

5.6: Transformations

SWBAT graph exponential functions.

Assignments:

HW42

Review: What is an exponential function?

- ▶ A function where the input is an **exponent**
- ▶ General form of an exponential function:

$$f(x) = a \cdot b^x$$

where $a \neq 0$ and $b > 0$ and $\neq 1$

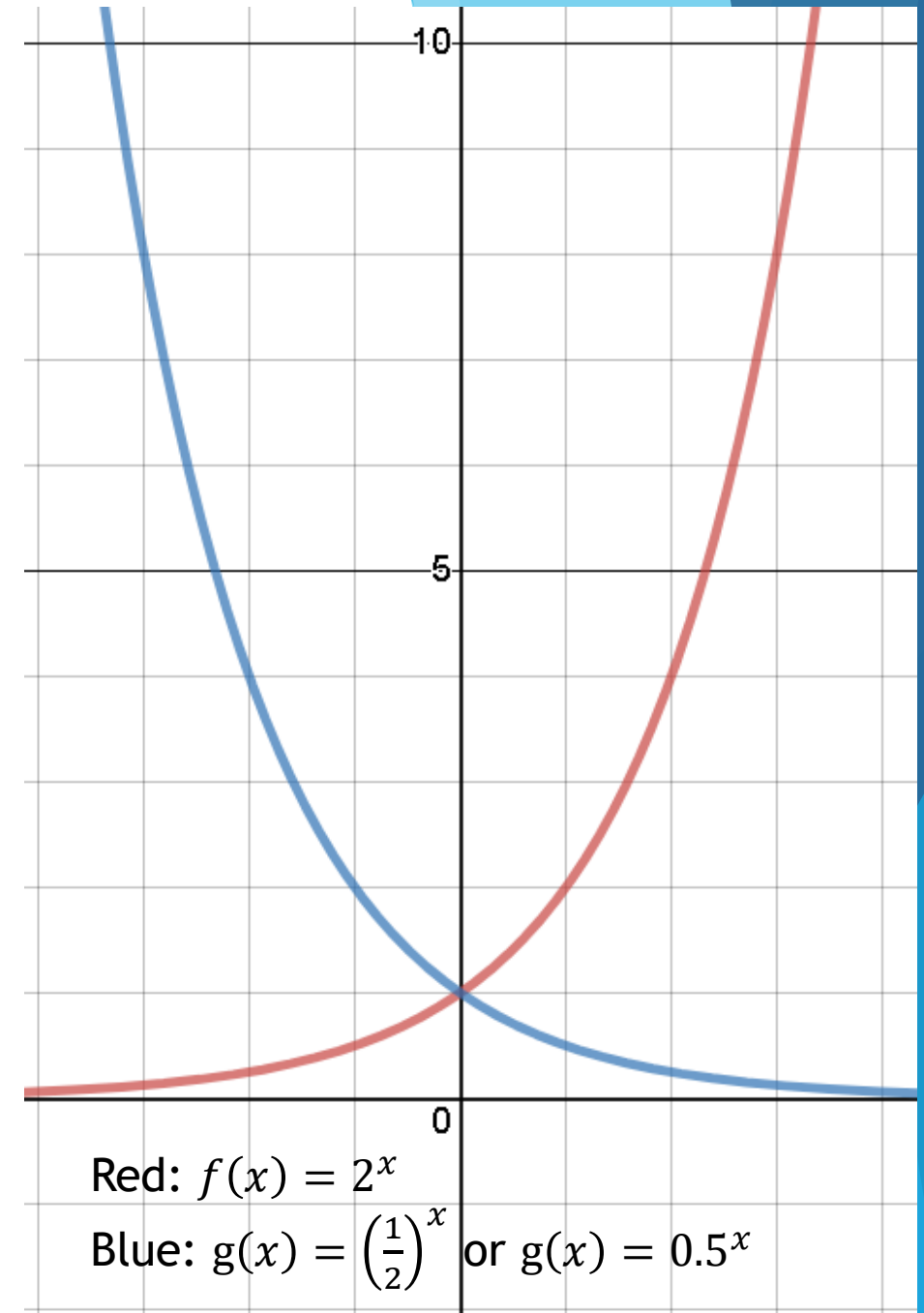
Percent increase/decrease

$$f(x) = a * (1 \pm r)^x$$

- ▶ a is the initial value, b is the change/growth factor, r is the percent increase/decrease
- ▶ When $b > 1$, we have *exponential growth functions*.
- ▶ When $0 < b < 1$, we have *exponential decay functions*.

Basic Shape of an Exponential Function

- ▶ Starts really, really small - the graph will lie almost on top of the x-axis on one side - and then gets really, really big
- ▶ y-intercept: $(0, a)$
- ▶ No x-intercepts
- ▶ Horizontal Asymptote at $y = 0$
- ▶ Domain: $(-\infty, \infty)$
- ▶ Range: $(0, \infty)$



Review: Function Transformations

What makes a graph...

- ▶ Shift up?
 - ▶ Add a positive to the output/outside
- ▶ Shift down?
 - ▶ Add a negative to the output/outside
- ▶ Shift left?
 - ▶ Add a positive to the input/inside
- ▶ Shift right?
 - ▶ Add a negative to the input/inside
- ▶ Reflect across the x-axis/flip upside down?
 - ▶ Multiply the output/outside by a negative