

**Essential Question:** How can we represent linear relationships symbolically given a table of values or verbal description?

**Do Now:** Craig is saving to buy an MP3 player. His parents provide him with a weekly allowance of \$10. He also earns money from mowing his neighbor's lawns. He charges \$20 per lawn.

- a) Complete the table below that represents Craig's earnings ( $y$ ) in one week after mowing  $x$  lawns.

Number of Lawns ( $x$ )	0	1	2	3	4	5
Earnings ( $y$ )						

- b) Write an equation that represents Craig's weekly income.

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### Modeling Linear Relationships

- 1) Tom works at an aquarium shop on Saturdays. One Saturday, he is asked to clean one of the tanks. Before cleaning the tank, he has to transfer the fish into another tank and then drain the tank. In order to drain the tank, he puts a hose into the tank and starts a siphon. The table below represents the relationship between the gallons of water remaining in the tank ( $y$ ) after  $x$  hours.

X Time (hours)	0	1	2	3	4	5	6	7
Y Water (gallons)	175	150	125	100	75	50	25	0

- a) Identify the  $x$  and  $y$ -intercepts in the table. Explain their meaning in the context of the situation.
- b) Write an equation that represents the relationship displayed by the table. What does the rate of change tell us?

- 2) Pictured below are two receipts from Super Clean Car Wash. There is a linear relationship that exists between the charge and the time spent (in minutes) to wash a car.

**SUPER CLEAN  
CAR WASH**

Date: 12 - 2 - 13

Start Time: 01:55 pm

Stop Time: 02:05 pm

Charge: \$7.00

**SUPER CLEAN  
CAR WASH**

Date: 12 - 7 - 13

Start Time: 09:30 am

Stop Time: 09:50 am

Charge: \$12.00

Write a linear equation relating the time it takes ( $x$ ) and the charge incurred ( $y$ ) by a person getting his/her car washed at Super Clean. What does the slope and  $y$ -intercept represent in your equation?

- 3) A truck driver is traveling from Sacramento to Reno. After 1 hour, the driver is 84 miles from Reno. After 2 hours, the driver is 36 miles from Reno. Assuming the driver is traveling at a constant rate, write a linear equation that relates the time passed since leaving Sacramento to the driver's distance from Reno. Explain the meaning of the slope and  $y$ -intercept in your equation.

Linear relationships can be modeled by graphs, tables and equations. Every linear relationship displays a *constant* \_\_\_\_\_. The rate of change and the \_\_\_\_\_ of a linear equation help us make sense of the relationship between the two variables (input and output).

**8 Algebra CC**

**HW #**

- 1) The height of a Willow Oak tree over a 20 year period is modeled by the table below.

<b>X</b> Time (years)	0	5	10	15	20
<b>Y</b> Height (feet)	3	10.5	18	25.5	33

- a) Write an equation that represents the linear relationship between height and time. Explain the meaning of the y-intercept and slope in your equation.

- b) Using your equation determine when the tree will reach its maximum height of 60 feet.

- 2) Carla borrowed \$4500 to pay her tuition bill. She makes monthly payments of equal amounts towards her loan. After 3 payments, she owed \$1800. It took her a total of 5 payments to pay the entire bill. Write an equation that represents the amount of money Carla owes ( $y$ ) after making  $x$  payments. Explain the meaning of the rate of change and y-intercept.