

## Dear Family,

**Your child is learning about the slope-intercept equation for a line.**



A linear function is a relationship between two quantities that can be shown by a straight line on a graph.

This graph shows the amount of savings,  $y$ , based on the number of weeks,  $x$ . Each point shows the total amount after a certain number of weeks. The points form a line so this is a linear function.

There are two key features of a linear function:

The  $y$ -intercept is where the line crosses the  $y$  axis.

- It is the  $y$ -value when  $x$  is zero.
- Here it represents the starting amount of \$30.

The slope shows the steepness of the line.

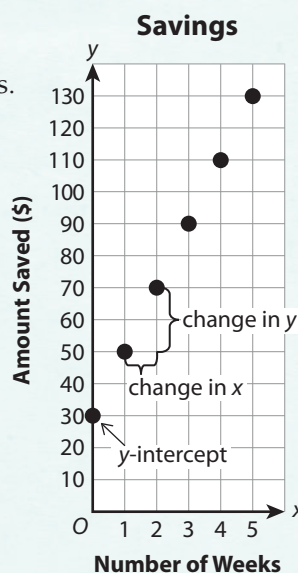
- It is given by  $\frac{\text{change in } y}{\text{change in } x} \rightarrow \frac{70 - 50}{2 - 1} = \frac{20}{1} = 20$
- Here it represents the amount saved each week, \$20.

A linear function can be represented by an equation.

- The slope-intercept form of the equation shows the slope,  $m$ , and  $y$ -intercept,  $b$ .
- Here,  $m = 20$  and  $b = 30$ .

The amount saved,  $y$ , is the 20 times the number of weeks,  $x$ , plus 30.

On the next page, you will see what your child will learn about writing an equation for the line representing the savings plan below.



$$\begin{array}{l}
 y = mx + b \\
 \downarrow \quad \swarrow \\
 y = (\text{slope})x + (\text{y-intercept}) \\
 \downarrow \quad \swarrow \\
 y = 20x + 30
 \end{array}$$

Number of weeks	0	1	2	3	4	5
Amount Saved (\$)	\$25	\$40	\$55	\$70	\$85	\$100



## Understand the Slope-Intercept Equation for a Line: Sample Solution

How can you write the equation of a line using the form  $y = mx + b$ ?

**One way:** Use a table.  
Find the slope and y-intercept.

Number of weeks	0	1	2	3	4	5
Amount Saved (\$)	\$25	\$40	\$55	\$70	\$85	\$100

Arrows above the table show a constant increase of +1 in the number of weeks from 0 to 5. Arrows below the table show a constant increase of +15 in the amount saved from \$25 to \$100.

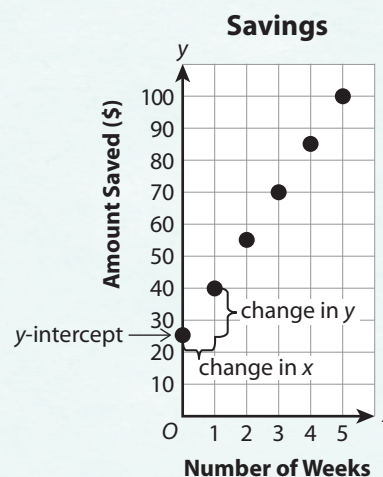
- slope:  $\frac{\text{change in savings, } y}{\text{change in weeks, } x} \rightarrow \frac{15}{1} = 15$
- y-intercept: when the number of weeks,  $x$ , is 0, the amount saved,  $y$ , is 25.

Use  $m = 15$  and  $b = 25$  in the equation  $y = mx + b$  to get  $y = 15x + 25$ .

**Another way:** Use a graph.  
Plot points on a graph with pairs of values from the table:  $x$  as number of weeks and  $y$  as amount saved.

Find the slope and y-intercept from the graph.

- slope:  $\frac{\text{change in } y}{\text{change in } x} \rightarrow \frac{40 - 25}{1 - 0} = \frac{15}{1} = 15$
- y-intercept: the line crosses the  $y$ -axis where  $y$  is 25.



Use  $m = 15$  and  $b = 25$  in the equation  $y = mx + b$  to get  $y = 15x + 25$ .

**Answer:** The equation of the line is  $y = 15x + 25$ . This equation tells you that the amount saved,  $y$ , is the amount saved each week, \$15, times the number of weeks,  $x$ , plus the starting amount, \$25.

### Vocabulary

**slope** ratio of vertical change to horizontal change.

**y-intercept** the  $y$ -coordinate of the point where a line crosses the  $y$ -axis.