

**Point-Slope Form Word Problems**

1) The table shows the altitude of a hot-air balloon during its linear descent. What equation in slope-intercept form gives the balloon's altitude at any time? Start with point-slope form.

X: Time (s)	Y: Altitude (m)
10	640
30	590
70	490
90	440

$$m = \frac{-50}{20} = -2.5 \quad m = \frac{-100}{40} = -2.5$$

point: (10, 640)  
 $x_1 \quad y_1$

$$y - 640 = -2.5(x - 10)$$

$$y - 640 = -2.5x + 25$$

$$\begin{array}{r} +640 \\ \hline \end{array} \quad \begin{array}{r} +640 \\ \hline \end{array}$$

$$y = -2.5x + 665$$

What does the slope represent?

The balloon goes down  
 @ -2.5 meters per second  
 (-2.5 m/s)

What does the y-intercept represent?

b = 665  
 balloon starts (time = 0) @  
 an altitude of 665 m.

2) You are an avid coin collector. You decide to start keeping better track of your coin collection. After 15 days, you count and find out you have 155 coins. After 22 days, you have a total of 218 coins.

a. Write an equation in point-slope form that represents the situation. Define your variables.

x: Days (15, 155) (22, 218 coins)  
 $x_1 \quad y_1 \quad x_2 \quad y_2$   
 y: Coins

$$m = \frac{155 - 218}{15 - 22} = \frac{-63}{-7} = \frac{9}{1} = 9$$

b. Convert your equation to slope-intercept form.

$$y - 155 = 9(x - 15) \Rightarrow \text{point - slope}$$

$$y - 155 = 9x - 135$$

$$\begin{array}{r} +155 \\ \hline \end{array} \quad \begin{array}{r} +155 \\ \hline \end{array}$$

$$y = 9x + 20 \Rightarrow \text{slope - intercept}$$

c. What does your slope represent?

$$m = \frac{\Delta y}{\Delta x} = \frac{\text{Coins}}{\text{day}} = \text{you collect 9 coins per day}$$

d. What does the y-intercept represent?

$$y = mx + b$$

b = 20 you start @ 20 coins  
 $x = 0$

e. After 30 days, how many coins would you have?

$$x = 30 \quad 9(30) + 20$$

$$y = 270 + 20$$

in 30 days  
 you have  
 290 coins

f. After how many days would you have 425 coins?

$$y = 425 \Rightarrow 425 = 9x + 20$$

$$\begin{array}{r} -20 \\ \hline \end{array} \quad \begin{array}{r} -20 \\ \hline \end{array}$$

$$\underline{405} = 9x \quad (45 = x)$$

45 days  $\Rightarrow$  425 coins

3) You figured out you could make \$50 per pool to clean pools during the summer. You did, however, need to purchase some equipment to get started. After cleaning 3 pools, you were still down \$15.

a. Write an equation in point-slope form that represents the situation. Define your variables.

$x$ : pools  
 $y$ : money (\$)

$m = 50$  points:  $(3, -15)$

$$y - (-15) = 50(x - 3)$$

$$y + 15 = 50(x - 3)$$

$$y + 15 = 50x - 150$$

$$y = 50x - 165$$

b. Convert your equation to slope-intercept form.

$y = mx + b$   $\longrightarrow$

$$y + 15 = 50(x - 3)$$

$$y + 15 = 50x - 150$$

$$- 15 \quad - 15$$

$$y = 50x - 165 = y = mx + b$$

c. What does the y-intercept represent?

$b = -165$  \$ the amount  
 \$165 on equipment  
 to get started.

d. How much money will you have made after cleaning 12 pools?

$x = 12$

$$y = 50(12) - 165$$

$$y = 600 - 165$$

$$y = 435$$

e. How many pools will you have to clean to make \$1100?

$y = 1100$

$$1100 = 50x - 165$$

$$+165 \quad +165$$

$$\frac{1265}{50} = \frac{50x}{50}$$

$$25.3 = x$$