8.6a Warm-Up:

1. Evaluate $\left(\frac{1}{2}\right)^3$. $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{2^3} = \frac{1}{8}$

2. Evaluate $\left(\frac{1}{4}\right)^{-2}$. $\left(\frac{4}{1}\right)^2 = 4^2 = 16$

3. The table shows how much money Tess owes after w weeks. Write a rule for the function.

Week, *w*	0	1	2	3
Owes, *m*	50	45	40	35

+1

-5

$m = 50 - 5w$

Exponential Decay Functions.

Tell whether the table represents an exponential function. If so, write a rule for the function.

1.

x	-1	0	1	2
y	$\frac{1}{9}$	$\frac{1}{3}$	1	3

+1 +1 ×3

$y = 3^x$

2.

x	-1	0	1	2
y	4	1	$\frac{1}{4}$	$\frac{1}{16}$

+1 +1 ×$\frac{1}{4}$

$y = \left(\frac{1}{4}\right)^x$

3.

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

mult by $\frac{1}{5}$

$y = \left(\frac{1}{5}\right)^x$

pattern gives the base number with 0 gives what you multiply by

4.

x	-1	0	1	2
y	$\frac{1}{8}$	$\frac{1}{2}$	2	8

mult by 4

$y = 4^x \cdot \frac{1}{2}$

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

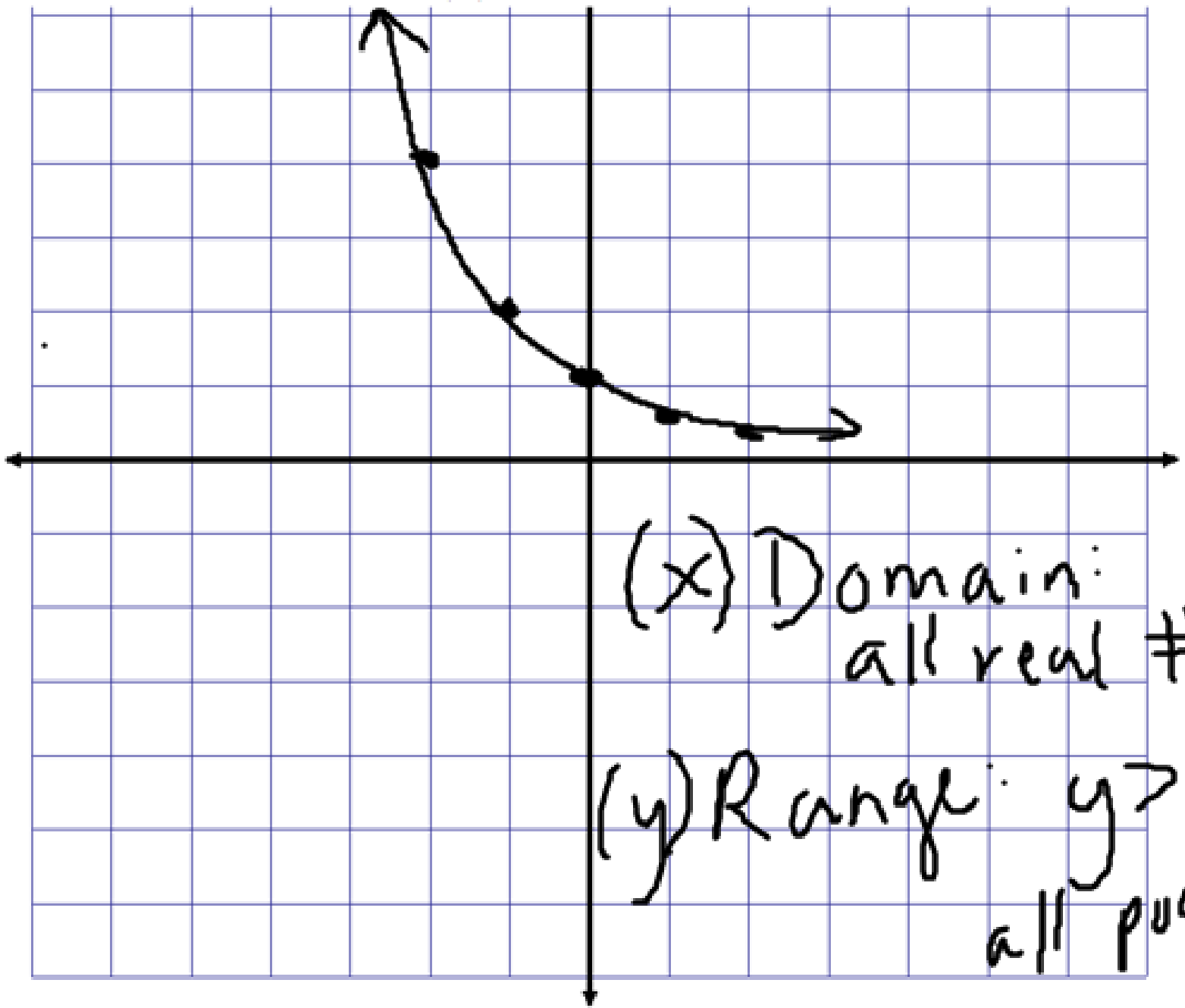
x	y
−2	4
−1	2
0	1
1	$\frac{1}{2}$
2	$\frac{1}{4}$

$$\left(\frac{1}{2}\right)^{-2} = \frac{1}{2^{-2}} = 2^2 = 4$$

$$\left(\frac{1}{2}\right)^{-1} = \left(\frac{2}{1}\right)^{1} = 2$$

$$\left(\frac{1}{2}\right)^{0} = 1$$

Graph the function $y = \left(\frac{1}{2}\right)^x$ and identify its domain and range.



(x) Domain: all real #'s

(y) Range: $y > 0$. all positives

$y = (0.4)^x$

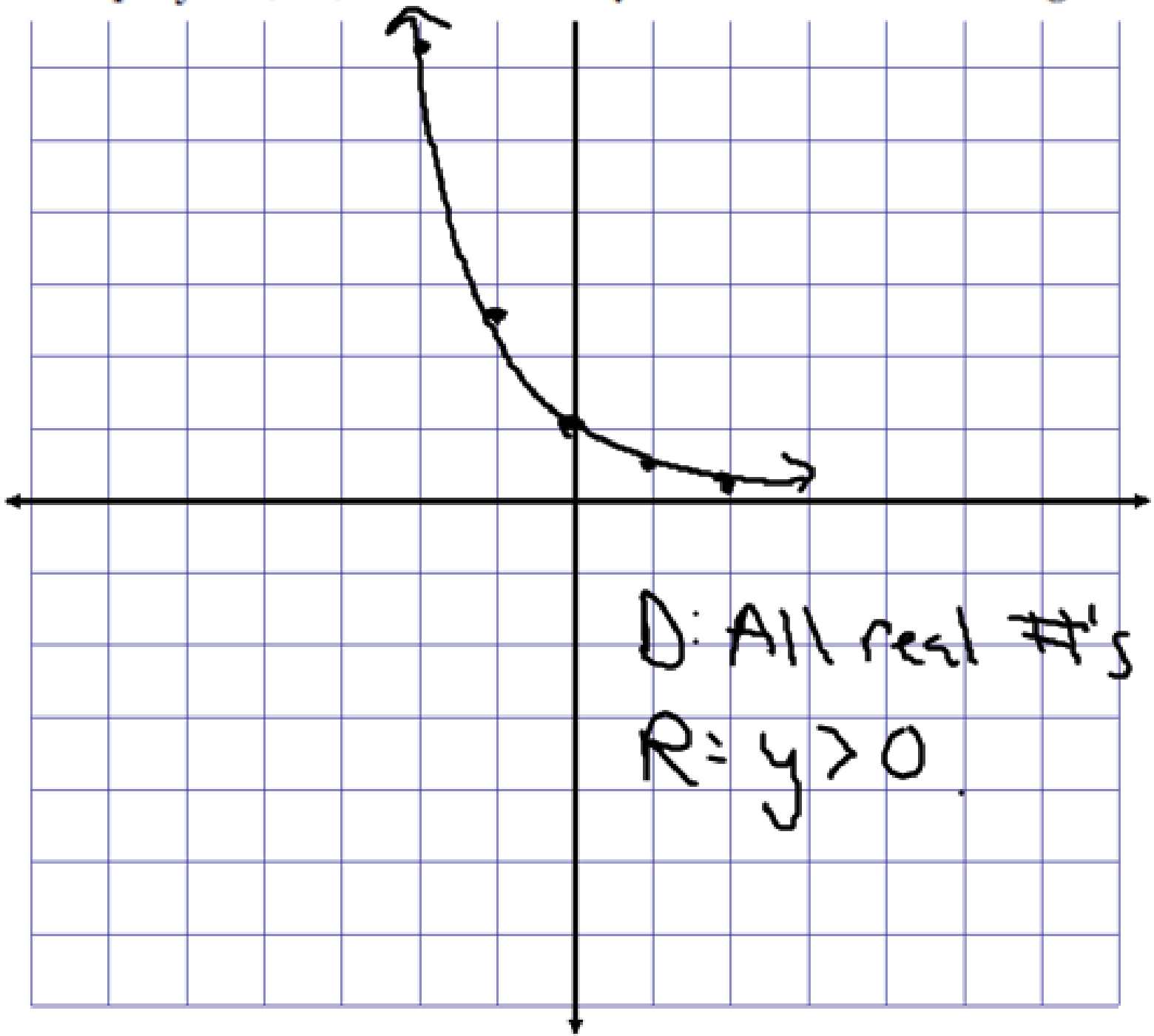
x	y
−2	6.25
−1	2.5
0	1
1	.4
2	.16

$(0.4)^{-2} = \frac{1}{.4^2} = \frac{1}{.16}$

$1 \div .16 = 6.25$

$(0.4)^{-1} = \frac{1}{.4^1} = 1 \div .4 = 2.5$

Graph $y = (0.4)^x$ and identify its domain and range.

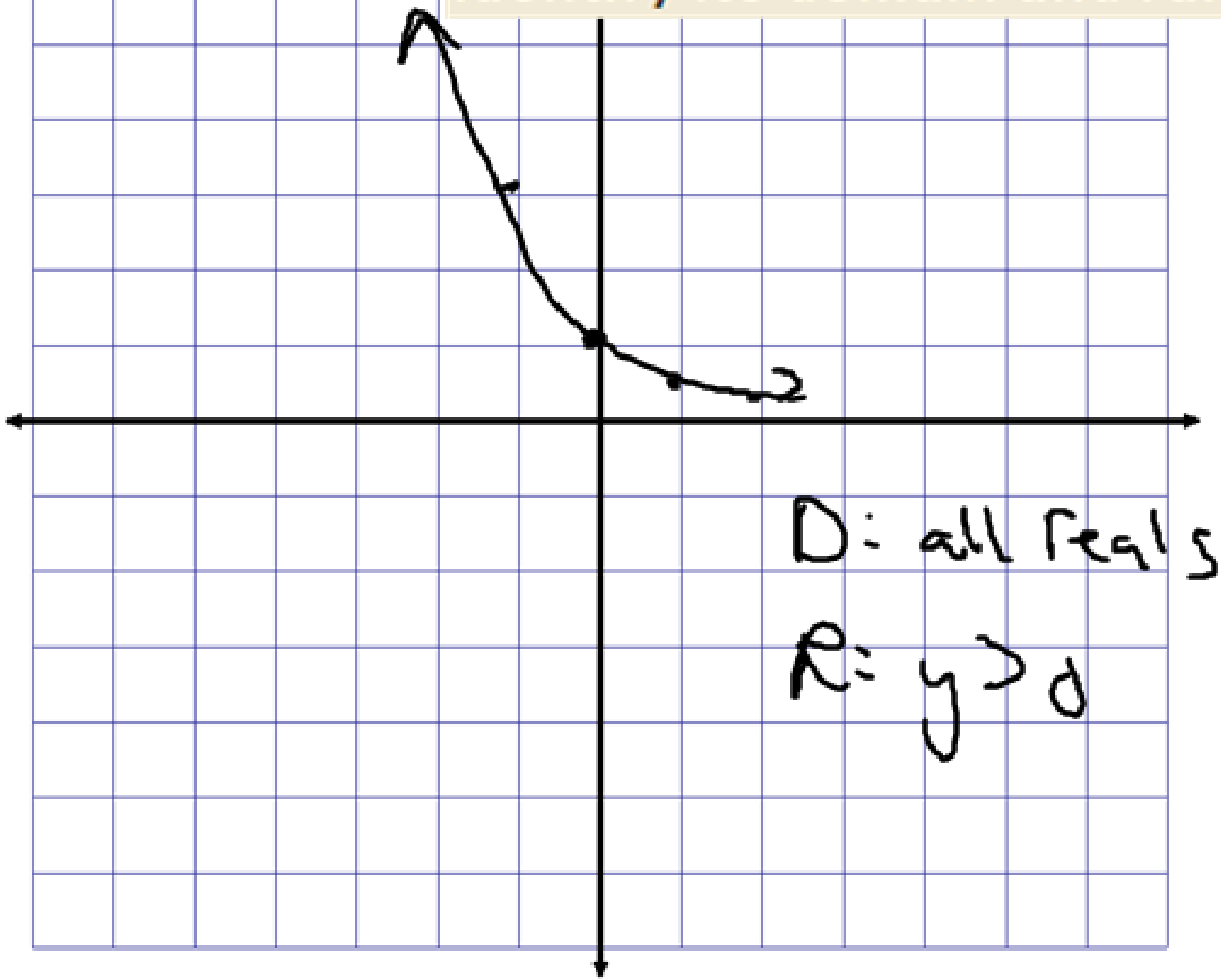


$$y = \left(\frac{1}{3}\right)^x$$

x	y
-2	9
-1	3
0	1
1	$\frac{1}{3}$
2	$\frac{1}{9}$

$$\left(\frac{1}{3}\right)^2 = \frac{1}{3^2} = \frac{1}{9}$$

Graph the function $y = \left(\frac{1}{3}\right)^x$ and identify its domain and range.



D: all reals

R: $y > 0$

Homework:

pp. 535-538
#'s 2-6, 8-18 E, 63-66