

Notes: Applications of Linear Functions

- 1) The cost of internet access at a café is a function of time. The cost for 8, 25 and 40 minutes are shown. Write an equation in slope intercept form that represents the function. Then find the cost of surfing the web at the café for one hour.

Time (min)	8	25	40	x
Cost (\$)	4.36	7.25	9.8	y

Given table/points \Rightarrow Find slope $\frac{\Delta y}{\Delta x} = \frac{9.8 - 7.25}{40 - 25} = \frac{2.55}{15} = .17$

$$m = \$.17 \text{ per minute}$$

Now you have points + a slope \Rightarrow Point-Slope Form

$$(40, 9.80) \quad m = .17$$

$x_1 \quad y_1$

$$y - 9.80 = .17(x - 40)$$

$$y - 9.80 = .17x - 6.80$$

$$\boxed{y = .17x + 3}$$

There is a \$3 charge to use the computer plus \$.17 per minute

- 2) The charge for a one day rental of a car is \$24 plus 15 cents for each mile driven.
- Write a function rule to express the rental cost as a function of the number of miles driven.
 - Find the cost for driving 85 miles.
 - Use your function rule to find how many miles you can drive for a charge of \$42.

slope: \$.15 per minute y-intercept: \$24

Given slope and intercept \Rightarrow Slope-Intercept Form

$$a) y = .15x + 24$$

$$b) y = .15(85) + 24$$

\$36.75 for 85 mile trip

$$c) 42 = .15x + 24$$

$$18 = .15x$$

$$x = 120$$

Drive 120 miles for \$42

- 3) A pool is being draining at a constant rate. The amount of water in the pool is a function of the number of minutes the pool has been draining, as shown in the table. Write an equation in slope - intercept form that represents the function. Then find the amount of water in the pool after 2 and a half hours.

Time (min)	12	20	50
Volume (gal)	4962	4754	3974

$$\frac{\Delta y}{\Delta x} = \frac{3974 - 4754}{50 - 20}$$

$$= -26$$

(losing 26 gallon per minute)

$$m = -26 \quad (12, 4962)$$

$$y - 4962 = -26(x - 12)$$

gallons remaining after x minutes \rightarrow $y = -26x + 5274$
 rate of change \uparrow \uparrow # of minutes \leftarrow initial # of gallons

2.5 hours

$$y = -26(150) + 5274$$

$y = 1,374$
gallons left

- 4) A plumber charges \$110 for a 3 hour job and \$160 for a five hour job.
 a) Write a function to express the plumber's charge as a function of the hours worked.
 b) Use your function rule to find the cost of an 8 hour job.

$$(3, 110) \quad (5, 160)$$

$$\frac{\Delta y}{\Delta x} = \$25 \text{ per hour}$$

$$m = 25 \quad (3, 110)$$

$$y - 110 = 25(x - 3)$$

$$y - 110 = 25x - 75$$

$$a) y = 25x + 35$$

$$b) y = 25(8) + 35$$

$$y = \$235$$

- 5) On a 25 - question test, students receive 4 points for each correct answer. For each incorrect answer, they lost 1 point. For an unanswered question, no points were added or deducted.
 a) Find the best possible score and worst possible score.
 b) Write a function to represent this situation
 c) What will the score be, from 0 - 100, that corresponds to a test result of 18 correct, 5 incorrect and 2 omitted?

points	%
100	100 (All correct)
-25	0 (All wrong)

$$b) \frac{\Delta y}{\Delta x} = \frac{100}{125} = \frac{4}{3}$$

$$m = \frac{4}{3} \quad (-25, 0)$$

$$y - 0 = \frac{4}{3}(x + 25)$$

$$y = \frac{4}{3}x + 20$$

converts points (raw score) to percentage

$$c) 18(4) - 5(1) = 67 \text{ (RAW SCORE)}$$

$$y = \frac{4}{3}(67) + 20$$

$$73.6\%$$