

1. The price of an item is first discounted by 20% and then marked up by 30%. What is the net percentage change of the price of this item? (Include the appropriate sign on your answer.)
2. When Andre was born, he weighed 14.2 pounds. He was weighed weekly, at the end of the week, for the next year. He gained .975 pounds a week for the first four weeks. The next 6 weeks he gained at a rate of .65 pounds a week. During weeks 11 to 22 he gained .42 pounds per week and for the remainder of the year, his weight gain held steady at .3 pounds per week. Write a function that gives Andre's total weight as a function of his age in weeks.
3. Solve for  $x$ . Give exact solutions (not decimal approximations).
 

$8(1+x)^2=4$	$4(1+x)^5=9$
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4. A certain stock tripled in value in 5 years time. If it rose by the same percentage each year, what was this percentage?
5. The local coffee shop decides to try a new price plan to encourage consumption of their daily blend. They're selling coffee cards on which they can track the number of cups of the daily blend they consume. The plan is as follows:
  - a. You buy the coffee card for \$10. (It is good for one year.) Then, the coffee is \$1/cup for the first 10 cups. For cups 11 to 20, you pay \$0.75/cup. After that it costs \$0.60/cup.
  - b. Let  $n$  be the number of cups consumed and  $C(n)$  be the total cost spent.
  - c. Write the equation for  $C(n)$ .
  - d. Draw the graph using Excel. (You should write a formula using IF statements!)
  - e. If someone drank 104 cups during the year (two per week), what would his average price per cup be?
6. A local business is supporting a fundraiser for a charity. The business has agreed to make a flat donation for every person that makes a contribution to the charity, regardless of their donation amount. The business will donate \$7 for every person that contributes to the fundraiser, for the first 100 people, and \$15 for every person that contributes, after the first 100 people. Write a function that gives the total amount the business will donate as a function of the number of donors to the charity.
7. 13 is 5% of what number? 12 is what percent of 10? What is 8% of 24?
8. Create an interactive table of values for,  $y = -3x + 12$ , using the *Start Value*, *Stop Value*, *# of Steps* and *Step Size* for the table as parameters. Then:
  - a. Graph the function using Scatter Plot
  - b. Change the start value to -5 and the stop value to 10
9. A high school cafeteria is planning a meal that includes chocolate and broccoli. Each serving of chocolate costs \$0.59 and has 7 units of calcium, 8 units of protein, 67 units iron, and 0 units of vitamin C. Each serving of broccoli costs \$0.09 and has 4 units of calcium, 3 units of protein, 4 units iron, and 135 units of vitamin C. From the chocolate and broccoli portion of the meal, each patient must receive 30 units of calcium, 21 units of protein, 100 units of iron, and 100 units of vitamin C. How many servings of chocolate and broccoli should be served to minimize the costs?
10. A company has revenue of \$30 per unit, variable costs of \$9 per unit, monthly fixed costs of \$38,000. Assume that the monthly cost, revenue and profit are linear functions of the production.
  - a. Write a function for cost line, revenue line and profit line.
  - b. Graph the three functions on one axis, making the graph interactive with the *Start Value*, *Stop Value*, etc. as parameters.

- c. Label the break-even point and give its coordinates.
11. A company buys a fleet of 100 cars for its sales force. The fleet costs \$1,500,000. The sales personnel are hard-driving and will wear out the cars in 3 years time, at which point the company plans to sell the whole fleet to a Brazilian used car dealer for \$300,000.
- What is the rate of depreciation in dollars per year for the fleet?
  - Find a formula for the value  $V$  of the fleet after  $t$  years.
  - Create a graph of the equation from part 1. Be sure to use the parameters of start value, stop value, # of steps, and step size. Label the Graph and the axes.
  - Use the equation to answer the following questions.
  - What will the fleet be worth after 2 years?
  - When will the fleet be worth \$992,500? (Use Goal Seek.)
12. Create an interactive table of values for  $y = -2x^2 + 5x - 7$  using the *Start Value*, *Stop Value*, *# of Steps* and *Step Size* for the table as parameters. Then:
- Graph the function using Scatter Plot
  - Change the start and stop values so that the graph shows what happens around the vertex.
13. A food cart carries two products—hot dogs and tamales. The profit on a hot dog is \$0.35 and on a tamale, \$0.25. A hot dog requires 12 in<sup>3</sup> of storage space in the cart and 1 ounce of condiment. A tamale requires 8 in<sup>3</sup> of storage space and .5 ounces of condiment. Suppose the food cart only has 3000 in<sup>3</sup> of storage space in it and room to carry 250 ounces of condiments. How many of each product should they stock the cart with each day if they want to maximize their profits?
14. Use *Goal Seek* to solve the following problems. *Hint: there may be more than one solution.*
- $3^x - 7 = 10$        $3^x - 7 = 10x$