6.3 Linear Functions

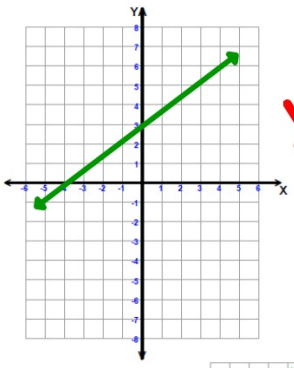
Learning Targets

- Write a Linear Function Using a Graph
- Write a Linear Function Using a Table
- Apply to Real-Life

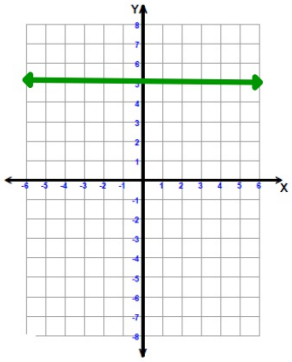
This should seem like a lot of Review!

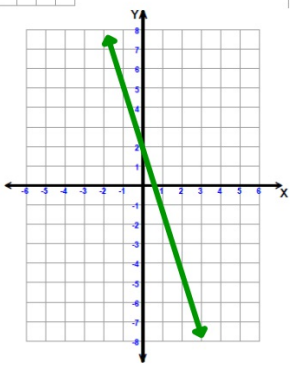
What is a Linear Function?

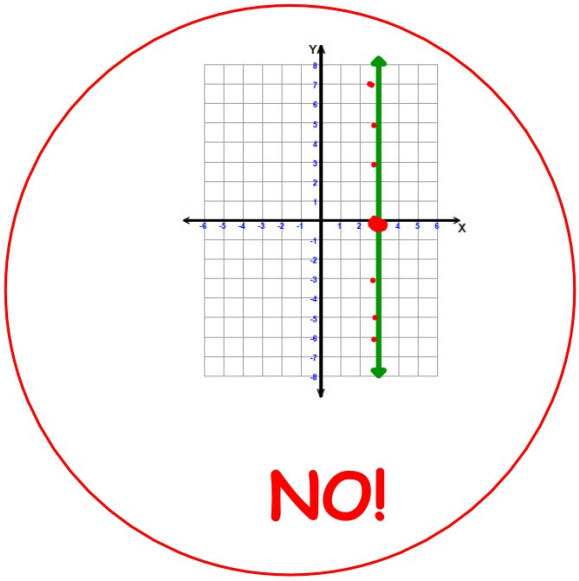
Linear Function = A nonvertical line



YES!







NO!

What is a Linear Function?

You write a Linear Function in the form

$$y = mx + b$$

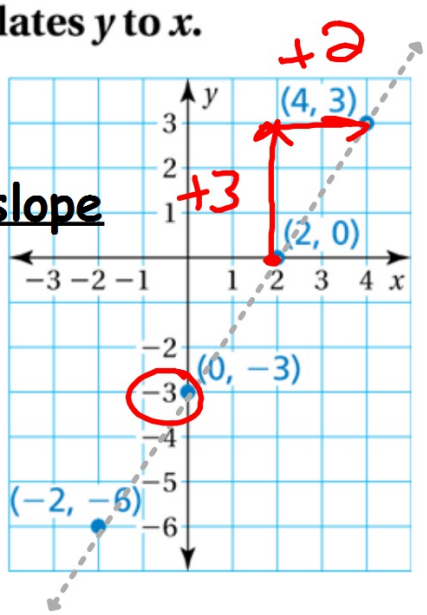
You need the slope

And the y-intercept

Learning Target 1

Write a Linear Function Using a Graph

Use the graph to write a linear function that relates y to x.



The points lie on line.

1st: Pick two points and find the slope

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{3-0}{4-2} = \boxed{\frac{3}{2}} \qquad \frac{\Delta y}{\Delta x}$$

2nd: Find the y-intercept

$b = -3$

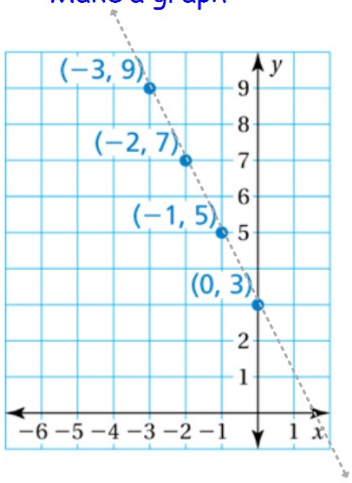
$\therefore$ $y = \frac{3}{2}x - 3$

Learning Target 2

Write a Linear Function Using a Table

Method #1

Make a graph



Use the table to write a linear function that relates y to x.

x	−3	−2	−1	0
y	9	7	5	3

Δx +1

Δy −2

Plot the points in the table.

1st: $m = \frac{\Delta y}{\Delta x} = \frac{-2}{1}$ or -2

2nd: $b = 3$

$\therefore$ $y = -2x + 3$

Learning Target 2

Write a Linear Function Using a Table

Method #2

you don't need to graph

Use the table to write a linear function that relates y to x.

x	-3	-2	-1	0
y	9	7	5	3

1st: Find Slope using any two points

2nd: Identify the y-intercept

∴

Learning Target 3

Real Life Application pg 259

Multi-Step Questions

Minutes, x	Height (thousands of feet), y
0	65
10	60
20	55
30	50

You are controlling an unmanned aerial vehicle (UAV) for surveillance. The table shows the height y (in thousands of feet) of the UAV x minutes after you start its descent from cruising altitude.

a. Write a linear function that relates y to x. Interpret the slope and the y-intercept.

Δx $+10$ $\quad$ Δy -5

Pick 2 points to find the slope

$$m = \frac{-5}{10} = -\frac{1}{2}$$

Identify the y-intercept (0, 65)

$$\therefore \quad y = -\frac{1}{2}x + 65$$

Minutes, x	Height (thousands of feet), y
0	65
10	60
20	55
30	50

Use the units to help interpret the function.

So, the linear function is $y = -0.5x + 65$.

a. **Write a linear function that relates y to x. Interpret the slope and the y-intercept.**

$m = -\frac{5}{10}$

The drone goes down 5000 ft every 10 min.

OR 500 ft every minute.

$b = 65$

The plane started its descent at 65000 ft.

Minutes, x	Height (thousands of feet), y
0	65
10	60
20	55
30	50

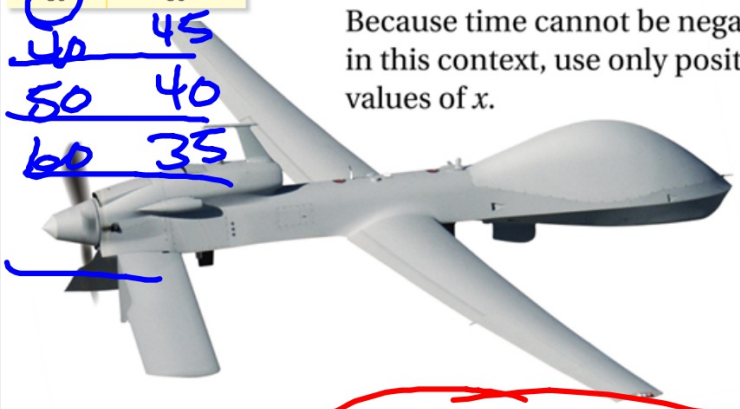
40 45

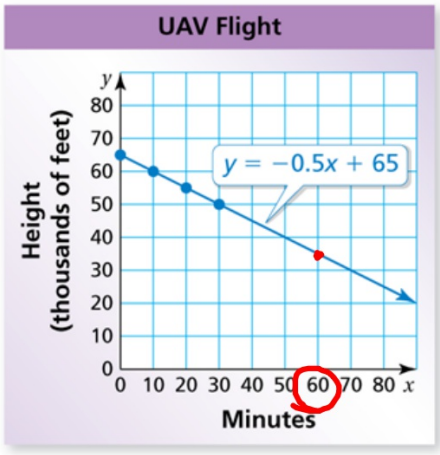
50 40

60 35

b. Graph the linear function.

Because time cannot be negative in this context, use only positive values of x.





c. Find the height of the UAV when you stop the descent after 1 hour.

35,000 ft

$Y = -\frac{1}{2}(60) + 65$

Homework

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you need graph paper

And 6.1, 6.2 Review