

8.5 Warm-Up:

Make and solve a list of 5 powers that have the same base and different exponents.

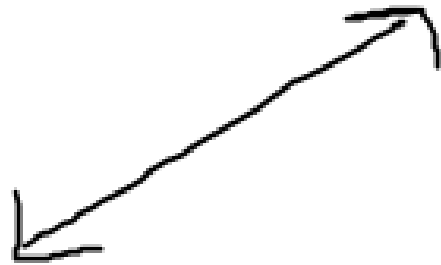
$$2^1 = 2 \quad 2^0 = 1$$

$$2^2 = 2 \cdot 2 = 4 \quad 2^3 = 2 \cdot 2 \cdot 2 = 8$$

$$2^4 = 2 \cdot 2 \cdot 2 \cdot 2$$

$\underbrace{\quad\quad}_4 \cdot \underbrace{\quad\quad}_4 = 16$

What is a linear function?



$$y = mx + b$$

$$y = 4x + 1$$

$$4(-1) + 1$$

$$4(1) + 1$$

$$4(2) + 1$$

x	y
-1	-3
0	-1
1	1
2	5

What do you suppose an exponential function would be?

$$y = 2^x$$

Exponential Functions

$$y = 2^x$$

	+1	+1	+1	+1	
x	-2	-1	0	1	2
y	1/4	1/2	1	2	4

$$\frac{1}{4} \cdot 2 \quad \times 2 \quad \times 2 \quad \times 2 \quad \times 2$$

$$y = 3^x$$

	+1	+1	+1	+1	
x	-2	-1	0	1	2
y	4/9	4/3	4	12	36

$$\times 3 \quad \times 3 \quad \times 3 \quad \times 3$$

$4 \cdot 3 = 12$
 $12 \cdot 3 = 36$
 $4 \cdot 3 = 12$
 $12 \cdot 3 = 36$

$$2^{-1} = \frac{1}{2^1} = \frac{1}{2}$$

$$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$$

$$3^0 \cdot 4 = 1 \cdot 4 = 4$$

$$3^1 \cdot 4 = 3 \cdot 4 = 12$$

$$3^2 \cdot 4 = 9 \cdot 4 = 36$$

$$3^{-1} \cdot 4 = \frac{1}{3} \cdot 4 = \frac{4}{3}$$

Write a rule for a function.

a.

		+1	+1	+1	+1	
x	-2	-1	0	1	2	
y	2	4	8	16	32	

$\times 2$ $\times 2$ $\times 2$ $\times 2$

$$y = 2^x \cdot 8 = 8 \cdot 2^x$$

b.

x	-2	-1	0	1	2
y	3	9	27	81	243

$$y = 3^x \cdot 27$$

What mult. by pattern is the base.

$$1 + 7 = 8$$

$$1 \cdot 8 = 8$$

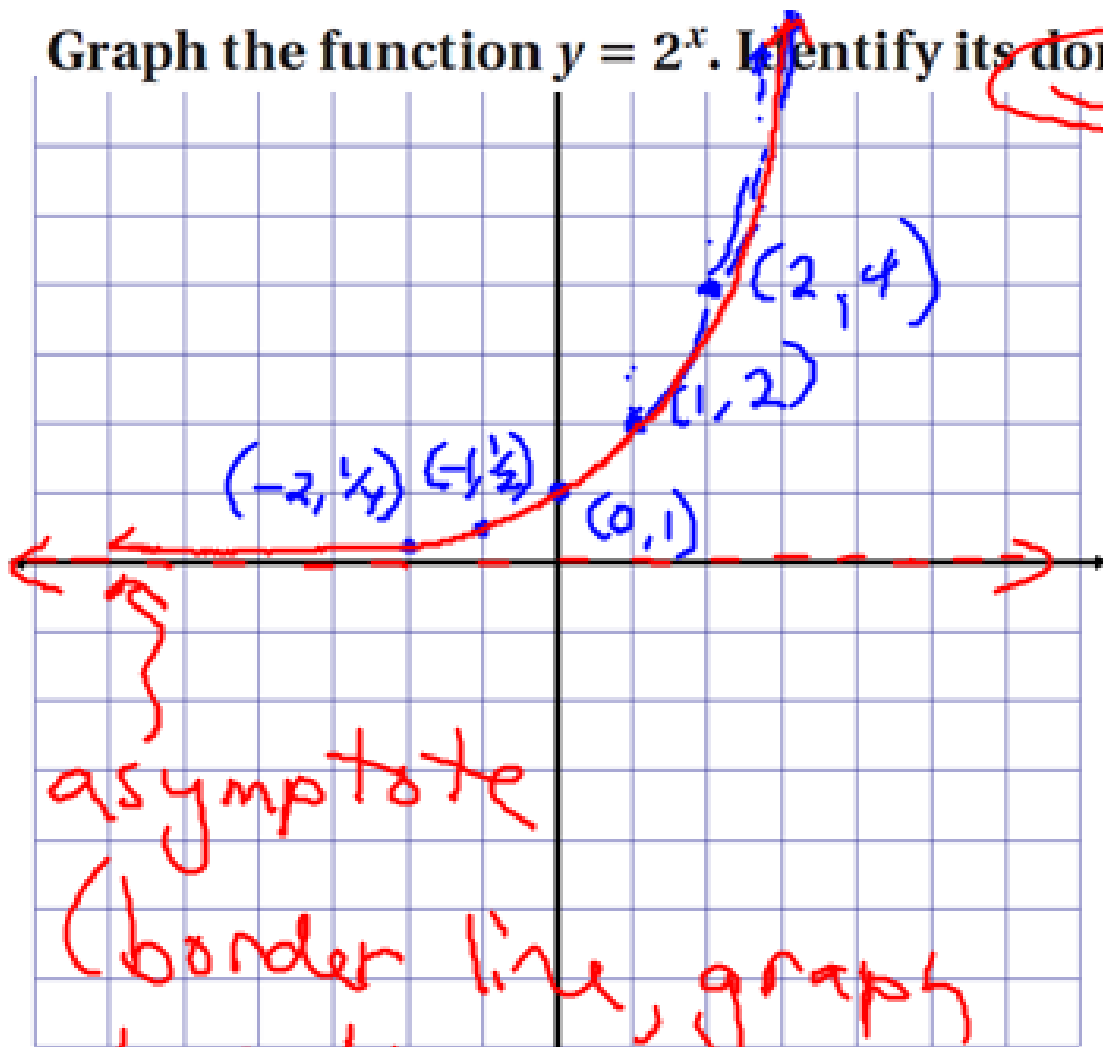
$a^x \cdot 8$

$2^x \cdot 8$ OR $2^x + 7$

$2^1 \cdot 8$ $2^1 + 7$

~~$y = 8 \cdot 2^x$~~

Graph the function $y = 2^x$. Identify its domain and range.

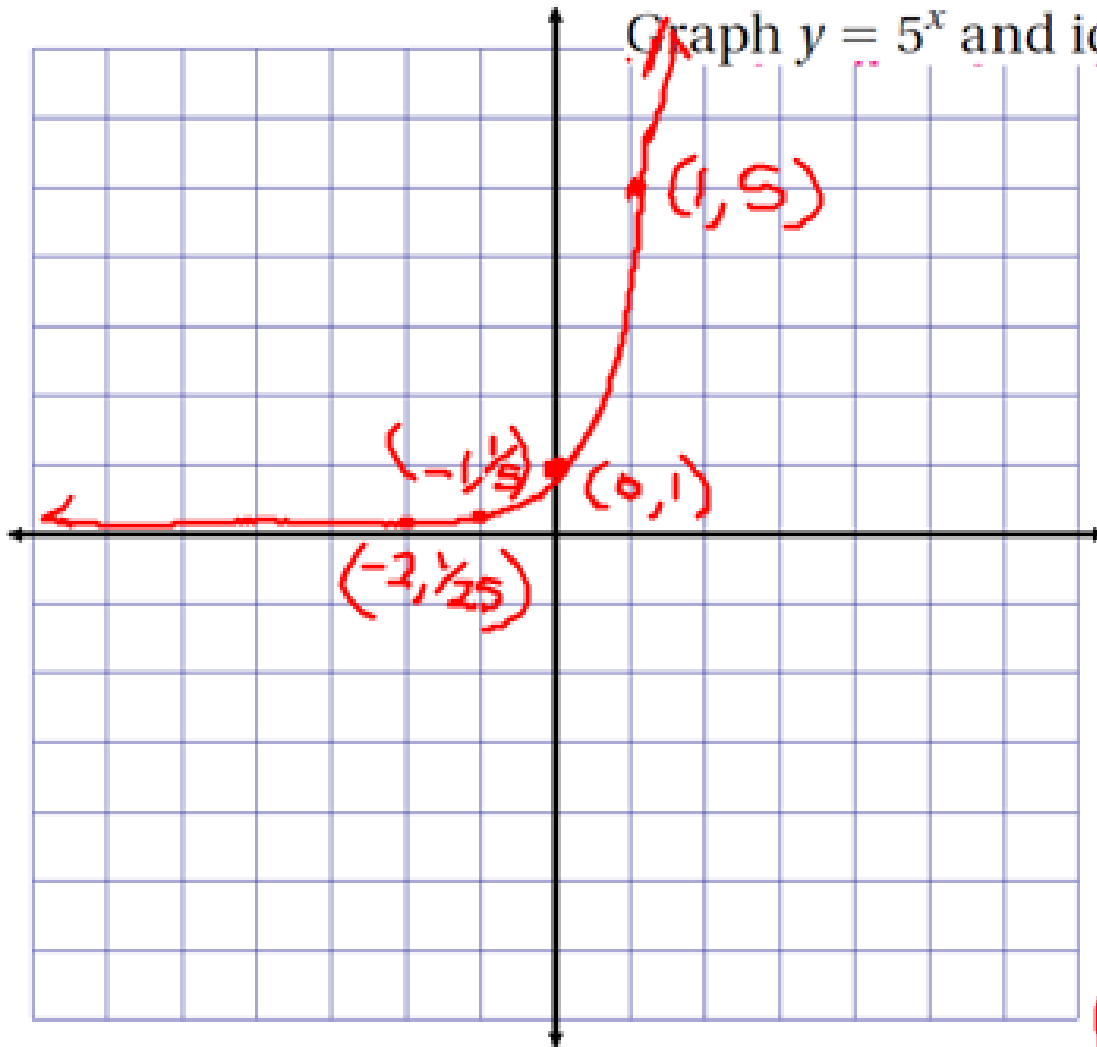


x	y
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8

Domain: all reals

Range: $y > 0$
(positive)

Graph $y = 5^x$ and identify its domain and range.



x	y	
-2	$\frac{1}{25}$	5^{-2}
-1	$\frac{1}{5}$	5^{-1}
0	1	5^0
1	5	5^1
2	25	$5^2 = 5 \cdot 5$

Domain: all reals

Range: $y > 0$.

Homework:

p 524

#'s 4-20

There is graph paper on the counter.
You will need the copy with front and
back graphs.