

Find the slope of the line through each pair of points.

23) $(8, -11), (-2, 11)$

$$\frac{-11 - 11}{8 - (-2)} = \frac{-22}{10} = \frac{-11}{5}$$

24) $(2, -12), (2, 18)$

$$\frac{-12 - 18}{2 - 2} = \frac{-30}{0} \leftarrow \text{undefined (zero in denominator)}$$

[0 in numerator = zero slope]

Find the x-intercept and the y-intercept.

25) $x + 3y = -9$

$$\begin{aligned} \hookrightarrow x &= -9 & 3y &= -9 \\ & & y &= -3 \end{aligned}$$

x-int $\rightarrow -9$
y-int $\rightarrow -3$

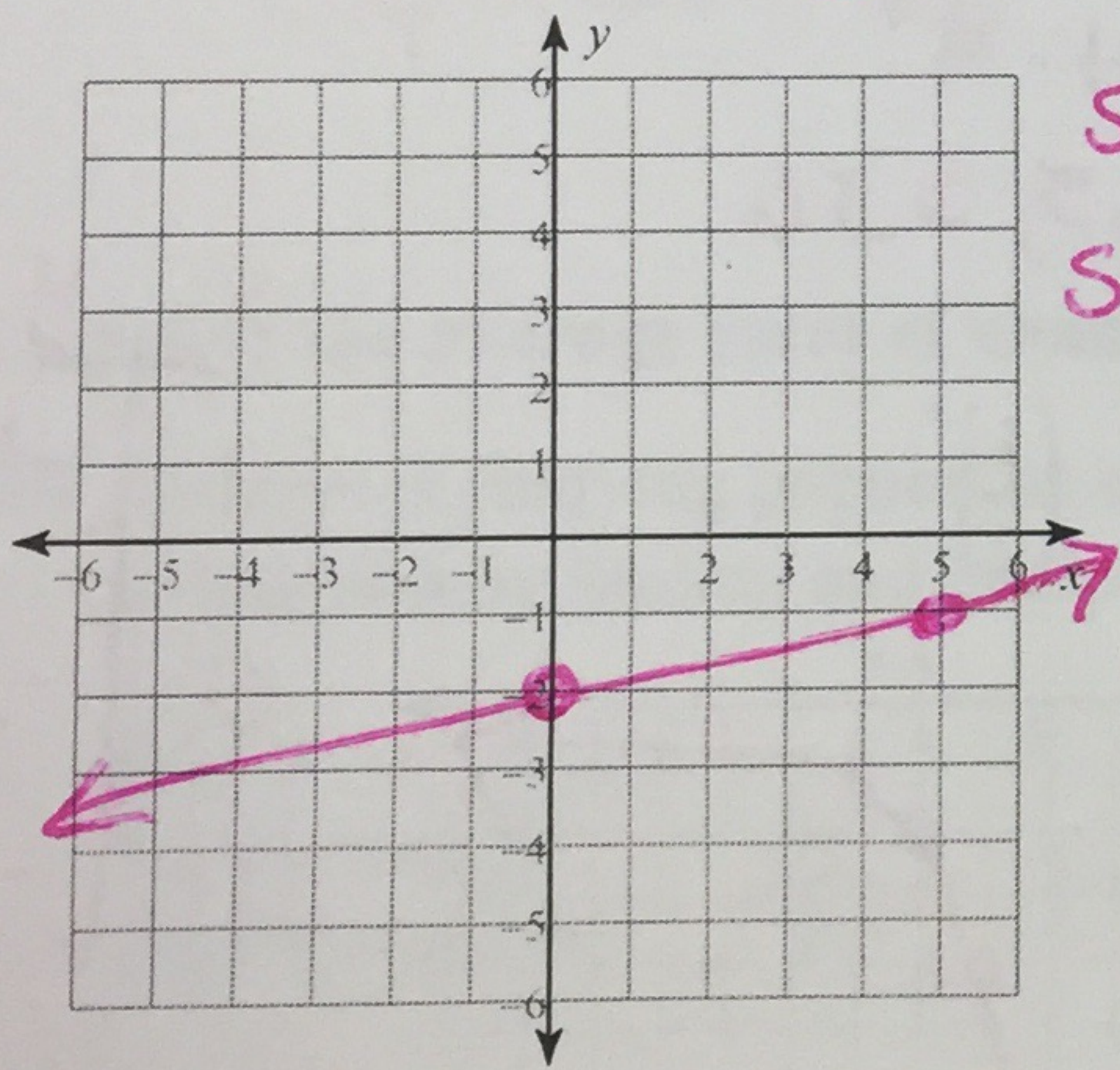
Sketch the graph of each line. Then describe the transformations from the parent function $y = x$.

26) $x - 5y = 10$

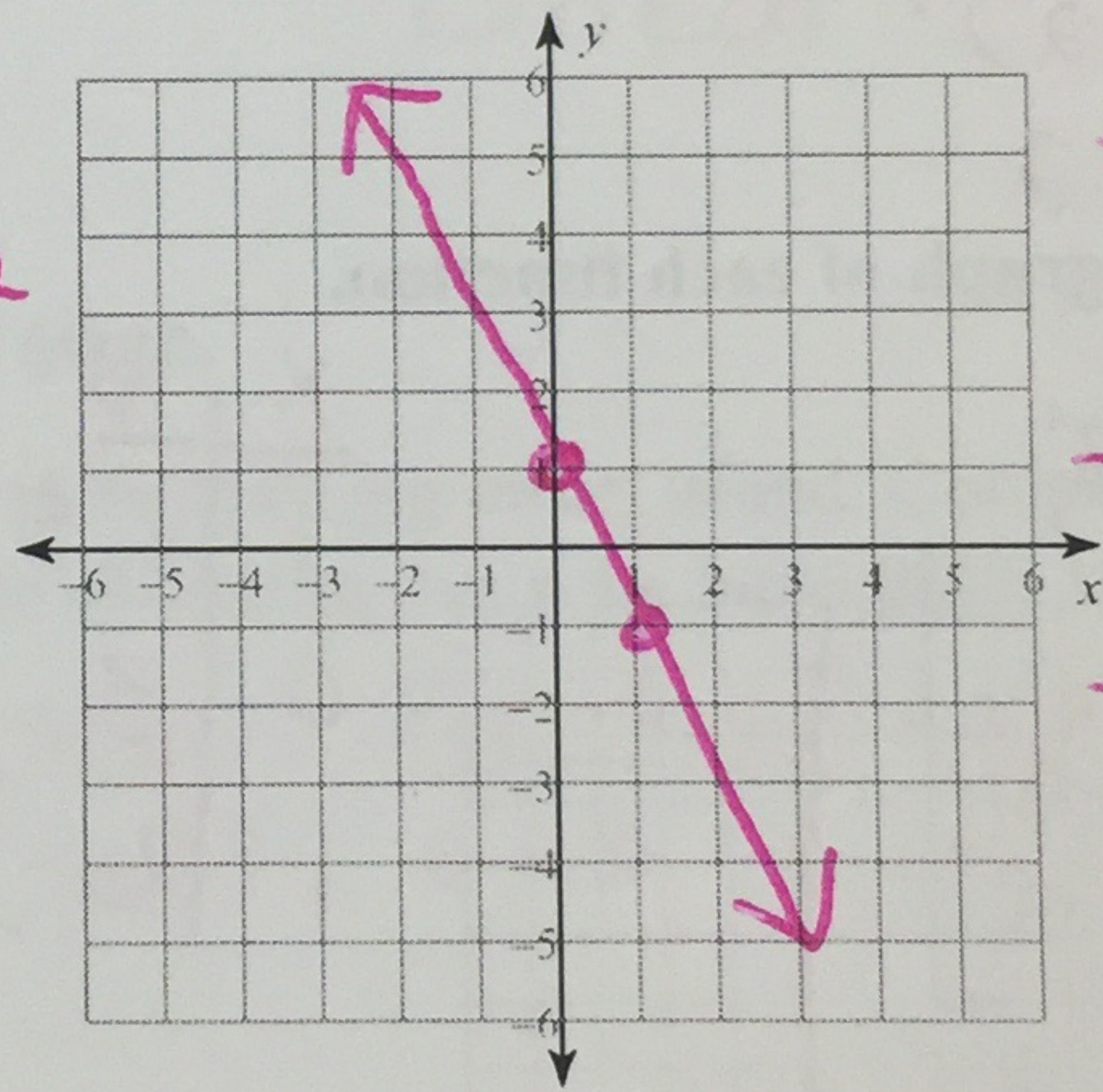
$$y = \frac{1}{5}x - 2$$

27) $2x + y = 1$

$$y = -2x + 1$$



shrink by $\frac{1}{5}$
shift down 2



- ref. across x
- stretch by 2
- shift up 1

+/- pattern

$$a_n = a_1 + d(n-1)$$



Determine if the sequence is arithmetic. If it is, find the common difference, the 52nd term, and the explicit formula.

28) -6, -10, -14, -18, ...

↖ ↖ ↖
-4 -4 -4

CD ⇒ -4

EF ⇒ $a_n = -6 + -4(n-1)$

$a_n = -6 - 4n + 4$

$a_n = -2 - 4n$

$a_{52} = -2 - 4(52)$

$a_{52} = -210$

Determine if the sequence is geometric. If it is, find the common ratio, the 8th term, and the explicit formula.

↑
mult pattern

30) 4, -8, 16, -32, ...

↖ ↖ ↖
x-2 x-2 x-2

CR ⇒ -2

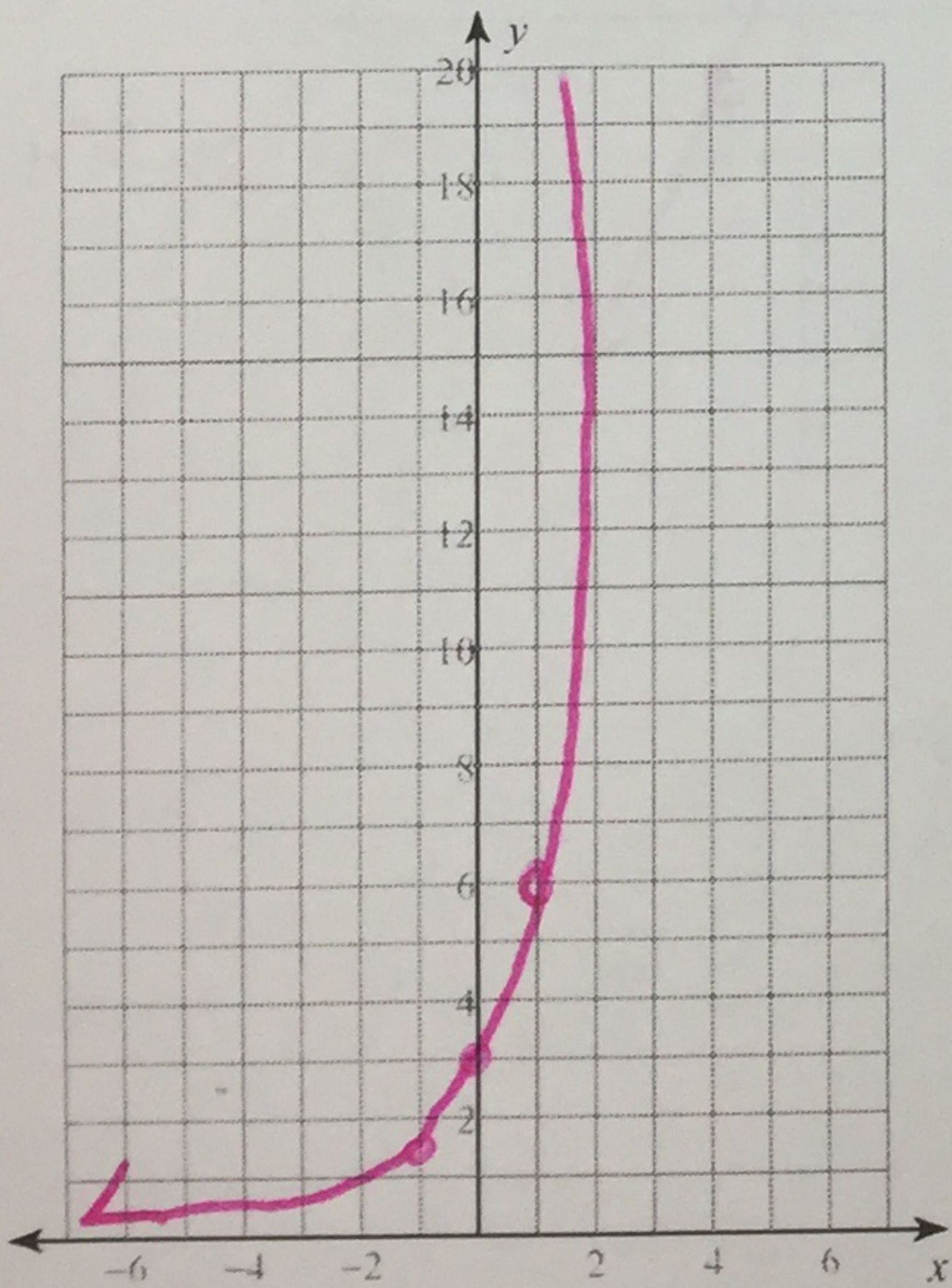
EF ⇒ $a_n = 4 \cdot (-2)^{n-1}$

$a_8 = 4 \cdot (-2)^7$

$a_8 = -512$

Sketch the graph of each function.

32) $y = 3 \cdot 2^x$



x	y
-1	1.5
0	3
1	6

29) 28, 58, 88, 118, ...

↖ ↖ ↖
+30 +30 +30

CD ⇒ 30

EF ⇒ $a_n = 28 + 30(n-1)$

$a_n = 28 + 30n - 30$

$a_n = -2 + 30n$

$a_{52} = -2 + 30(52)$

$a_{52} = 1,558$

Determine if the sequence is geometric. If it is, find the common ratio, the 8th term, and the explicit formula.

31) 4, 16, 64, 256, ...

↖ ↖ ↖
x4 x4 x4

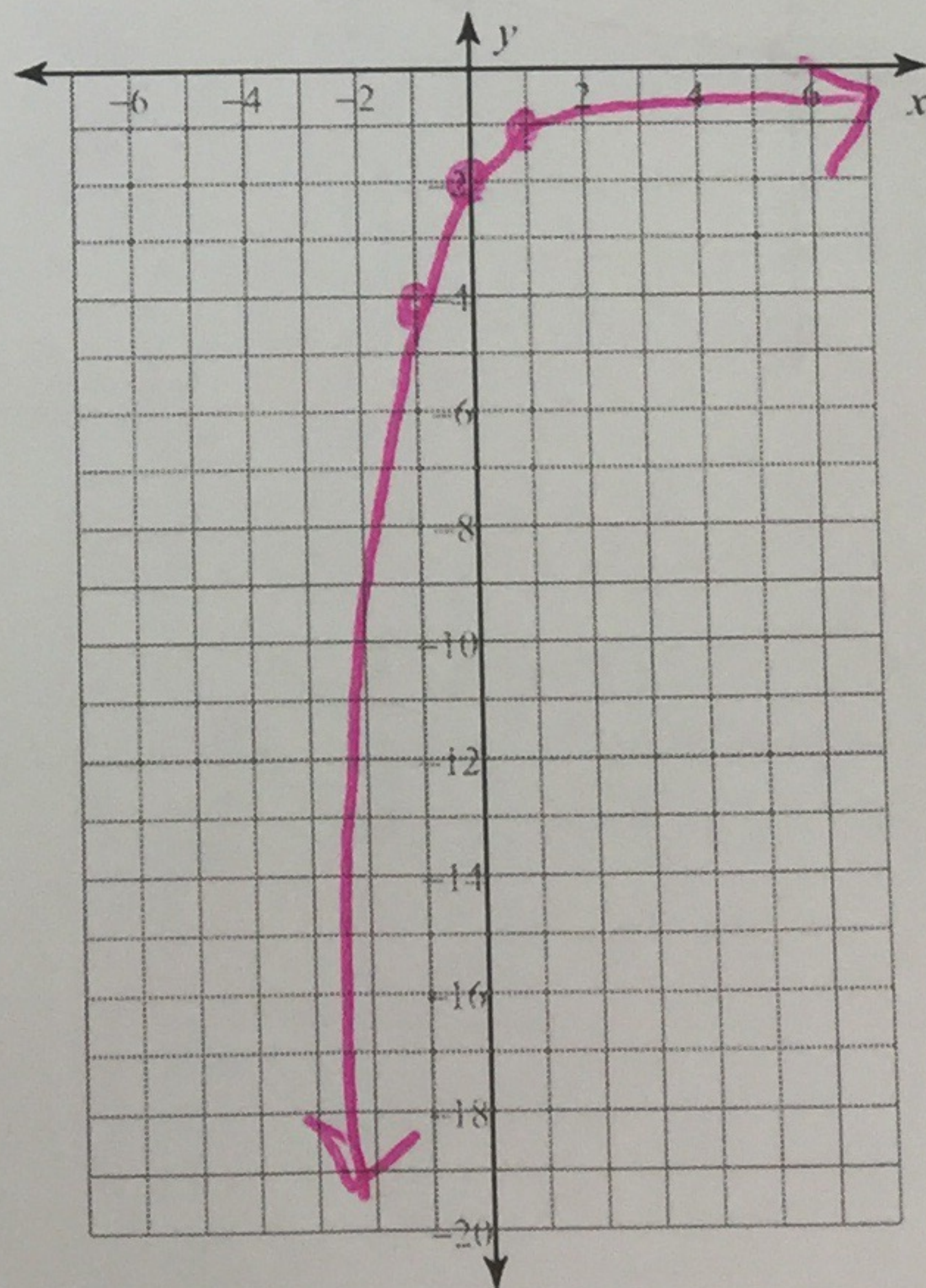
CR ⇒ 4

EF ⇒ $4 \cdot 4^{n-1}$

$a_8 = 4 \cdot 4^7$

$a_8 = 65,536$

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



x	y
-1	-4
0	-2
1	-1

Write an exponential model and find the total value of the investment after the time given.

34) \$57,000 at 3% compounded annually for 4 years

$$57000 \left(1 + \frac{.03}{1}\right)^4 = 64,154$$

35) \$37,000 at 12.6% compounded quarterly for 2 years

$$37000 \left(1 + \frac{.126}{4}\right)^8 = 47419.35$$

36) Fluorine-20 has a half-life of 11 seconds. Find the amount of Fluorine-20 left from a 40 gram sample after 2.2 minutes.

2.2 minutes = 132 sec.

$$40 (.5)^{\frac{132}{11}} = .0098 \text{ or } .01$$

37) The value of a gold coin is \$150 and is increasing at a rate of 15% each year. Find the value of the coin in 11 years.

$$150(1 + .15)^{11} = \$697.86$$

Look for a pattern in each data set to determine which kind of model best describes the data.

38) $\{(0, 6), (1, 12), (2, 24), (3, 48)\}$

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

exponential

39) $\{(3, 4), (6, -2), (9, -8), (12, -14)\}$

$-6 \quad -6 \quad -6$

Linear

Compare the average rates of change over the interval given.

40) Michael is studying population changes in two types of birds living on an island. Compare the population by finding and interpreting the average rate of change over the interval (0, 18).

Bird A
Time(months) | 0 | 6 | 12 | 18
Pop.(thousands) | 8.3 | 8.6 | 8.8 | 9.1

0	6	12	18
8.3	8.6	8.8	9.1

$$\frac{9.1 - 8.3}{18 - 0} = \frac{0.8}{18} = .04$$

Bird B
 $y = 3.6 \cdot 1.06^x$

$$y = 3.6 \times 1.06^0$$

$$y = 3.6 \quad (0, 3.6)$$

$$\frac{3.6 - 10.3}{0 - 18} = \frac{-6.7}{-18} = .37$$

$$y = 3.6 \times 1.06^{18}$$

$$y = 10.3 \quad (18, 10.3)$$

$$\frac{10.3 - 3.6}{18 - 0} = \frac{6.7}{18} = .37$$

41) Mr. Krabbs has \$2500 in his savings account. He wants to save more money. He is considering two plans. Under Plan 1 he will increase his balance by \$500 each year. Under Plan 2, he will increase his balance by 25% each year. How much more will he save with Plan 2 after 10 years? Round to the nearest hundredth.

① $2500 + 500 \times 10$

10 years

② $2500(1 + .25)^{10}$

① 7500

② 23283.06

More?

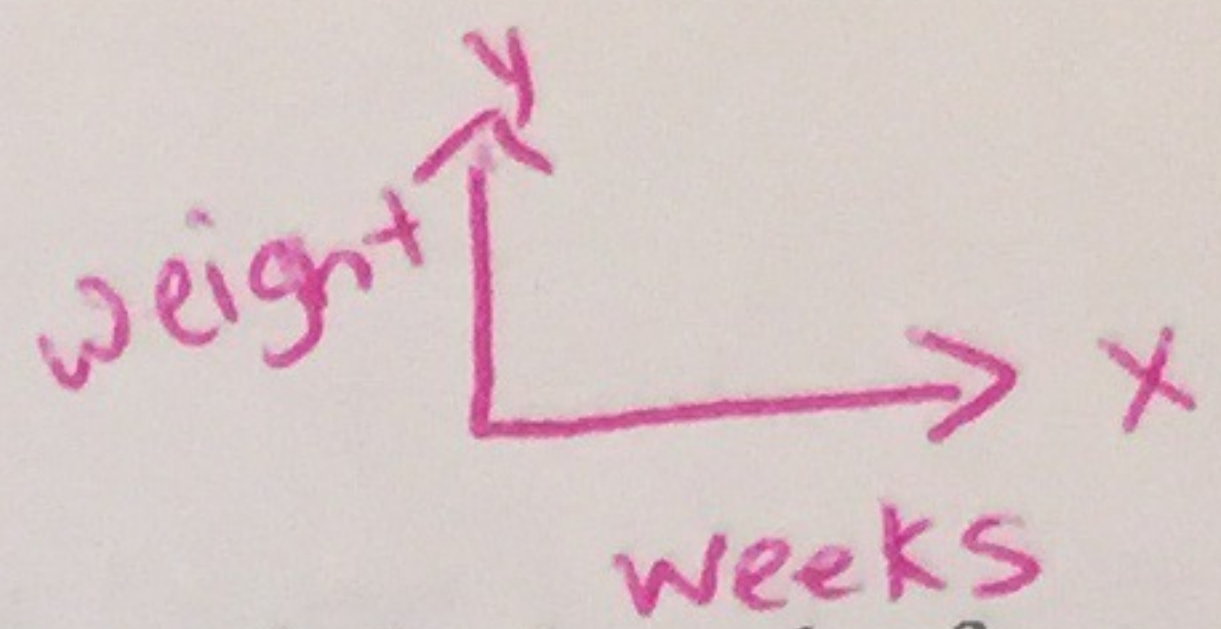
\$15783.06

42) What is the domain of an exponential function?

- A) $y \geq 0$ B) All real numbers
C) $x > 0$ D) $x \geq 0$

43) A weight loss company is offering a 6 week special. You can lose up to 25 pounds in 6 weeks for a one time fee of \$50. What are the possible values for the range? *y-values*

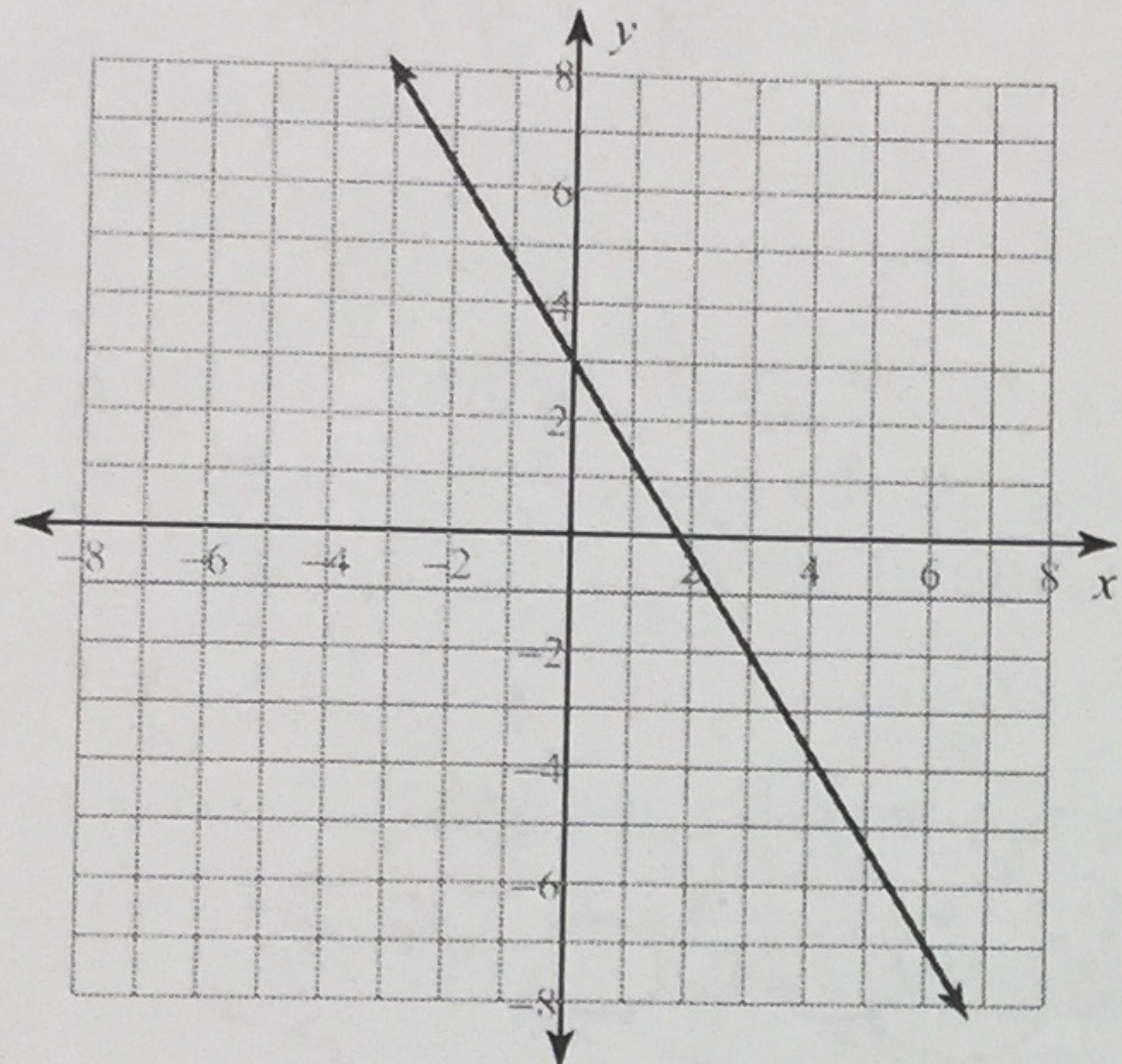
- A) All integers between 0 and 6
 B) All whole numbers greater than 0
 C) None of the above
 D) All real numbers between 0 and 25



least you could lose
 most you could lose

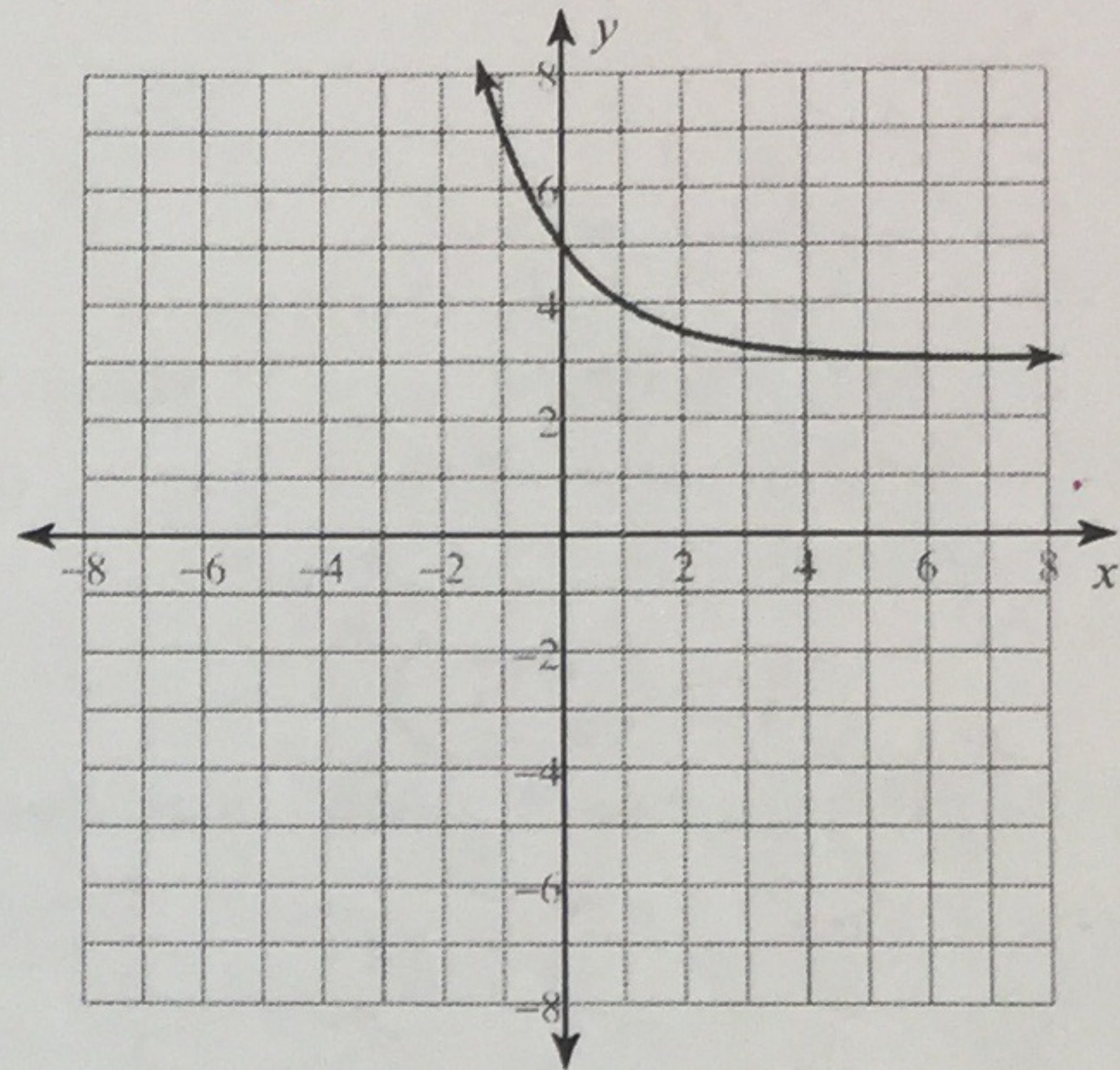
Analyze the graph.

44)



Domain = all real
 range = all real
 Max/min/none = none
 intervals = decreases for all x-values
 rises on left, falls on right
 X-int = 1.8 or so
 y-int = 3

45)



Domain = all real
 Range = $y \geq 3$
 min approaches 3
 intervals = /
 rises on left, approaches 3 on right
 X-int = none
 y-int = 5

46) Which of the following exponential decay functions have a vertical shrink and vertical shift down?

~~A) $y = -2 \cdot \left(\frac{1}{4}\right)^x - 1$~~ *not shrink*

~~B) $y = -\frac{1}{2} \cdot 4^x - 1$~~ *not decay*

~~C) $y = -\frac{1}{2} \cdot \left(\frac{1}{4}\right)^x + 1$~~ *NO shift down*

D) $y = -\frac{1}{2} \cdot \left(\frac{1}{4}\right)^x - 1$
shrink decay shift down