Typeset by Jonathan Rufo Bacolod using LaTeX

## Lesson 1.7.1: Solving Problems Involving Linear Equations

**Motion-related Problems:** Problems that make use of the formula $d = ax + b$, where

- $d$ = distance
- $a$ = constant rate the object is moving per unit time
- $x$ = time the object has moved
- $b$ = initial distance

**How to Solve Motion-related Problems Involving Linear Equations:**

1. Read, understand, and analyze the problem.
2. Use the facts of the problem to form a working equation.
3. Solve the equation.

**How to Solve Problems Involving Linear Equations that have Constant Rate:**

1. Read, understand, and analyze the problem.
   (a) Determine the dependent variable $y$ and independent variable $x$ in the problem.
   (b) Compute for the slope: $m = \dfrac{\text{dependent variable}}{\text{independent variable}} = \dfrac{y}{x}$.
   (c) Determine the initial state $b$ of the dependent variable.
2. Use the facts of the problem to form a working equation.
3. Solve the equation.

### Practice Exercises 1.7.1

Solve the each problem completely.

1. Eugene was engaged in reading his favorite Manga while going to his 5th class. Unknowingly, Jenny who is 50 meters away coming from the opposite direction is also reading her report for her next class. If the distance between them is gradually getting smaller by one meter per second, how long will it take before they bump into each other?
2. A cell phone repairman charges P150 for a repair service, plus 50 for each hour of work. How much will the repairman charge if he works for 5 hours?
3. Two trains start from the same station at the same time, train A is going north bound while train B is going south bound. After 5 minutes the trains are 10km apart, in 15 minutes they are 30km apart. How many minutes will it take for the trains to be 50km apart?
4. A dress maker charges P750.00 for sewing a seat cover with a minimum of 20 pieces, plus P100.00 per seat cover cloth. How much will it cost if you will order 20 seat covers?
5. A tricycle passenger is charged P20.00 for the first ten kilometers and an additional of P3.00 per succeeding kilometers. What is the cost of a 25 kilometers ride?

### Activity 1.7.1

Solve the each problem completely.

1. A small company buys computer equipment for 200,000 pesos. After 2 years the value of the computer equipment is expected to be 120,000 pesos. What linear equation can be used to assess the value $V$ of the equipment given a time $t$ in years after it is bought? What will be the value of the computer equipment 4 years after it was bought?
2. The distance between two towns is 380 km. At the same moment, a passenger car and a truck start moving towards each other from different towns. They meet 4 hours later. If the car drives 5 kph faster than the truck, what are their speeds in kilometers per hour?
3. A long-distance runner started a course running at an average speed of 6 mph. One and one-half hours later, a cyclist traveled the same course at an average speed of 12 mph. How long after the runner started did the cyclist overtake the runner?
4. A multicab passenger is charged P10 for the first 4 km and an additional P2 per succeeding kilometer as fare. What is the cost of a 28-km ride?
5. Reena begins to save for a new pair of shoes that cost P2,375.00. She already has P500.00 and plans to save P75.00 per week. How long will it take her to save the amount for the shoes?

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