

Business Math

Unit: Business of Textiles

Problem Area: Core Skills

Lesson: Business Math

■ **Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1 Calculate open to buy (OTB) budgets.**
- 2 Calculate gross margin.**
- 3 Calculate markups and markdowns.**
- 4 Calculate sales tax.**
- 5 Take basic body measurements.**
- 6 Use mental math.**

■ **Resources.** The following resources may be useful in teaching this lesson:

E-unit(s) corresponding to this lesson plan. CAERT, Inc. <http://www.mycart.com>.

"Children's Clothing Size Conversions," *USA Tourist*. Accessed May 16, 2014.
<http://www.usatourist.com/english/traveltips/shopping/shopping-childrens-sizes.html>.

Fetters, K. Aleisha. "How to Measure Bra Size," *Women's Health*. Access May 16, 2014.
<http://www.womenshealthmag.com/style/bra-size>.

"Men's Clothing Size Conversions," *USA Tourist*. Accessed May 16, 2014.
<http://www.usatourist.com/english/traveltips/shopping/shopping-mens-sizes.html>.

"Open to Buy Calculator," *CSGNetwork.com*. Accessed May 16, 2014.
<http://www.csgnetwork.com/opentobuycalc.html>.



Schaefer, Kayleen. "How to Get a Perfect Hem," *Details*. Accessed May 16, 2014.
<http://www.details.com/style-advice/perfect-wardrobe/200705/how-to-get-a-perfect-hem-photos#intro>.

"Women's Clothing Size Conversions," *USA Tourist*. Accessed May 16, 2014.
<http://www.usatourist.com/english/traveltips/shopping/shopping-womens-sizes.html>.

■ **Equipment, Tools, Supplies, and Facilities**

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

■ **Key Terms.** The following terms are presented in this lesson (shown in bold italics):

- big
- Euro sizes
- gross margin
- gross profit
- gross profit margin
- initial markup
- inventory
- junior
- markdowns
- markup
- markup percentages
- mental math
- missy
- on order
- open to buy (OTB)
- petite
- planned BOM
- planned EOM
- planned sales
- plus size
- regular
- sales revenue
- sales tax
- short
- tall
- vanity sizing
- women's

- **Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Share the following with your students: According to glassdoor.com, applicants for a job at Century 21 department store in New York City must complete and pass a math test as part of the hiring process. Sales associates must calculate discounts and markups on the floor. In addition to helping customers, associates need to protect the business by understanding when sales are rung incorrectly.

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Calculate open to buy (OTB) budgets.

Anticipated Problem: How is OTB calculated?

- I. **Open to buy (OTB)** is a financial budget for retail merchandise. It is a slang term for an inventory-buying plan.
 - A. **Inventory** is an itemized list or catalog of the stock (tangible goods, products, or services) of a retail business. Inventory control answers these questions: “What should be purchased?” “When should it be purchased?” “How much should be purchased?” Tracking inventory levels is as important as what to buy to improve purchasing processes. OTB is the dollar amount budgeted for merchandise purchases for a specific time period. It is the difference between how much merchandise (inventory) the business requires and how much is actually available. Available means inventory on hand, in transit, and any outstanding orders. To maintain an adequate inventory “on hand,” the OTB plan projects inventory and sales figures. The plan is based on future projected sales. For businesses with a sales history, the previous year’s figures can be used to calculate the projection. Open to buy is similar to a budget in that it uses estimates to come to the final projected figures for a time period.
 1. An open to buy strategy is a tool. It works especially well for fashion industry retailers because it takes into account seasonal changes in merchandise and predetermined markdowns. It helps the retailer answer: “How much should I buy?”
 2. Too much inventory during certain periods slows cash flow and may reduce profits with too many markdowns.
 3. Too little inventory opens the business to lost sales opportunities and perhaps missed profit goals.

4. Businesses need a way to calculate the optimal amount of inventory for a given period of time. An open to buy strategy fulfills that goal.
- B. Open to buy formula
1. $\text{OTB (retail)} = \text{Planned Sales} + \text{Planned Markdowns} + \text{Planned EOM Inventory} - \text{Planned BOM Inventory} - \text{On Order}$
 2. **Planned sales** are the anticipated sales for a given period of time based on retail sales trends and planned increases over a period of time. Planned sales figures are in retail dollars. The business projects the total retail dollars it would earn selling merchandise. The timeframe may be estimated in any increment but often projects out for 12 months.
 3. Planned markdowns reduce the amount of inventory and retail dollars coming into the retailer. Markdown inventory usually has been on the selling floor for a few months. Typically, markdowns occur when new seasonal merchandise is scheduled to be placed on the selling floor. Last season's merchandise needs to "make room" for new products. Discounts can be included here or subtracted in a separate line. Discounts include the dollar amount for employee discounts and promotions.
 4. **Planned BOM** is an estimate of inventory on hand at the beginning of the month.
 5. **Planned EOM** is an estimate of inventory on hand at the end of the month.
 6. **On order** is the amount of inventory set for delivery to a store in a particular month.

Teaching Strategy: Use VM-A to lead a discussion. Then ask how employee discounts may benefit or hurt the business's bottom line.

Objective 2: Calculate gross profit margin.

Anticipated Problem: How is gross profit margin calculated?

- II. **Gross profit margin** is a company's total sales revenue minus its cost of goods sold, divided by the total sales revenue, expressed as a percentage.
 - A. The gross profit margin represents the percent of total sales revenue that the company retains after paying the cost of goods sold (COGS) required to produce the goods and services sold by a business. To calculate gross profit margin, it is necessary to divide gross profit margin by sales. Gross profit margin is expressed as a percentage. The higher the percentage, the more the company is able to retain of each dollar of sales as profit. For example, a gross profit margin percent of 25 means the company keeps 25 cents of every dollar of revenue.
 1. $\text{Gross Profit Margin \%} = \text{Gross Profit} \div \text{Sales Revenue}$
 2. **Gross profit** is a company's revenue minus the cost of goods sold (COGS). It is the remaining profit after selling a product or service and deducting the

costs associated with the product's production and sale. Gross profit is calculated as Sales Revenue – COGS.

3. **Sales revenue** is the dollar amount generated by a company after deducting returns, allowing for damaged or missing goods and any allowed discounts. Sales revenue is calculated as Sales Revenue – Returns.
4. Case study: Gross margin percentage of "The Unique Boutique"
 - a. Sales revenue is \$75,000.
 - b. The cost of goods sold (COGS) is \$50,000.
 - c. It is important to calculate Unique Boutique's gross profit margin percent.
 - (1) $\text{Sales Revenue} - \text{COGS} \div \text{Sales Revenue}$
 - (2) $\$75,000 - \$50,000 = \$25,000$
 - (3) $\$25,000 \div \$75,000 = 0.3333$
 - (4) Gross profit margin = 33 percent

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM-B to review. Ask students to brainstorm ways stores could turn returns into sales.

Objective 3: Calculate markups and markdowns.

Anticipated Problem: How are markups and markdowns calculated?

III. Markups and markdowns

A. Markups

1. **Initial markup** is the average price increase required on any product to cover the cost of the item, expenses, and a reasonable profit. A common method is doubling the cost of an individual product to arrive at the selling price. $\text{Initial Dollar Markup} = (\text{Operating Expenses} + \text{Price Reductions} + \text{Profit}) \div (\text{Forecasted Sales Revenue} + \text{Price Reductions})$
2. **Markup** is a percentage added to the item's cost to arrive at a retail-selling price. It is the difference between the cost of the good or service and its selling price. A markup is added to the total cost incurred by the producer of a good or service in order to create a profit.
 - a. $\text{Markup Amount (\$)} = \text{Retail Price} - \text{Item Cost}$
 - b. $\text{Markup Percent (\%)} = \text{Markup Amount} \div \text{Retail Price}$
3. Setting prices for inventory can be tricky. When goods are priced too low, a business may not be able to sustain a profit. In contrast, when goods are priced too high, customers will visit the competitors for a better deal. Completing Internet research and/or shopping at competitors' stores provides current pricing data.
4. Various industries have different markup percentages. For instance, the markup on software is much higher than the markup on fabric. A 40-yard bolt of fabric costs the fabric retail store \$2 per yard to purchase. The bolt cost to

the retailer is \$80. A common markup for a bolt of fabric is 150 percent. To calculate the markup on the fabric:

- a. $\$2/\text{yard} \times 150\% = \$3$
- b. $\$2 + \$3 = \$5/\text{yard}$ selling price
- c. $\text{Revenue/bolt} = 40 \text{ yards} \times \$5/\text{yard} = \$200$
- d. $\text{Profit/bolt} = \$200 - \$80 = \$120$ with no discounts

B. **Markdowns** are planned reductions in the selling price of an item; a discount from the suggested retail price. Markdowns are usually limited to a number of days and often are initiated within a certain number of days after new seasonal merchandise is received. Markdowns are typically permanent discounts that encourage customers to purchase inventory at a reduced price for the retailer to make room for new merchandise.

1. $\text{Markdown Price} = \text{Retail Price of Good} - (\text{Markdown Percent} \times \text{Original Retail Price})$
2. Swimsuit sale: The original floor price of a swimsuit is \$120. In August, swimsuits are marked down to 60 percent off the original price. The markdown price to the customer is calculated as:
 - a. $\$120 - (0.60 \times 120) = \text{Markdown price}$
 - b. $\$120 - \$72 = \$48/\text{swimsuit}$ markdown price
3. Stores may have inventory that is not selling as planned or there may be inventory from a past season left in stock. For example, Macy's Chicago may have winter boots in inventory in March that arrived in the store in November. Fashion retail is forward thinking, so spring merchandise would be leading on the display floor in March. The company wants to sell the winter boots left in stock. To entice customers to buy a product still in stock past the planned time, the company would markdown the item.

C. Customers that frequent a specific retail chain or store become familiar with that company's markdown strategy. For instance, Target's post-holiday sales are busy and active. At the end of the year, customers can find wrapping paper, lights, décor, and many other seasonal items at deep discounts of up to 70 percent off the original price. Stores normally follow a schedule and a predictable strategy on seasonal merchandise. The strategy is deeper and deeper cuts as the product becomes further from the floor set of the merchandise.

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM-C. Ask students to discuss their best shopping strategies related to markdowns.

Objective 4: Calculate sales tax.

Anticipated Problem: How is a sales tax rate calculated?

IV. **Sales tax** is a percentage of the sale of a good that goes to a governing body.

A. Some examples of governing bodies that receive sales tax are municipalities, counties, and states. Sales tax rates differ from one governing body to another. Rates are not the same across the country or within the same state or county. In Illinois, the sales tax rate varies from 6.25 to 9.75 percent, depending on the municipality in which a person resides.

1. Some retail entities, such as the Mall of America in Minnesota, have no sales tax on clothes and shoes because the state of Minnesota does not tax clothing. Frugal shoppers visit specific geographic areas to shop because they can save money.
2. Sales Tax = Price of Good or Service $\times$ Sales Tax Rate. For example, a high school logo hoodie sells for \$22 at a local store. The sales tax rate is 8.75 percent.
 - a. $8.75\% \times \$22$
 - b. $0.0875 \times 22 = \$1.93$
 - c. Customer cost of the hoodie = $\$22 + \$1.93 = \$23.93$

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM-D to review. Ask students to compare sales tax rates in the area. Which of the neighboring municipalities near your home offer bargain sales tax rates? If time permits, have them compare state taxes.

Objective 5: Take basic body measurements.

Anticipated Problem: How are basic body measurements taken?

V. Size charts

- A. One role of the store associate is to assist customers. The associate should know the inventory, be able to locate it, provide product knowledge, and help the customer make an informed selection. Size charts vary from store to store and brand to brand. If the customer does not know his or her size, the associate can take simple measurements with a tape measure to determine the right sizes. The four basic measurements a store associate should be able to take for a customer are bust/chest, waist, hip, and inseam.
- B. Female size categories and fit
1. **Missy** is a standard size range of clothing made to fit the average female with an average bust, average height, and an hourglass figure. It is the most com-

mon size category and is best suited to females 5 feet 4 inches to 5 feet 9 inches.

2. **Petite** is a standard size range of clothing made to fit shorter females. Petite garments have shorter arms, legs, and torso (shorter waist) than the missy size. This size is best suited to females 4 foot 11 inches to 5 foot 3 inches (sometimes 5 feet 4 inches, depending on the brand).
3. **Junior** is a standard size range of clothing for shorter women—5 feet 4 inches to 5 feet 5 inches—with high busts and a relatively straight, slim body through the waist and hips. The shoulders, waist, and thigh are cut smaller than the missy size. Junior designs are youthful and can be trendy.
4. **Women's** is a standard range of clothing sizes for curvier women of average height and sometimes with a lower bust line. **Plus size** is another term for women's clothing. Women's sizes begin at 16W. Category sizes are 1X (similar to extra large with slightly different proportions) and up and parallel increased bust, waist, and hip measurements. Designs can be trendy or classic.
5. Other female sizes
 - a. Tall—Proportionally average bust height and an hourglass figure
 - b. Half-size—Lower bust, shorter back, and an hourglass shape
 - c. **Vanity sizing** is the labeling of clothing with a size smaller than the actual cut of the item. In recent years, men's waist sizes have expanded an average of 2 to 3 inches larger than the label size (e.g., 34-inch waist pants may actually measure between 36 and 37 inches). Women's vanity sizing is even more variable. For instance, a size 8 in one store may be a size 4 in the next or a size 10 in the third store. The downsized labels appear to make customers feel better about themselves. The store gambles that the customers will feel great about their purchases and will be back to buy more.

C. Male size categories and measurement details

1. **Regular** is a standard size range of clothing for a well-proportioned man's body 5 feet 8 inches to 6 feet $\frac{1}{2}$ inch tall, with hips and chest of equal girth (circumference).
2. **Short** is a standard size range of clothing for a short torso or sleeve length and a man 5 feet 3 inches to 5 feet $7\frac{1}{2}$ inches tall. The garment body is 2 inches shorter than the "regular" size.
3. **Tall** is a standard size range of clothing for men 6 feet 1 inch to 6 feet 3 inches tall with a long torso and/or long arms. The body length of shirts is 2 inches longer than regular. The coat sleeve and body length is $1\frac{1}{2}$ inches longer than regular.
4. **Big** is a standard size range of clothing for men of average height (5 feet 8 inches to 6 feet $\frac{1}{2}$ inch tall) whose neck, sleeve, waist, and chest measurements are larger than regular. Pockets, lapels, and other details increase in size for a pleasing proportion.

- D. **Euro sizes** are European standard clothing label sizes based on body dimensions and measured in centimeters. Euro sizes are 10 numbers higher than U.S. sizes. For example, a men's size 58 Euro is a size 48 in the United States.
1. European sizing is becoming more common in U.S. stores. Most stores selling garments in European sizes make conversion charts available. It is best to take the time to try clothes on because sizes and conversions are an approximation.
 2. To find the U.S. size equivalent to a European size, a person must simply find a known U.S. size on the conversion chart and look vertically in the same column to find the corresponding European size. For instance, a U.S. woman who wears a size 10 may find that she wears a size 14 in European sizes.
- E. Generic or unisex clothing sizes
1. Men and women's clothing is available in unisex sizes: extra, extra small (XXS); extra small (XS); small (S); medium (M); large (L); extra large (XL); and extra, extra large (XXL), etc. Manufacturers supply a size conversion chart for these categories. Online shoppers are normally provided a link for viewing the correlated measurements for each size. In a brick and mortar store, an associate may have a product information book at the desk.
 2. Generic and unisex sizes normally provide a range of a few inches between size categories. For example, a size medium in a specific line at Kohl's states the recommended bust measurement is 36 to 38 inches for the blouse. For men, the chest measurement would be used to select a shirt.
- F. Bust/chest, waist, hip, and inseam are the basic measurements taken. A flexible tape measure should be used for accuracy. It is best for another person to take the measurements for precision. A person should always stand with good posture when measurements are taken. The measuring tape is held so a finger can be placed behind the tape and close to the body as well as flat on the body. Feet are placed in a natural standing position, about six inches apart. Good posture is essential for taking accurate measurements.
- G. A retail associate should accurately determine hem length for men and women. In addition, department stores typically have an alterations department for fit adjustments. The following steps should be completed to mark a hem.
1. The customer should wear the shoes he or she would wear with the garment. Heel heights vary and make a difference in the hem length.
 2. The desired length for the garment can be designated by:
 - a. Pinning up/folding up the hemline
 - b. Using a seam gauge, a ruler, a yardstick, or a hem marker (pin or chalk style) to mark the hemline from the floor to ensure the length is the same all the way around a skirt, sleeve, or pant leg
 3. The hem can be pressed in place.
 4. A person may sew or stitch by hand or machine.

- H. It is estimated that more than 50 percent of U.S. women are wearing the wrong bra size. The following steps should be completed to measure for bra size:
1. The customer should wear a non-padded bra and stand in front of a mirror.
 2. The associate should place the tape measure around the back and under the breasts. This is the bra band measurement. Any odd number of inches should be rounded up to an even number.
 3. The associate places the tape measure around the fullest part of the breasts. The tape measure is not pulled tightly.
 4. To arrive at a bra cup size, it is essential to subtract the band measurement from the breast measurement.
 - a. A 1 inch difference is an A cup.
 - b. A 2 inch difference is a B cup.
 - c. A 3 inch difference is a C cup.
 - d. A 4 inch difference is a D cup.
 - e. A 5 inch difference is a DD cup.
- I. Hosiery

1. Hosiery size charts correlate weight and height to determine the correct size for each customer. Associates or customers draw one straight line horizontally and one vertically in the corresponding row and column for weight and height to find a recommended size. The sizing is usually in a color-shaded area.
2. For example, a customer who weighs 140 pounds and is 5 ft. 4 in. tall typically wears a medium hosiery size. However, a customer who weighs 140 pounds and is 5 ft. 10 in. tall typically wears a large hosiery size. However, size charts vary slightly from brand to brand.

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM-E and VM-F. Ask students to compare clothing sizes of items they purchased at different stores. Then ask them to discuss any vanity sizing they have encountered.

Objective 6: Use mental math.

Anticipated Problem: What is mental math?

- VI. **Mental math** is the act of a person doing arithmetic and mathematics calculations in his or her head without using a pencil and paper, a calculator, or other devices.
- A. Associates and customers who can quickly calculate discounts, markups, and markdowns are able to make estimations and decisions about purchases without resorting to calculator use. Store purchasing situations—markdowns, discounts, and coupon savings—require people to compute the new price. Mental math success often includes the rote memorization of multiplication tables.

- B. Discounts are often in the form of a percentage off the original price. There are multiple ways to mentally calculate percentages. Common percent off calculations include:
1. 10, 20, and 30 percent discounts
 - a. To calculate a 10 percent savings, the decimal point in the price of a sweatshirt (\$34.00) must be moved one place to the left = $\$3.40 = 10\%$ savings. The sweatshirt price is the product of $\$34.00 - \$3.40 = \$30.60$.
 - b. To calculate 20 percent off, a person can simply double the 10 percent savings (e.g., $\$3.40 \times 2 = \$6.80 = 20\%$ savings); $\$34.00 - \$6.80 = \$27.20$.
 - c. The discounted price of the sweatshirt is \$27.20.
 2. 50 percent discount
 - a. The \$80 price of a pair of boots must be divided in half.
 - b. The discounted price of the winter boots is \$40.
 3. 75 percent discount
 - a. A toddler dress is \$30. The price must be divided in half twice. So $\$30$ divided by 2 = \$15.
 - b. Then \$15 divided by 2 is \$7.50.
 - c. The discounted price of the dress is \$7.50.
 4. 33 percent discount
 - a. The price of a rain slicker is \$60. It should be divided by 3, which equals \$20.
 - b. The \$20 should be subtracted from the original price. $\$60 - \$20 = \$40$.
 - c. The discounted price of the rain slicker is \$40.

Teaching Strategy: Many techniques can be used to help students master this objective. Use VM-G to review. Ask students to mentally calculate sales discounts. Hold up random “percent off figures” and the original dollar amount of the discounted item.

- **Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. If a textbook is being used, questions at the ends of chapters may be included in the Review/Summary.
- **Application.** Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.
- **Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

■ Answers to Sample Test:

Part One: Matching

1. c
2. f
3. e
4. d
5. i
6. a
7. h
8. j
9. b
10. g

Part Two: True/False

1. T
2. F
3. T
4. T
5. F
6. T
7. F
8. T
9. T
10. T

Part Three: Short Answer

1. The four basic measurements a store associate should be able to take for a customer are bust/chest, waist, hip, and inseam.
2. Gross margin is a company's total sales revenue minus its cost of goods sold, divided by the total sales revenue, expressed as a percentage. The gross margin represents the percent of total sales revenue that the company retains after paying the direct costs required to produce the goods and services sold by a business.
3. Markup is a percentage added to the cost to arrive at a retail-selling price. It is the difference between the cost of the good or service and its selling price. A markup is added to the total cost incurred by the producer of a good or service in order to create a profit.

Business Math

► Part One: Matching

Instructions: Match the term with the correct definition.

- | | |
|----------------------|------------------------|
| a. sales tax | f. markdowns |
| b. gross profit | g. missy |
| c. on order | h. gross profit margin |
| d. mental math | i. sales revenue |
| e. open to buy (OTB) | j. women's |

- _____ 1. The amount of inventory set for delivery to a store in a particular month
- _____ 2. Planned reductions in the selling price of an item: a discount from the suggested retail price
- _____ 3. A financial budget for retail merchandise
- _____ 4. The act of a person doing arithmetic and mathematics calculations in his or her head without using pencil and paper, a calculator, or other devices
- _____ 5. The dollar amount generated by a company after deducting returns, allowing for damaged or missing goods and any allowed discounts
- _____ 6. A percentage of the sale of a good that goes to a governing body
- _____ 7. A company's total sales revenue minus its cost of goods sold, divided by the total sales revenue, expressed as a percentage
- _____ 8. A standard range of clothing sizes for curvier women of average height and sometimes with a lower bust line
- _____ 9. A company's revenue minus its cost of goods sold
- _____ 10. A standard size range of clothing made to fit the average female with an average bust, average height, and an hourglass figure



► Part Two: True/False

Instructions: Write *T* for true or *F* for false.

- _____ 1. Planned sales are the anticipated sales for a given period of time based on retail sales trends and planned increases over a period of time.
- _____ 2. Planned EOM is an estimate of inventory on hand at mid-month.
- _____ 3. Initial markup is the average price increase required on any product to cover the cost of the item, expenses, and a reasonable profit.
- _____ 4. Markdowns are planned reductions in the selling price of an item or a discount from the suggested retail price.
- _____ 5. To calculate a 75% off discount, divide the price of the product in half four times.
- _____ 6. To calculate a 33% off discount, divide the price of the product by 3.
- _____ 7. Regular is a standard size range of clothing for a well-proportioned man's body 5 feet 3 inches to 5 feet 7½ inch tall, with hips and chest of equal girth (circumference).
- _____ 8. Euro sizes are European standard clothing label sizes based on body dimensions and measured in centimeters.
- _____ 9. Use a ruler, a yardstick, or a hem marker (pin or chalk style) to mark the hemline from the floor.
- _____ 10. Vanity sizing is the labeling of clothing with a size smaller than the actual cut of the item.

► Part Three: Short Answer

Instructions: Answer the following.

1. List the four basic measurements a store associate should be able to take for a customer.

2. Describe gross margin and what the figure represents.

3. Describe markup and how it influences profit.

BLACK FRIDAY AND CYBER MONDAY PLANNING

How would retailers use OTB to plan for Black Friday and Cyber Monday events?



GROSS PROFIT MARGIN CASE STUDY

Calculate Unique Boutique's gross profit margin percent using the figures for sales revenue and the cost of goods sold (COGS) as well as the formula.



- ◆ Sales revenue is \$75,000.
- ◆ COGS is \$50,000.
- ◆ Formula for gross profit margin: $\text{Sales Revenue} - \text{COGS} \div \text{Sales Revenue}$
 - Step 1: $\$75,000 - \$50,000 = \$25,000$
 - Step 2: $\$25,000 \div \$75,000 = 0.3333$
 - Step 3: Gross Profit Margin = 33%

SWEATER PRICE MARKDOWNS

- ◆ The original price of a sweater is \$50.
- ◆ To calculate a 20 percent markdown off the original price:
 - Change 20% to a decimal = 0.20
 - Multiply the original sweater price by 0.20 to calculate the amount of the markdown.
 - $\$50 \times 0.20 = \$10$ markdown
 - $\$50 - \$10 = \$40/\text{sweater}$
- ◆ Calculate the markdown and new cost of the sweater for each percent shown below:
 - 5%
 - 10%
 - 50%



How did you use mental math to calculate these markdowns?

SALES TAX

Sales tax rates vary among municipalities. If you make a large purchase, such as a car, you can save hundreds of dollars by purchasing the item in a location—state, county, or municipality—with a lower tax rate than your current location.



You could purchase your new car in a municipality with a 7.75% sales tax rate or purchase it in a municipality with a 6.25% sales tax rate. What is the sales tax savings on a \$24,500 car?

Sales tax cost of a car purchased in a municipality with a 7.75% tax rate = \$_____.

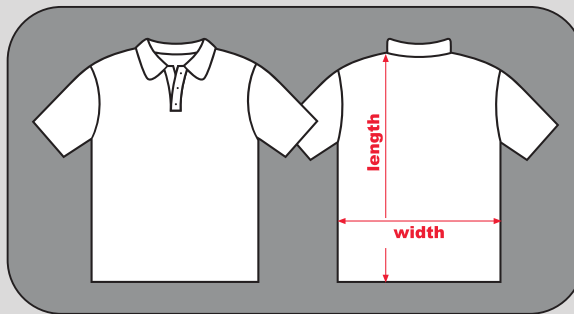
Sales tax cost of a car purchased in a municipality with a 6.25% tax rate = \$_____.

Savings = \$_____

GENERIC AND UNISEX SIZES

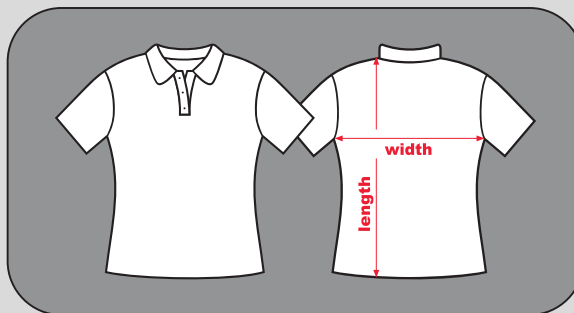
Generic and unisex sizes normally provide a range of a few inches between size categories.

men t-shirt polo with short sleeves



	S	M	L	XL	XXL
length	54	55	57	59	60
width	40	44	48	50	52

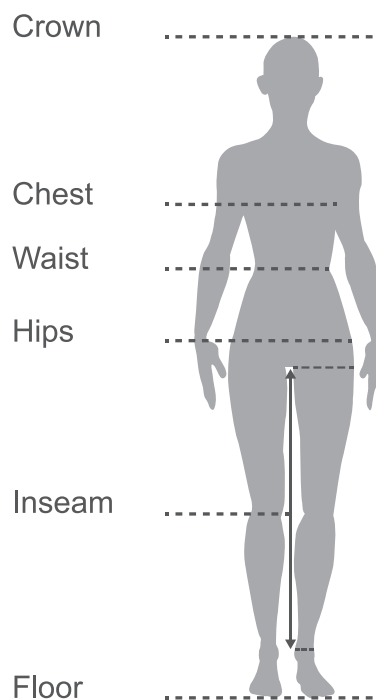
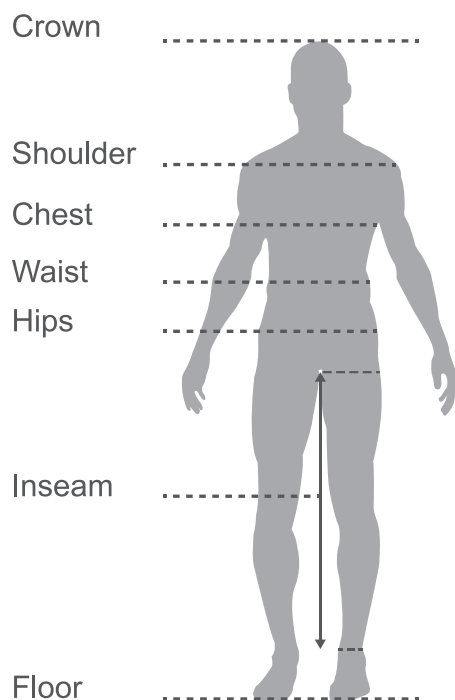
woman t-shirt polo with short sleeves



	S	M	L	XL	XXL
length	54	55	57	59	60
width	40	44	48	50	52

BASIC MEASUREMENTS: WOMEN AND MEN

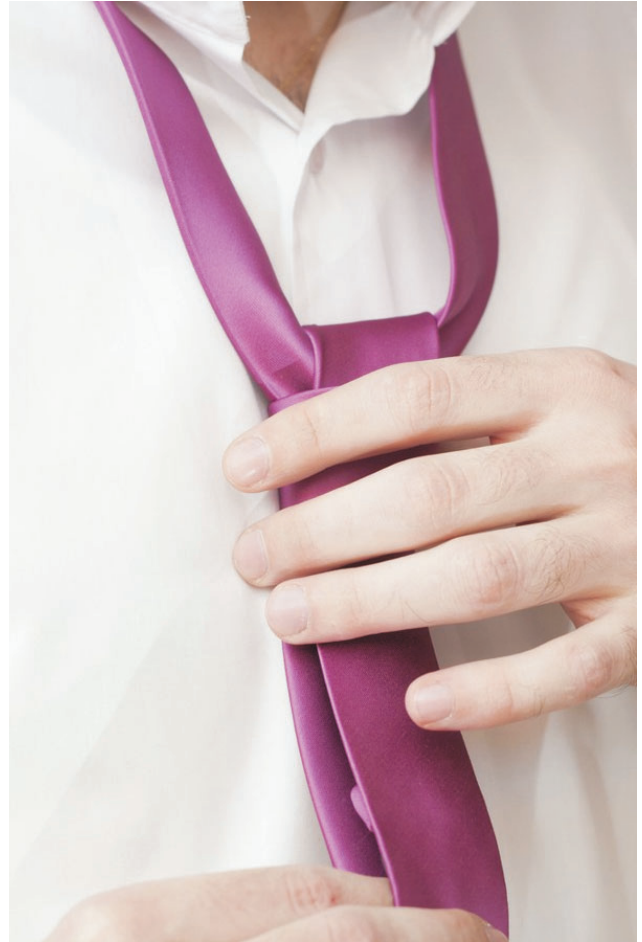
Measurements are more accurate when taken by another person. Stand with good posture and your feet about six inches apart when being measured.



CASE STUDY: MENTAL MATH

Mental math comes in handy while you are shopping for yourself or when helping customers.

Scenario: You work at Macy's Department Store. A customer is looking for clothes to wear to an interview. He finds a shirt for \$45 and a tie for \$25. Macy's is having a sale of 30% off when a customer purchases a shirt and tie. The man asks you how much his combination purchase would total and how much he would save.



Actual Solution:

Traditional computation:

1. Add the cost of the shirt (\$45) and the cost of the tie (\$25) in your head = \$70.
2. Change the percent to a decimal: $30\% = 0.30$
3. Multiply \$70 by 0.30 = \$21 saved by purchasing the combination of a shirt and tie
4. Subtract \$21 from \$70 = \$49
5. The cost of the combination purchase of a shirt and tie is \$49.

Mental Math computation:

1. Add together the cost of the shirt (\$45) and the cost of the tie (\$25) in your head = \$70.
2. Move the decimal point for \$70.00 one place to the left = \$7.00 (10% savings)
3. Multiply the 10% savings by 3 to equal 30% savings
= $\$7.00 \times 3 = \$21.00$ savings (30% savings)
4. Subtract \$21 from \$70 = \$49
5. The cost of the combination purchase of a shirt and tie is \$49.

Business Math Calculations

Purpose

The purpose of this activity is to compute common retail math problems.

Objectives

1. Review your class notes.
2. Calculate markdowns after discounts.
3. Calculate sales tax.
4. Calculate markups.
5. Calculate the gross margin percent.
6. Calculate the gross profit.
7. Calculate the OTB using given data.

Materials

- ◆ pencil
- ◆ paper
- ◆ calculator (optional)
- ◆ class notes

Procedure

1. Work on your own. Review your notes and the formulas for OTB, gross margin, and gross profit. Show your work in each problem.



2. Complete the following problems. Complete problems “a” through “c” without the use of a calculator. Complete problems “d” through “f” with or without a calculator.
- a. Find the price of an item whose sticker price is \$45 with a 20% off markdown.
 - b. Find the price of an item whose sticker price is \$30 with a 30% off markdown. The customer wants to know the final price with tax. The tax rate is 5%.
 - c. A store marks up items 200%. An item costs the store \$5 to purchase. What is the price tag on the item?
 - d. Find the gross margin percent when the gross profit is \$50,000 and sales revenue total \$100,000.
 - e. Find the gross profit when sales are \$50,000 and the cost of goods sold are \$28,000.
 - f. Find the OTB amount when the planned sales are \$200,000; the planned markdowns are \$30,000; the planned EOM inventory is \$45,000; the planned BOM inventory is \$40,000; and on order is \$15,000.

Business Math Calculations

- a. \$36.00
- b. \$22.05
- c. \$15.00
- d. 0.5
- e. \$22,000
- f. \$220,000