -2^{x+2}$ Growth $b=2$

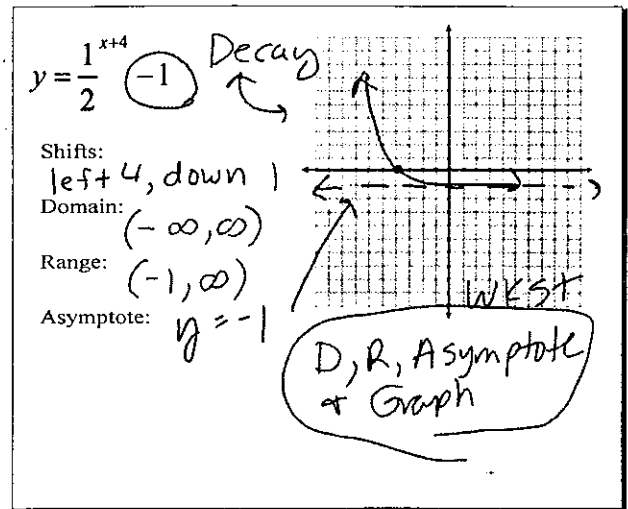
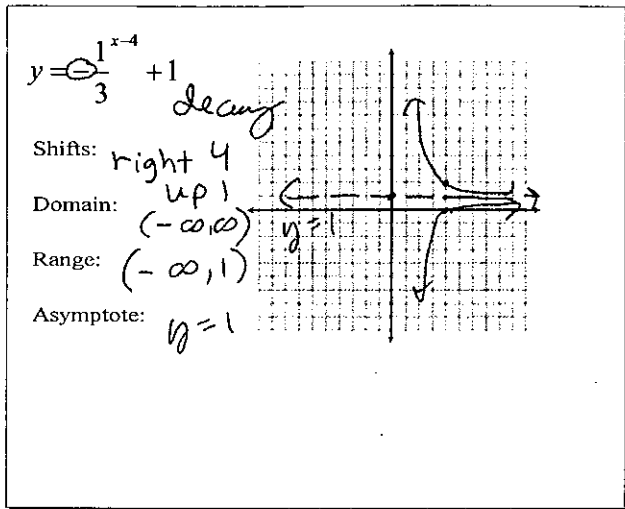
$y = -1 \cdot 2^{x+2}$

Shifts: reflection, left 2

Domain: $(-\infty, \infty)$

Range: $(-\infty, 0)$

Asymptote: $y=0$



HW: Finish wkst (All)
 Graph each
 Find Domain
 Range +
 Asymptote
 in addition to shifts

Name: _____ Block: _____

Experiment 2: Half-life Pennies

Equipment Needed: About 50 pennies.

Date: _____

Procedure

- a. Count the total number of pennies and record this as the number of pennies remaining for zero drops.
- b. Randomly drop the coins and remove those that land tails up.
- c. Count the number of coins remaining and record this number as the number of pennies remaining for drop 1. These are the coins you will use for the next drop.
- d. Repeat steps a and b until either you have completed 10 drops or all the coins have been removed, which ever comes first.

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Experiment 2: Half-life Pennies

5pts

Drop number	Number of pennies remaining	Ratio
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Data Analysis

- 5 a. Create a graph of the data (*drop number, number of pennies remaining*) on paper.
- 2 b. Calculate the ratios of consecutive terms. Decide on a ratio that you think best represents the list of values you just created.
- 3 c. Use the number of pennies you started with and the ratio you named in b to write an equation for the exponential curve. Sketch this graph on your plot from a.
- 1 d. Calculate the half-life for this experiment. In other words, how many drops would you expect to make before half of the original number of coins are remaining?

