

## Solving Systems of Equations with Substitution

Big Ideas: A "solution" to a set of linear equations (system) is where the lines cross (this is where they are equal).  
Using Substitution is usually best when equations are in slope-intercept form.

Example:

Big T, a t-shirt company, charges \$20 for set-up fee and \$5 a shirt. T's R Us charges a \$80 set up fee and \$4 a shirt.

a. Write a system of equations to represent this situation.

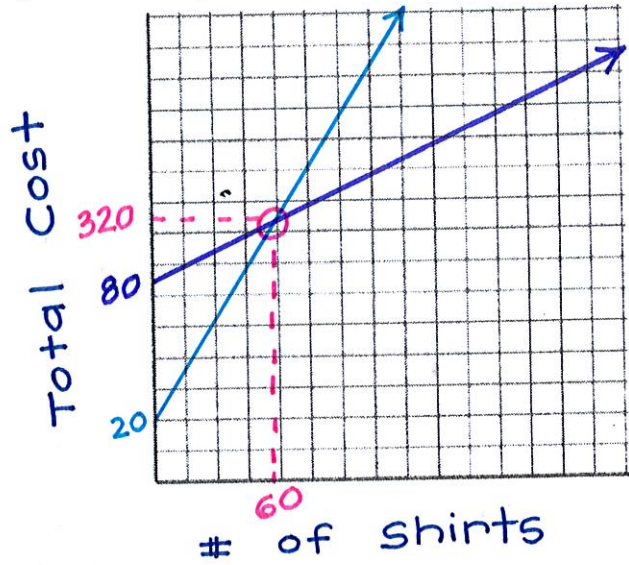
$$y = 5x + 20$$

$$y = 4x + 80$$

b. Sketch a Graph of this situation.

c. Solve this system using substitution to find the "solution," (break-even point). Label this important point on your sketch.

$$\begin{array}{r} 5x + 20 = 4x + 80 \\ -20 \quad -20 \\ \hline 5x = 4x + 60 \\ -4x \quad -4x \\ \hline x = 60 \end{array}$$



d. Which Shirt Company would you choose if you needed 50 shirts? *Big T ... it's cheaper*

e. How much would those shirts cost?

$$5(50) + 20 = 250 + 20 = \text{\$270}$$