Word problems in Slope-intercept form

When a word problem involves a constant rate or speed and a beginning amount, 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

When you are given a rate of change (m) and a starting point (b), use the slope-intercept equation! $y = mx+b$

1. You are visiting Miami, FL and you need to uber to get around. Uber charges a flat fee of $3.00 for using the service and $0.75 per mile.
    (m) (x) (b)

   A. Write an equation that you could use to find the cost of the uber ride in Miami, FL. Let x represent the number of miles and y represent the total cost.

   $y = mx+b$
   A. $y = 0.75x + 3$

   B. How much would a uber ride for 8 miles cost?
      * plug in 8 for x

   B. $y = 0.75(8) + 3$
      $y = 6 + 3$
      $y = \$9$

   C. If an uber ride costs $15, how many miles did the uber travel?
      (y) (x)
      * plug in 15 for y

   C. $15 = 0.75x + 3$
      $\underline{-3 \qquad\quad -3}$
      $12 = 0.75x$

   $\frac{12}{0.75} = \frac{0.75x}{0.75}$

   $16\ miles = x$

2. You are in the city attending a Lil Baby Concert and your car gets towed. There is a $50 pickup fee. They also charge you $25.00 per hour for storage.
    (m) (x) (b)

   A. Write an equation that you could use to the determine the cost of getting towed based on the number of hours of storage. $y = mx+b$ $y = 25x + 50$

   B. How much would it cost to have your car towed and in storage for 2.5 hours?
      * plug in 2.5 for x $\Rightarrow$ $y = 25(2.5) + 50$ $= \$112.50$

   C. If the bill from the tow company is $162.50, how many hours did they have possession of your car? (y) (x)

   * Plug in $162.50 for y, then solve for x.

   $y = 25x + 50$

   $162.50 = 25x + 50$
   $\underline{-50 \qquad\qquad -50}$
   $\frac{112.50}{25} = \frac{25x}{25}$ $\Rightarrow$ $4.5\ hours = x$

3. You hit the lottery for $30,000. You buy a new pair of retro Jordan's every month for $500. If you continue to spend that same amount every month: $(m) = -500$
                                                                                                 (x)

   starting point (b)

   A. Write an equation to model the situation.

   B. Find out how much money you have after 5 months.
      * plug in 5 for x

   $y = mx+b$

   $y = -500x + 30,000$

   $y = -500(5) + 30,000$

   $y = -2500 + 30,000$

   $y = \$27,500$

Practice

1. Mirna is tracking the progress of her puppy's growth. Today the puppy is 13 inches tall. The puppy grows 1.5 inches per month.

$\underset{m}{\underline{1.5\text{ inches}}}$ per month. $\underset{(x)}{}$ $\quad$ starting → b

    A. Find an equation that represents the puppy's height after any given number of months.

                                        $y = 1.5x + 13$

    B. How tall is the puppy after 9 months?

$$y = 1.5(9) + 13$$
$$y = 13.5 + 13$$
$$\boxed{y = 26.5 \text{ inches}}$$

2. An internet service provider charges $18 per month plus an initial set –up fee. One customer paid a total of $81 after 2 months of service.

$\underset{y}{} \quad \underset{x}{} \qquad \underset{\text{rate} = m}{\underline{\text{rate} = m}} \qquad \underset{b}{\underline{b}}$

    A. Write an equation modeling this situation.   A. $81 = 18(2) + b$

    B. What is the initial set-up fee?   B. $81 = 36 + b$

    C. How much does it cost after 5 months of service? $\boxed{45 = b}$

new equation: $\quad y = mx + b$
$$y = 18x + 45$$
$$y = 18(5) + 45$$
$$y = 90 + 45$$
$$\boxed{y = \$135}$$

3. Your gym membership costs $33 per month after an initial membership fee. You paid a total of $228 after 6 months.

$\underset{\text{rate} = m}{\underline{\underset{(x)}{\$33\text{ per month}}}} \qquad \underset{b}{\underline{\text{initial membership fee}}}$

    A. Write an equation that gives you the total cost related to the months of your gym membership.

    B. Find the total cost after 9 months.

① Solve for b:
$$y = mx + b$$
$$228 = 33(6) + b$$
$$228 = 198 + b$$
$$\underline{-198 \quad -198}$$
$$30 = b$$

$$y = 33(9) + 30$$
$$y = 297 + 30$$
$$\boxed{y = \$327}$$

② new equation:
$$\boxed{y = 33x + 30}$$