

It Costs What?

Math Instructor Notes

- Course Level/Topic: Pre-algebra/Percent Application
- Time Required: 20 – 30 minutes
- Prerequisite Knowledge:
 - Multiplication and division of decimals
 - Converting percents to decimals
- Brief Description: Using the standard percent increase and decrease formulas students will look at the pricing of college materials. Many college bookstores use the relationship: $Price = \frac{cost}{(1 - markup\%)}$ and this formula will also be used to determine pricing. This gives students a different way to look at pricing which requires using division instead of just multiplication and addition.
- General Notes: Many college bookstores use this second method to determine the price to students for the materials bought in the bookstore. You might want to check with your college bookstore to determine the method used. These prices were calculated by the San Diego Mesa College Bookstore for materials which they sell.
- Follow Up/ Discussion Questions:
 - Assuming your textbooks had a 25% mark-up, reference materials had a 40% mark-up and supplies such as paper, pens, etc. had a 50% mark-up, how much of the cost of your books and supplies for this semester went to supporting the bookstore?
 - Students can research the mark-up used by stores in their area on items of interest.

It Costs What?

Name(s): _____ KEY _____

The price of an item is determined by the cost plus an additional charge to cover the expense of doing business and to make a profit. In general, Prealgebra texts and many businesses use the percent of increase method to determine the price of an item. This involves taking a percent of the cost and adding that amount to the original cost to determine the price.

Method 1: $\text{Price} = \text{cost} + (\text{markup}\% \times \text{cost})$

Example: A book costing \$100 with a 25% mark-up would be priced at:

$$\text{Price} = \$100 + (0.25)\$100 = \$100 + \$25 = \$125$$

However, many college bookstores use the following relationship:

Method 2: $\text{Price} = \frac{\text{cost}}{(1 - \text{markup}\%)}$ and then round to the nearest nickel.

Example: A book costing \$100 with a 25% mark-up would be priced at:

$$\text{Price} = \$\frac{100}{1 - 0.25} = \$\frac{100}{0.75} = \$133.333 \text{ rounded to } \$133.35$$

Note that this alternative method yields a higher price to the student!

1. The combined beginning and intermediate algebra textbook costs \$99.50 and has a 25% mark-up.

What is the price to the student using method 1? \$124.38

What is the price to the student using method 2? \$132.65

What is the difference between the prices? \$8.27

2. Books which cannot be returned to the publisher for a variety of reasons may have a 30% mark-up. A pre-algebra book which costs \$72.00 cannot be returned because of the cd that comes with the book.

What is the price to the student using method 1? \$93.60

What is the price to the student using method 2? \$102.85

What is the difference between the prices? \$9.25

3. General study guides and reference materials have a 40% or greater mark-up. The Merrian Webster Language reference set costs the bookstore \$11.10 and has a 40% mark-up.

What is the price to the student using method 1? \$15.54

What is the price to the student using method 2? \$18.50

What is the difference between the prices? \$2.96

4. The English Grammar reference card is priced at \$4.95 and has a 50% mark-up, what was the cost to the bookstore if they used method 2 to determine the price? \$2.48

The sale price of an item is determined by the current price minus a mark-down which is generally lower than the original mark-up.

$$\text{Sales price} = \text{current price} - (\text{mark-down}\% \times \text{current price})$$

Example: A book costing \$100 was priced at \$133.35 and now is on sale with a 20% mark-down.

$$\text{Sales price} = \$133.35 - (0.20) \$133.35 = \$100 - \$26.67 = \$106.68$$

5. The algebra textbook in problem #1 is now going on sale at 20% off. Using the price you obtained from method 2, what is the sales price?
\$106.16
6. The English Grammar reference card reference set in problem #4 is now going on sale at 25% off. Using the price you obtained from method 2, what is the sales price? \$3.71
7. The Super Review for Algebra and Trigonometry cost the bookstore \$4.48 and was priced at \$8.95 using method 2. It is now on sale for 45% off, is the bookstore losing money? NO - New price is \$4.92