

1. The BSU Track Team is planning to sell t-shirts at the NSIC Conference Track Meet. Thunderbird Graphics charges \$25 to set up a screen print with the NSIC Logo (\$25 is called a fixed cost. No matter how many t-shirts they purchase they still need to pay \$25.) and \$5.75 a t-shirt (this cost depends on how many t-shirts they sell, so it is a variable cost.). They plan to sell the t-shirts for \$10 a shirt.

- a. Consider the linear equation that gives the amount spent in terms of the number of t-shirts purchased.

What should the independent variable represent?

What should the dependent variable represent?

Write the linear equation that gives the amount spent in terms of the number of t-shirts purchased.

What is the slope? Write a sentence interpreting the meaning of the slope.

What is the y-intercept? Write a sentence interpreting the meaning of the y-intercept.

- b. Consider the linear equation that gives the amount of money you take in for the sale of the t-shirts. This equation is called your revenue equation.

What should the independent variable represent?

What should the dependent variable represent?

Write the linear equation that gives the amount of money you take in for the sale of the t-shirts.

What is the slope? Write a sentence interpreting the meaning of the slope.

What is the y-intercept? Write a sentence interpreting the meaning of the y-intercept.

- c. The break-even point is where revenue equals cost. Find the break-even point for the NSIC t-shirt problem. Set the revenue equation equal to the cost equation and solve for the number of t-shirts.

$$\text{Revenue} = \text{Cost}$$

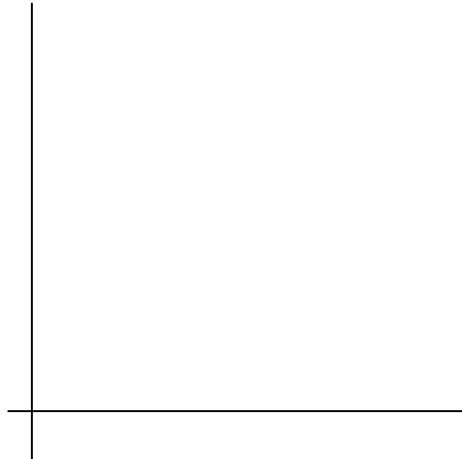
- d. Now let's look at this graphically.  
Click on this address or copy this web address into your internet browser:  
[http://my.hrw.com/math06\\_07/nsmedia/tools/Graph\\_Calculator/graphCalc.html](http://my.hrw.com/math06_07/nsmedia/tools/Graph_Calculator/graphCalc.html)

Be sure Equations is selected. Let  $y_1$  be revenue and  $y_2$  be cost.

Select Settings. Input appropriate values

Press: Graph

Draw a rough sketch of what you see below.



Mark on your graph above where Revenue equals Cost. You found this algebraically. To find the break-even point graphically, Select: Intersection, Click in each box by the equations and then Press: Find Intersection Point(s).

What do you get?                      How does this compare to the break-even point you found algebraically?

- e. When does revenue exceed cost? How would you find this algebraically? graphically?

- f. When does cost exceed revenue? How would you find this algebraically? graphically?
  - g. What is the fewest number of t-shirts the Track Team needs to sell in order to make a profit?
2. Thunderbird Graphics sells different quality t-shirts. The price per t-shirt is \$4.75 for this t-shirt.
- a. What would the cost equation be?
  - b. What is the slope? Write a sentence interpreting the slope.
  - c. What is the y-intercept? Write a sentence interpreting the y-intercept?
  - d. How many t-shirts would the Track Team have to sell to break even?
  - e. How does the number of t-shirts compare to the result you got when the price was \$5.75 a t-shirt?
  - f. What should the BSU Track Team consider as they decide which t-shirt to purchase for the Conference Track Meet?