MFM2P – Equations of Lines – Day 10: Real Word Applications

You can determine the equation of a real world situation given a certain amount of information.

Steps:

1. Identify the Dependent Variable and Independent Variable for your situation.
2. Translate the information you are given into points, a slope, and/or a y-intercept.
3. Use the processes outlined in class and the slope-intercept form equation $y = mx + b$ to determine the equation of your real life situation.

Example 1

You and your friends have decided to rent out the Bracebridge bowling alley for a birthday party. The bowling alley charges a *secret* fixed cost plus $2.50 per person. The **total** cost for 8 people is $26. (first determine the secret fixed cost / initial value)

Determine an equation to represent the situation.

Independent Variable	Dependent Variable
Number of People	Cost ($)

slope / rate of change = 2.50 (m)

we have a point $(x, y) = (8, 26)$

$y = mx + b$

$26 = (2.5)(8) + b$

$26 = 20 + b$

$-20 \quad -20$

$6 = b$

∴ the initial cost is $6

$y = 2.5x + 6$

OR

$C = 2.5p + 6$

where C is cost, p is number of people

Example 2

You just started a new job as a Saturday morning paperboy/girl. You get paid $10 for the day plus $0.50 per paper you deliver.

Determine an equation to represent the situation.

Independent Variable	Dependent Variable
Number of papers delivered	Earnings ($)

$E = 0.5p + 10$, E is earnings

p is number of papers delivered

Example 3

You are conducting a Spring-time temperature study and you lost a bunch of your data! All that's left is the temperature recordings for two different days. According to your notes, the temperature on Day 4 was 2°C and on Day 12 was 14°C. (two points!)

Determine an equation to represent the situation.

Independent Variable	Dependent Variable
Day number	Temperature (°C)

We have two points: (4, 2) and (12, 14)
x_1 y_1 x_2 y_2

$m = \frac{14-2}{12-4}$

$m = \frac{12}{8}$

$m = \frac{3}{2}$

$m = 1.5$

$y = mx + b$
use point (1)

$2 = (1.5)(4) + b$

$2 = 6 + b$

$-6 \quad -6$

$-4 = b$ initial value is -4°C

$y = 1.5x - 4$ OR $T = 1.5d - 4$

T: temperature; d: day number

Example 4

A child starts with a jar of 50 jelly beans. After 3 days there are 29 jelly beans left. (two points)

Determine an equation to represent the situation.

Independent Variable	Dependent Variable
Day number	# of jelly beans

We have two points again: (0, 50) and (3, 29)
x_1 y_1 x_2 y_2

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{29-50}{3-0}$

$m = \frac{-21}{3}$

$m = -7$

→ Note: we could find the initial value using $y = mx + b$... BUT we already have it! "a child starts with 50 jelly beans"

initial value

$y = -7x + 50$

OR

$J = -7d + 50$

J: # of jelly beans; d: day number