Algebra 1 7.5

Graph exponential functions

Identify exponential behavior

base

exponent

y-intercept

rate of change

linear

exponential growth

exponential decay

Activity: giant graphs

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

$3^5 = 243$

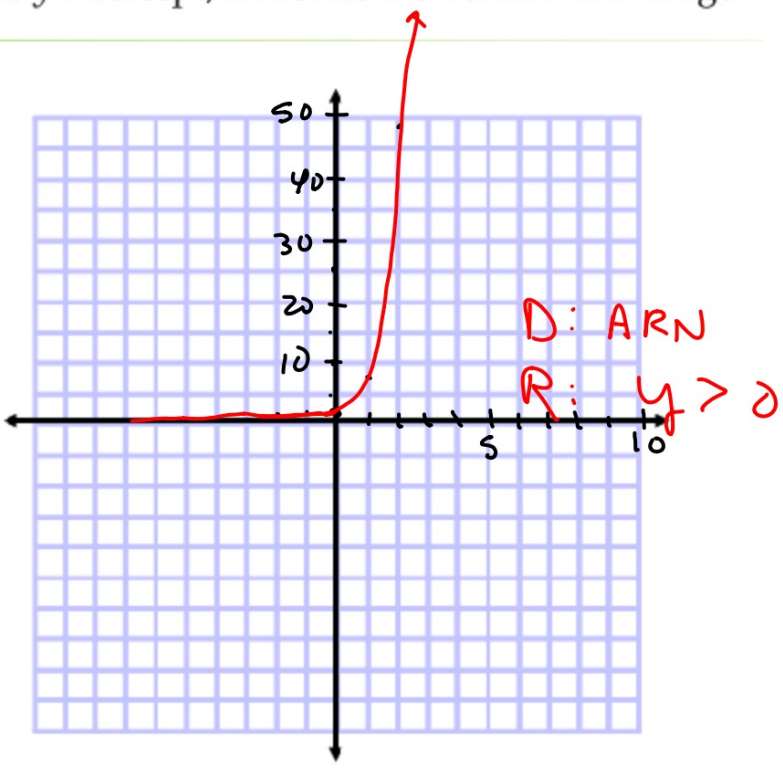
$-5^2 = -1 \cdot 5^2 = -25$

$(-4)^3 = -64$

GuidedPractice

1. Graph $y = 7^x$. Find the y-intercept, and state the domain and range.

x	7^x	y
0	7^0	1
1	7^1	7
2	7^2	49
3	7^3	343
-1	7^{-1}	$\frac{1}{7}$
-2	7^{-2}	$\frac{1}{49}$



$y = \left(\frac{1}{2}\right)^x$ $y = 2^x$ $y = 3^x$

Each group choose an equation (cards)
Use a table of values to determine coordinates
Plot the coordinates on 1-inch grid paper

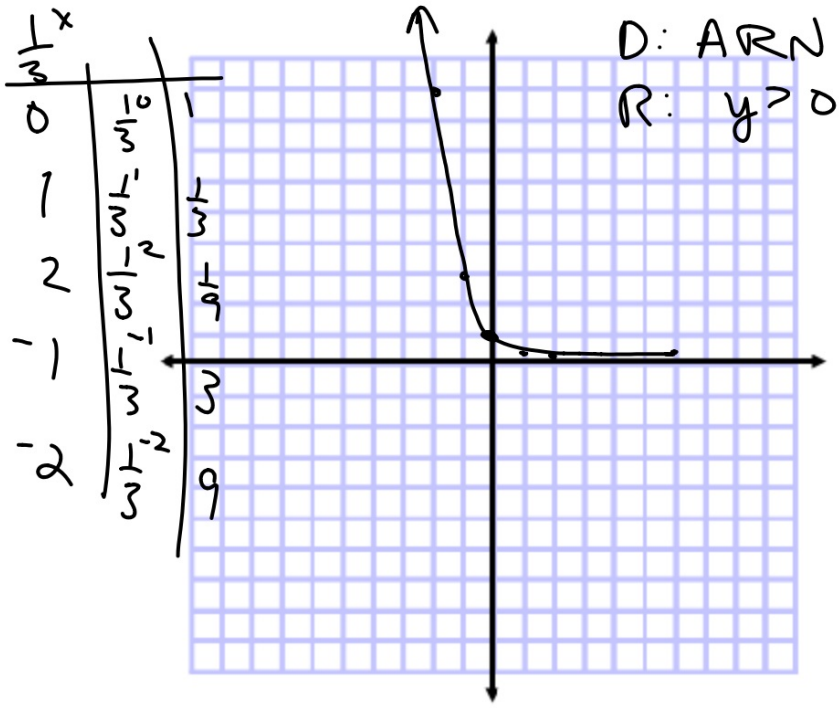
x	y
-3	
-2	
-1	
0	
1	
2	
3	

Gallery walk
What do you notice?
What do you wonder?

$b > 1$  $0 < b < 1$

Example 2 Graph with $a > 0$ and $0 < b < 1$

Graph $y = \left(\frac{1}{3}\right)^x$. Find the y-intercept, and state the domain and range.



KeyConcept Graphs of Exponential Functions

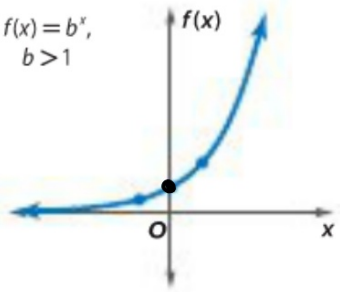
Exponential Growth Functions

Equation: $f(x) = ab^x$, $a > 0$, $b > 1$

Domain, Range: all reals; all positive reals

Intercepts: one y-intercept, no x-intercepts

End behavior: as x increases, $f(x)$ increases; as x decreases, $f(x)$ approaches 0



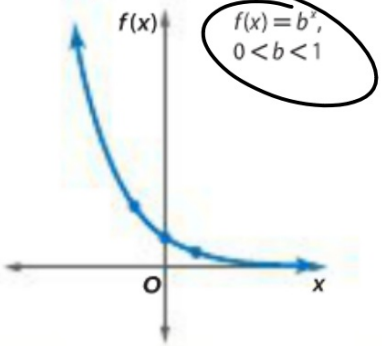
Exponential Decay Functions

Equation: $f(x) = ab^x$, $a > 0$, $0 < b < 1$

Domain, Range: all reals; all positive reals

Intercepts: one y-intercept, no x-intercepts

End behavior: as x increases, $f(x)$ approaches 0; as x decreases, $f(x)$ increases



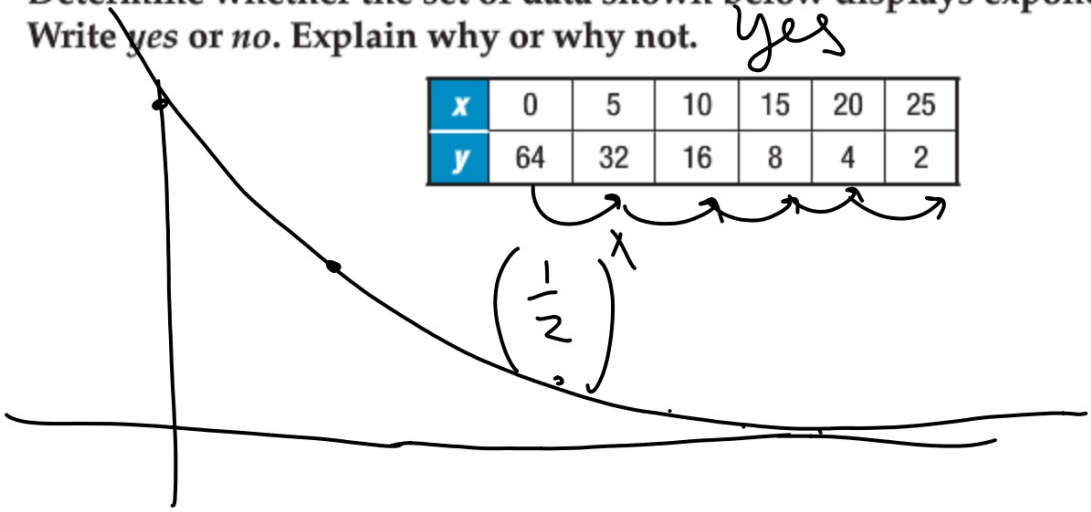
Is it a multiplying rule?

Example 4 Identify Exponential Behavior

Determine whether the set of data shown below displays exponential behavior. Write *yes* or *no*. Explain why or why not.

yes

x	0	5	10	15	20	25
y	64	32	16	8	4	2



Is it a multiplying rule?

4. Determine whether the set of data shown below displays exponential behavior. Write *yes* or *no*. Explain why or why not.

x	0	3	6	9	12	15
y	12	16	20	24	28	32

no

7.5 11-39 eo

11, 15, 19, 23 . . .