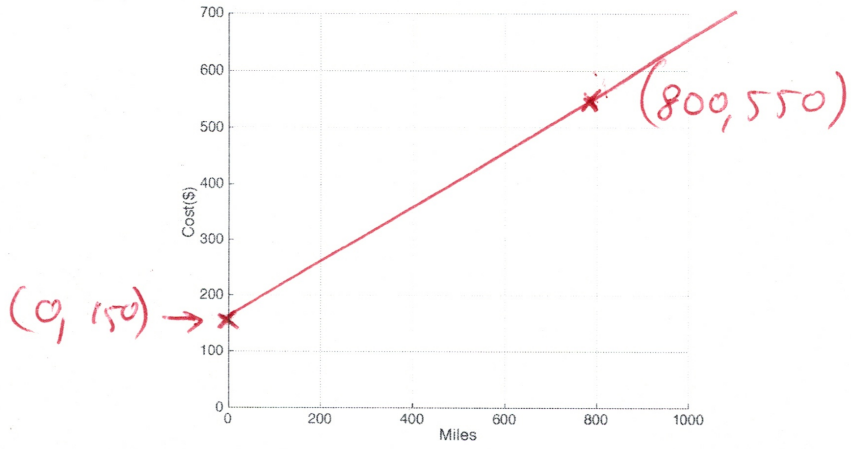
Name:_____ Date:_____

Lines, slopes, and more: Representations

1. A truck rental company charges a **$150** rental fee in addition to a charge of **$0.50** per mile driven.

   a. Graph the linear function relating the total cost of the rental in dollars, **C**, to the number of miles driven, **x**, on the axes below.



   b. If the truck is driven **0** miles, what is the cost? How is this shown in the graph?

0 miles → $150 y-intercept.

   c. What is the slope of the line you drew in (a)? What does it mean in the context of the problem?

Slope is 0.5 [$/mile] For every mile driven, cost up by $0.5.

   d. Write the equation of the linear function that models the relationship between number of miles driven and total rental cost.

$$\text{Cost} = 0.5 \cdot \text{Miles} + 150$$

$$y = 0.5x + 150$$

Slope-Intercept form: $y = mx + b$

y-intercept. 1

Useful for: When you have slope and y-intercept info

2. An online bookseller has a new book in print. The company estimates that if **30** copies of the book will be sold per day, they will make a profit of **$20**. For every additional **1** book sold per day, their profit will increase by **$2**.

a. Identify the ordered pair described in the problem.

$(30 \frac{\text{copies}}{\text{day}}, \$20)$

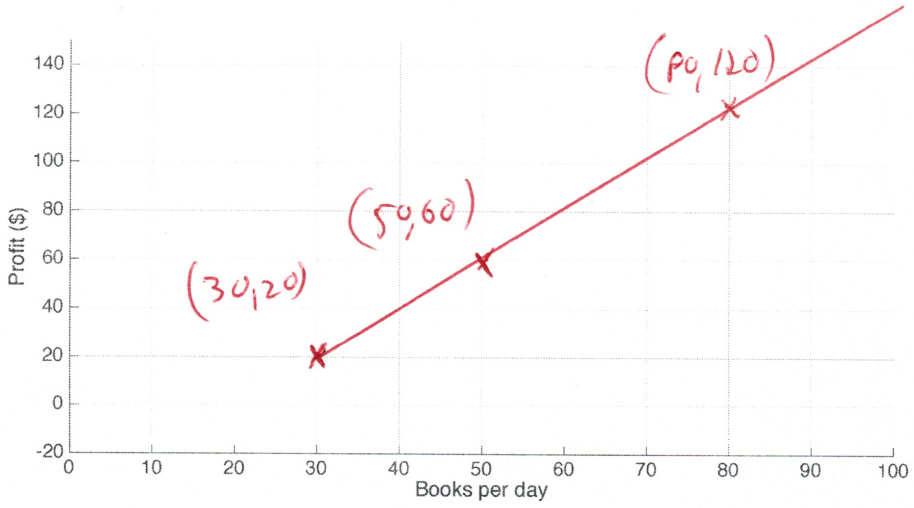
b. If **50** books are sold per day, what would be the profit?

$2 \cdot (50 - 30) + 20 = \boxed{\$60}$

c. If **x** books are sold per day, what would be the profit? Express your result as a function of x.

$2 \cdot (x - 30) + 20$

d. Graph the linear function relating the copies sold per day and the cost of the book.



Point-Slope form:

$(y - y_1) = m(x - x_1)$

Useful for: Point given + slope

3. Jenna bought a **3**-year old car for **$18,000**. A new car cost **$25,500**.

a. Identify the TWO ordered pairs described in the problem.

(3, $18,000) (0, $25,500)

b. Assuming the decrease in car value remains the same over the years. What would be the value of the car after **5** years?

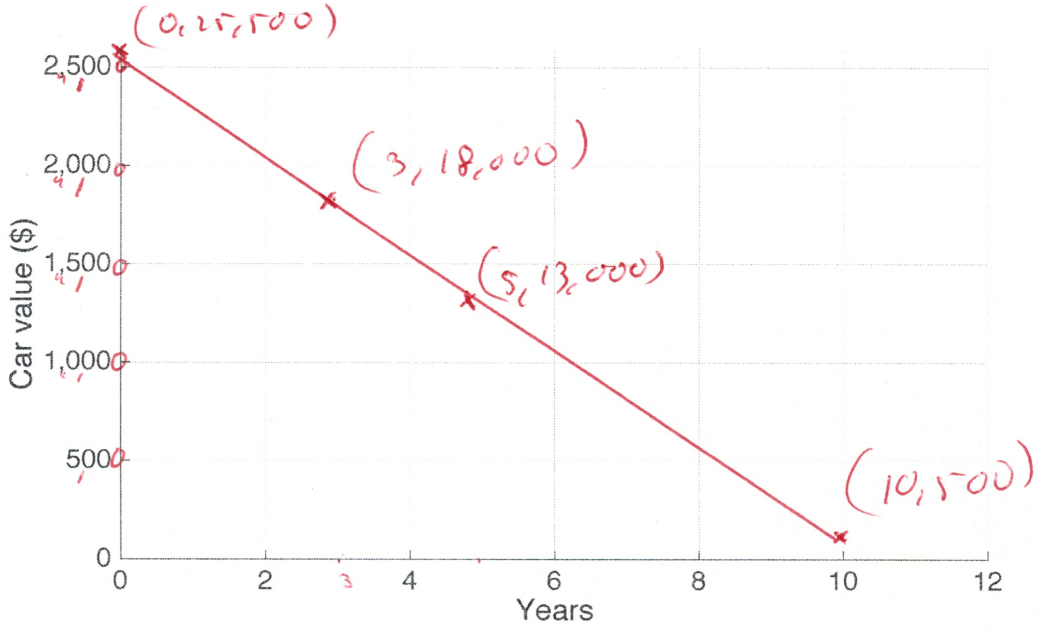
$\text{slope} = \frac{25{,}500 - 18{,}000}{-3} = \frac{7{,}500}{-3} = -2{,}500 \ \frac{\$}{\text{year}}$

$25{,}500 - 2{,}500 \times 5 = 25{,}500 - 12{,}500 = \$13{,}000$

c. What would be the value of the car after **x** years?

$(-2{,}500)(x - 0) + 25{,}500 = 25{,}500 - 2{,}500x$

d. Graph the linear function relating the years passed and the value of the car.



Two-point form: $(y - y_1) = \frac{y_2 - y_1}{x_2 - x_1} \cdot (x - x_1)$

Useful for: Given two points

4. A linear line is described by the equation

$$3x + 5y = 15$$

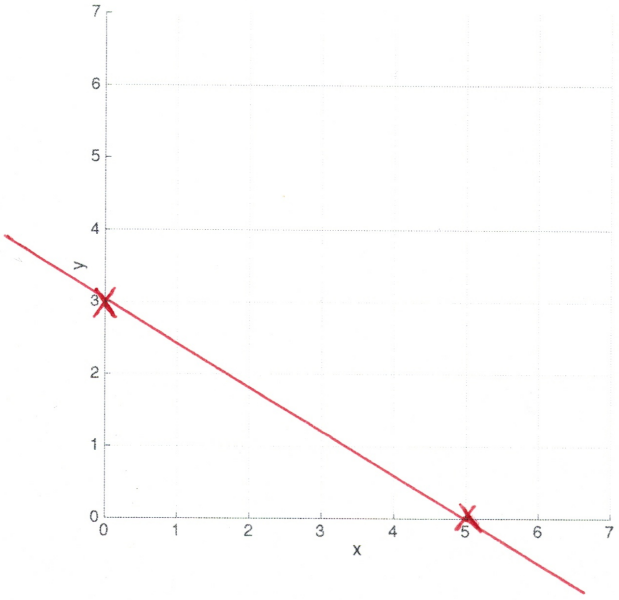
a. Without drawing the line, find the x-intercept.

$x=0 \Rightarrow 5y=15$ $\boxed{y=3}$

b. Without drawing the line, find the y-intercept.

$y=0 \Rightarrow 3x=15$ $\boxed{x=5}$

c. Graph the linear function described above. Mark on the graph the x-intercept and y-intercept.



Standard form: $Ax+By+C=0$ $A \neq 0$ $B \neq 0$

Useful for: Polynomials analysis