U11- 7 Writing Linear Equations for Word Problems

When a word problem involves:

- **A constant rate or speed (m)** &
- **A beginning amount (b),** it can be written in slope-intercept form: $y = mx + b$**.**

To do this, recognize which number will represent *m*, the rate, and which number will represent *b*, the y-intercept.

m is the _____ or _____

b is the _____ or _____

Example 1:
An airplane 30,000 feet above the ground begins descending at the rate of 2000 feet per minute. Assume the plane continues at the same rate of descent. The plane's height and minutes above the ground are related to each other.

a) Identify the variables in this situation:

m = _____ How fast is the plane descending? What is the rate?

b = _____ How high is the plane when it starts to descend?

x = _____ Measure of time? (years, months, weeks, days, hours, minutes, seconds etc)

y = _____ What unit is the y-intercept (b) being measured in?

b) Write an equation to model the situation:

y = mx + b.

Substitute "m" and "b" into the equation:

y = _____x + _____

y represents _____

&
x represents _____

c) Use your equation to find the altitude of the plane after **5 minutes**.

Example 2:
Suppose you receive $100 for a graduation present, and you deposit it in a savings account. Then each week thereafter, you add $5 to the account but no interest is earned. The amount in the account is a function of the number of weeks that have passed.

a) Identify the variables in this situation:

m = _____ How much are you saving per week?

b = _____ How much money did you start with?

x = _____ Measure of time? (years, months, weeks, days, hours, etc.)

y = _____ What unit is the y-intercept (b) being measured in?

b) Write an equation to model the situation:

y = mx + b.

Substitute "m" and "b" into the equation:

y = _____x + _____

y represents _____

&
x represents _____

c) Use your equation to find when you will have **$310** in the account

Example 3:
Nick is given $50 to spend on a vacation. He decides to spend $5 a day. The amount Nick has left and the number of days are related.
Identify the variables in this situation:

m = _____ How much is Nick spending a day?

b = _____ How much money did Nick start with?

x = _____ Measure of time? (days, hours, minutes, seconds etc)

y = _____ What unit is the y-intercept (b) being measured in?

a. Write an equation relating *x* and *y*.

b. Use your equation to find out when Nick will have $15 left.

Example 4:
The math department leases a copy machine. Each month, the department has to pay $1500 plus $0.02 per copy for each copy made.

a) Write a linear equation to compute the total monthly bill the math department has to pay if x is the number of copies made.

x = _____ y = _____ m = _____ b = _____

b) Use your equation to compute the copy bill if the department makes 35,000 copies in a particular month.

Example 5:
A phone company charges a flat rate of $25 per month. In addition they charge $0.05 for each minute of service.

a. Write a linear equation for the monthly charge based upon the number of minutes of service each month.

x = _____ y = _____ m = _____ b = _____

b. What will be the charge for 100 minutes of service?

c. You can afford a $55 phone bill each month. How long can you afford to talk on the phone each month?