# Graphing Exponential Functions

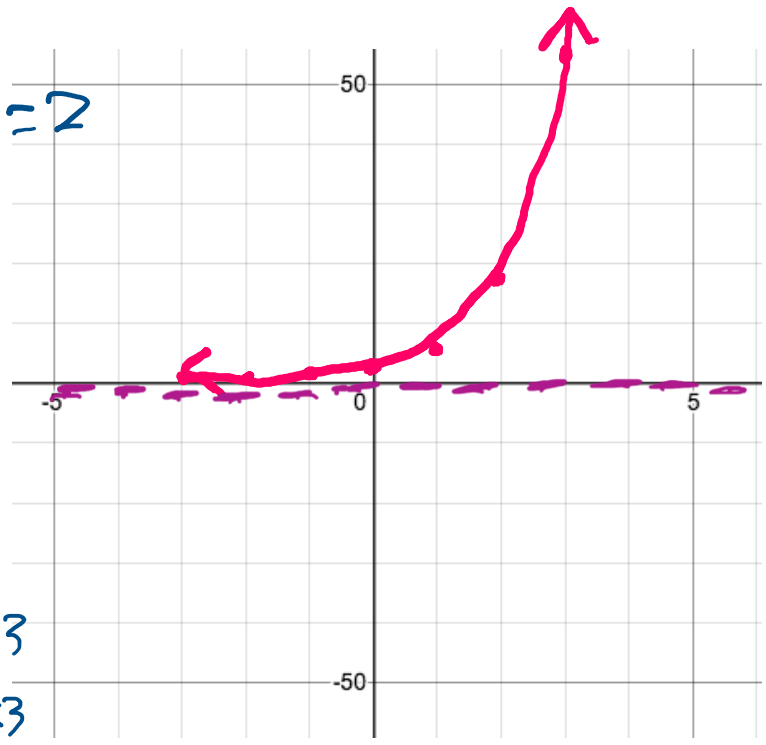
1. $f(x) = 2(3)^x$

$2(3)^0 = 2(1) = 2$

$\frac{2}{3} \div 3$

$\frac{2}{3} \cdot \frac{1}{3} = \frac{2}{9}$

a. Predict: What do you think the graph will look like?
SKETCH it below




b. Fill in the chart using the equation

| $x$ | $f(x)$ |
|---|---|
| -3 | 2/27 |
| -2 | 2/9 |
| -1 | 2/3 |
| 0 | 2 |
| 1 | 6 |
| 2 | 18 |
| 3 | 54 |

×3 ×3 ×3

c. Graph the points that you came up with and then connect them.

d. Will the graph ever go below the x-axis? Why or why not?

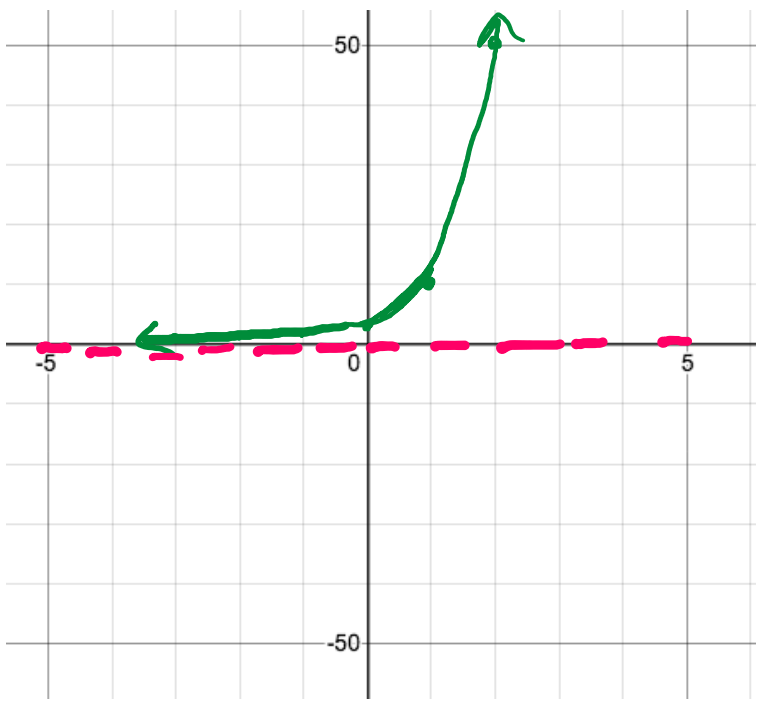
No b/c if you keep ÷ by 3, it will never be negative.

Definition of asymptote: a line that a graph continually approaches but WILL NEVER TOUCH

e. Domain: all real numbers Range: $y > 0$

2. $f(x) = 2(5)^x$

a. Predict: How will this graph be different from #1?
SKETCH it below.




GROWTH

b. Fill in the chart using the equation

| $x$ | $f(x)$ |
|---|---|
| -3 | 2/125 |
| -2 | 2/25 |
| -1 | 2/5 |
| 0 | 2 |
| 1 | 10 |
| 2 | 50 |
| 3 | 250 |

c. Graph the points that you came up with and then connect them.

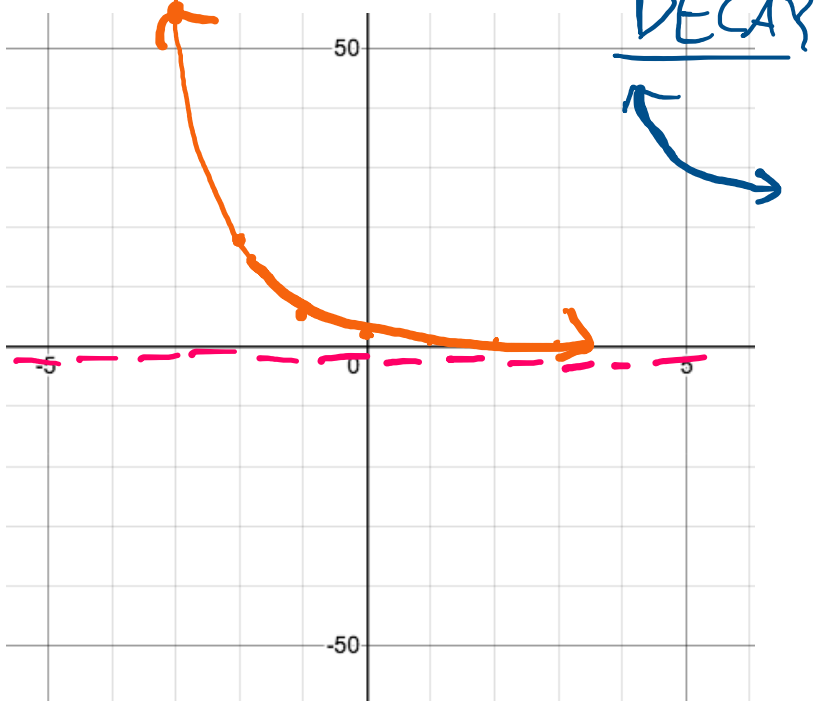
d. Draw the asymptote.

e. Domain: All real #s Range: $y > 0$

3. $f(x) = 2\left(\frac{1}{3}\right)^x$ → same as ÷3 pattern

DECAY

a. Predict: How will this graph be different from #1? SKETCH it below.




| $x$ | $f(x)$ |
|---|---|
| -3 | 54 |
| -2 | 18 |
| -1 | 6 |
| 0 | 2 |
| 1 | 2/3 |
| 2 | 2/9 |
| 3 | 2/27 |

b. Fill in the chart using the equation.

c. Graph the points that you came up with and then connect them.

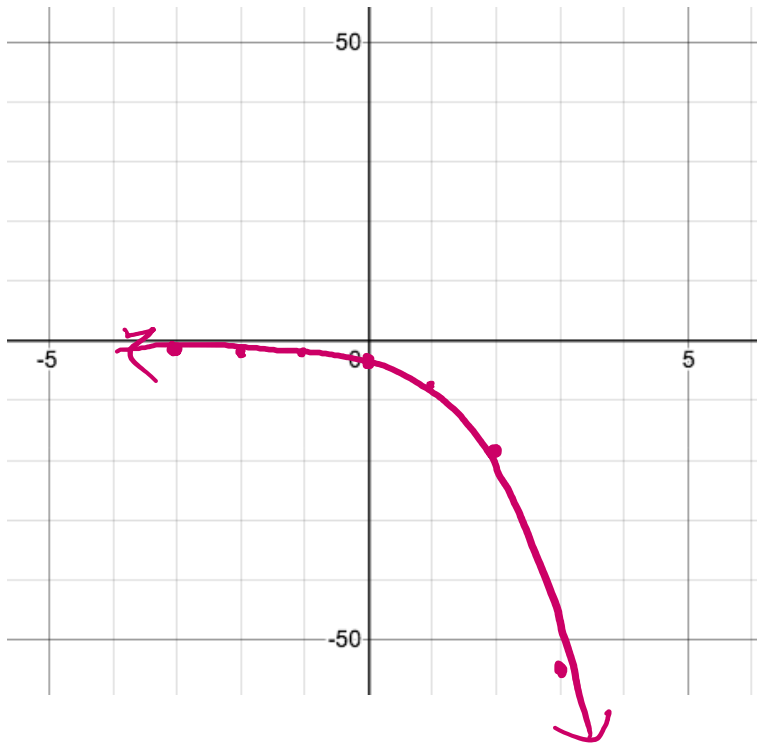
d. Draw the asymptote.

e. Domain: All real #s Range: $y > 0$

4. $f(x) = -2(3)^x$

a. Predict: How will this graph be different from #1? SKETCH it below.

| $x$ | $f(x)$ |
|---|---|
| -3 | $-2/27$ |
| -2 | $-2/9$ |
| -1 | $-2/3$ |
| 0 | $-2$ |
| 1 | $-6$ |
| 2 | $-18$ |
| 3 | $-54$ |




b. Fill in the chart using the equation.

c. Graph the points that you came up with and then connect them.

d. Draw the asymptote.

e. Domain: ARN Range: $y < 0$

**Reflection Questions:**

1. How do the graphs of #1 and #4 look different? What caused this difference?

2. What caused the difference between the graphs of #2 and #3?

3. Will any of these functions ever be able to cross the x axis? Why or why not?

4. Write an exponential function that will cross the x-axis.