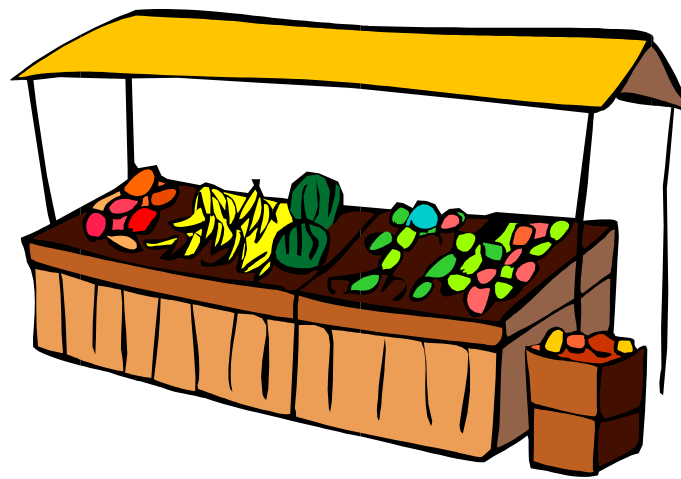


MARKETING

Application Problems

General Math



Applied Problems Fractions

1. Cards are cut from a 22 inch wide piece of cardboard stock. Each card is $1\frac{3}{8}$ inches wide. How many whole cards can be cut from the piece of cardboard?
2. It takes $12\frac{1}{4}$ hours to print 25,000 folders. How many folders are printed each hour? (Round to nearest tenth.)
3. A compositor works $7\frac{1}{2}$ hours each day. A job takes 5 days. How many hours does the compositor work?
4. The increase in the length of two babies is compared. Baby A grows $\frac{3}{8}$ inch while Baby B grows $\frac{5}{16}$ inch. Which baby increases the most?
5. An employee spends $\frac{1}{4}$ of his 8-hour shift working on a window display while another employee spends $\frac{3}{8}$ of her 8-hour shift working on a sales ad. Which employee spends less time per day working the remainder of their shift on the sales floor?
6. An employee goes over the weekly receipts and finds that $\frac{1}{3}$ of the week's receipts were for items on sale. A total of 14,391 receipts were recorded. How many receipts were for regularly priced items?
7. The store manager determines that her staff of 127 employees must be decreased by approximately $\frac{1}{12}$. How many staff positions must be eliminated?

8. You have been assigned the duty of mixing mouse poison for the storeroom at work. One rat poison is known to cause death to a mouse in amounts as small as $\frac{1}{250}$ of an ounce. If there is $\frac{4}{5}$ ounce of poison, how many lethal doses can be prepared?

9. Two file cabinets for sales records are the same size. One cabinet is $\frac{4}{5}$ full and the other is $\frac{1}{4}$ full. A clerk wants to combine the cabinets. Can the contents of these two cabinets be combined into one file cabinet?

10. The \$125,000 advertising budget for a floral shop must be reduced by $\frac{1}{10}$. How much money will remain in the budget for advertising after the reduction?

11. Dan's Cheese Store sold $\frac{1}{4}$ gross cheddar head hats in November, $\frac{3}{8}$ gross in December and $\frac{7}{12}$ gross in January. How many cheddar head hats were sold altogether during the three months? (A gross is a dozen dozen or 144 items.)

12. Randy Smith still owes $\frac{5}{18}$ on a debt. He makes a payment that is $\frac{1}{6}$ of the original debt. What fractional part of the debt does he still owe?

13. The Art Preservation Society has raised $\frac{7}{9}$ of the funds necessary for their remodeling project. If this amounts to \$985,000, how much total money is needed? (Round answer to nearest dollar.)

Applied Problems Decimals

14. Two customers self bag saffron from the spice section of the Country Store. The first customer bags 0.8201 grams and the second bags 0.820 grams. Which customer buys the larger quantity?

15. There are five major firms that account for the vast majority of stapler sales. The 1999 figures for each firm are Sharp Staplers – 3.1 million; Swingline Staplers – 8.9 million; DCB Staplers – 2.8 million; Sanford Staplers – 2.9 million; and Holiday Staplers – 3.3 million. What is the total sales in the stapler market?

16. It has been determined that an average of 35 cotton swabs are used per patient in one week at a certain health care facility. These swabs are manufactured in packages of 100 each. If the patient load is determined to average 62 patients per week, how many packages of swabs should be ordered to provide a twenty-six week supply?

17. Hair twists are purchased at a cost of \$0.1062 each. Assuming no discount is given, how much does the store manager pay for 15 dozen hair twists?

18. For a \$5.00 fee, a jewelry store will pierce an ear. It costs the store \$0.50 per piercing. Yesterday, the store pierced 178 ears. What was the store's gross profit for the day?

19. The daily receipts for one week at a local mini-mart were \$1991.58, \$1498.56, \$1699.03, \$1945.34, \$2235.15, \$2065, and \$1522.25. Find the total receipts for the week.

20. A computer service firm rents computer storage space for \$.0095 per file per day. Find the cost to store 10,245 files for one year of 365 days.

Applied Problems Percents

21. A copier costs \$3000. The selling price is 15% of the cost. Find the selling price.
22. A suit coat sells for \$350. Find the sales price if there is a 15% discount on the price.
23. Ivan earns \$750 per week. He receives a 12% raise. What is Ivan's new weekly earning?
24. Chris had two part-time jobs. She saves 60% of the \$500 she earns at the clothing store and 20% of the \$950 she earns as a worker in a clinic.
- How much money does Chris save?
 - What percent of her total earning is this? (Round to nearest tenth.)
25. A new mainframe computer costs \$7,325. It depreciates 28% the first year, 22% the second year, and 17% the third year. What is the value of the equipment after 3 years?
26. A business lot costing \$45,250 appreciates or increases in value 15% the first year and 8% the second year. What is the value of the land after two years?

27. Pauline earns \$2945 per month plus a 6% commission on her sales at the Sharp Appliance Center. One month her sales are \$4,350. What are her monthly earnings?
28. A retailer has \$321,000 invested in her San Francisco business and finds she is earning 10.5% per year on her investment. How much money is she earning per year?
29. A shipment of paperback books valued at \$705 was damaged in transit. The estimated damage was 54% of the total shipment. What was the value of the undamaged books?
30. A retailer must collect 5 $\frac{1}{2}$ % of the amount of each sale for sales tax. If sales for the month are \$23,080, find the combined amount of sales and tax.
31. Joanne Vice has a 60% ownership in a company called Balloons and Clowns. If the company has a value of \$15,675 and Vice receives an income of 5% of her ownership, find the amount of her income.
32. A local casino advertises that it gives a 96.9% payback on slot machines with the balance retained by the casino. If the amount retained by the casino is \$890,775, find the total amount played on the slot machines.

Applied Problems Measurement

33. If 245 centimeters of cloth are required for a riding coat, how many riding coats could be cut from a 13 meter of cloth?
34. Jan walks an average of 1500 meters per day. During one month, she walked 20 days. How many kilometers did she walk?
35. A rectangular show area, 60 m by 150 m, is to be enclosed with a railing that costs \$4.60 per meter. Find the cost of the railing. ($P = 2w + 2L$)
36. Posts for this rectangular show area are to be placed at each corner and 2.5 meters apart.
- Find how many posts are needed
 - If each post costs \$2.70, find the cost of all the posts.
37. During each 15-minute test, a recording kymograph is geared to use 3.275 m of 12-cm wide paper.
- How much paper should be purchased for five hundred 15-minute tests?
 - How many tests can be made with 150 m of paper?

38. Brand A of string is found to cost \$12.60 per 15-meter roll. Brand B comes in 25-meter rolls costing \$23.90 each. Assuming the quality is equal, which is the better buy?
39. Metallic paper is available in 50-meter rolls, 12.5 cm wide, at a cost of \$37.85. This roll is to be cut in lengths 75 centimeters long before using.
- How many pieces can be cut from the 50-meter roll?
 - What is the cost per piece?
40. A small storage room measures 8 meters by 3 meters. If 1 square meter of floor tile requires 75 milliliters of wax, how many liters of wax will be needed to wax ten rooms of this size?
41. The average customer's waist measure is 105 centimeters. Suppose a role of bulk belting chording contains 101.6 meters. How many average sized belts could be made from this roll?

Applied Problems Formulas

42. A 150 page financial report is 1 centimeter thick. A different report, printed on the same kind of paper, has 450 pages. How thick is the second book?
43. A store buys material and uses $\frac{3}{4}$ of it to make draperies. If $4\frac{1}{4}$ meters are used for the draperies, how many meters are bought?
44. During one day, the Happy Puppy Store writes 27 checks. The total bank service charge is \$2.97. What is the service charge per check?
45. Lindsey travels 4 kilometers per liter with her new car. At this rate, how many liters of gasoline will she need for a business trip of 300 kilometers?
46. It costs 31 cents a square foot to lay vinyl flooring. Find the cost to lay 180 square yards of flooring.
47. A stenographer transcribes notes at the rate of 1 line typed in 10 seconds. At this rate, how long (in minutes and seconds) will it take to transcribe notes, which will require 7 pages of typing, 25 lines to the page?
48. A piece of property is assessed at \$22,850 and the tax rate is \$4.80 per thousand dollar value. What is the amount of tax that must be paid on the property?
49. A stationer buys note pads at \$.75 per dozen and sells them at \$.25 apiece. What is the profit based on the cost?

50. You have decided to establish a scholarship in your name. Every year, some student will receive a \$1500 scholarship. Using the given formula, calculate the present value of a balance needed to establish this perpetuity assuming a 3% interest rate.

Present value (of a perpetuity) = payment \div interest rate

51. Recently, you were given a credit card with a 3% per month interest rate. What is the annual rate that you are actually charged, given the nominal rate is 36%? Use the following formula: Effective annual rate = $(1 + i/m)^m - 1$, given i =the nominal interest rate, m =number of compounding periods. Round to the nearest tenth.

52. What is the effective annual rate for a savings account that pays 1.2% per quarter interest rate, given the nominal rate of 4.8%? Use the formula given in #51. Round to the nearest tenth.

53. A company sells 100,000 units for a total in sales of \$200,000. It has fixed costs of \$40,000 and variable costs of \$80,000. Find the next income by using the following formulas:

Contribution Margin = Sales – All Variable Costs

Net Income = Contribution Margin – All Fixed Costs

54. Use the information given in #53 to find the contribution margin ratio for this company. Express as a fraction in lowest terms.

Formula: Contribution Margin Ratio = Contribution Margin (in \$s) \div Sales (in \$s)

55. Use the information given in #53 and #54 to find the break-even amount.

Formula: Break Even = Fixed Costs \div Contribution Margin Ratio Round to nearest cent

Applied Problems Geometry

56. The measurements of a show room are 6.983 meters long and 5.179 meters wide with walls 2.438 meters high.
- What is the surface area of the floor to the nearest thousandth square meter?

 - What is the surface area of the four walls to the nearest thousandth square meter?
57. A production room measures 5.750 m by 6.125 m by 3.000 m. A circulating fan can exchange 12.750 m^3 of air each hour. How much time in hours and minutes is required to exchange all the air in the room? ($V = W \times L \times H$)
58. A piece of circular filter paper has a diameter of 16 centimeters. Calculate the surface area for one side of the paper. ($A = (3.14D^2) / 4$)
59. Find the total area of a tabletop that measures 6' 4" by 2' 32" in square feet. Round to nearest tenth.
60. All six sides of a solid rectangular, wooden box is to be covered with carpeting. The dimensions of the box are 2' by 4.5' by 2'. Find the total *square yards* of carpeting needed to cover this box. Round to nearest tenth.

Applied Problems Algebra

Linear functions are used extensively in business analyses. The Korona Company has determined that the total cost of manufacturing 20 televisions is \$3951.20 and the total cost for 25 televisions is \$4514. Assume that the relationship between cost and volume is linear. Determine the linear equation that relates cost to volume and use it to predict the cost of manufacturing 28 televisions.

Solution: Let x be the number of televisions manufactured, y be the corresponding total cost and $y = mx + b$ the **cost-volume equation**. When $x = 20$, $y = 3951.20$, and when $x = 25$, $y = 4514$. Use these as two points on the line to find the slope m . Let $(x_1, y_1) = (20, 3951.20)$ and $(x_2, y_2) = (25, 4514)$, then

$$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4514 - 3951.20}{25 - 20} = 112.56$$

Now use the point-slope form to find the cost-volume equation.

$$\begin{aligned}y - 3951.20 &= 112.56(x - 20) \\y &= 112.56x + 1700\end{aligned}$$

Looking at the interpretation of this equation:

$$\begin{aligned}\text{Slope} &= \text{cost of producing one more television} \\ &= \$112.56, \text{ called } \mathbf{marginal\ cost}\end{aligned}$$

$$\begin{aligned}\text{y-intercept} &= \text{Cost incurred when no televisions are produced} \\ &= \$1700, \text{ called } \mathbf{fixed\ cost}\end{aligned}$$

Building depreciation and property taxes are parts of the fixed cost.

Now use this cost-volume equation to predict the cost of manufacturing 28 televisions. Let $x = 28$ in the equation.

$$\begin{aligned}y &= 112.56(28) + 1700 \\ &= 4851.68\end{aligned}$$

The predicted total cost of manufacturing 28 televisions is \$4851.68.

61. The PineHill Company found that the cost of manufacturing 10 wooden park tables is \$460. The cost for 15 tables is \$612.90.

- a. Find the cost-volume equation (assuming it is linear).
- b. What is the fixed cost?
- c. Predict the cost of manufacturing 20 tables.

62. The Cardiff Manufacturing Company found that the cost of producing 20 electric toothbrushes is \$415. The cost for 25 toothbrushes is \$436.35.

- a. Find the cost-volume equation (assuming it is linear).
- b. What is the fixed cost?
- c. Predict the cost of manufacturing 30 toothbrushes.

Applied Problems – Answer Key

1. 16
2. 2,041
3. 37.5
4. Baby A
5. 2nd employee
6. 9,594
7. 11
8. 200
9. no
10. \$112,500
11. 174
12. 1/9
13. \$1,266,429
14. 1st customer
15. 21 million
16. 565 packages
17. \$19.12
18. \$801
19. \$12,956.91
20. \$35,524.54
21. \$3450
22. \$297.50
23. \$840
24. a. \$490, b. 33.8%
25. \$3414.39
26. \$56,200.50
27. \$3206
28. \$33,705
29. \$324.30
30. \$24,349.40
31. \$470.25
32. \$28,734,677.42
33. 5
34. 30 km
35. \$1,932
36. a. 168 posts b. \$453.60
37. a. 1,637.5 m b. 45
38. Brand A
39. a. 66 b. \$.57/piece
40. 1.8 L
41. 96
42. 3 cm
43. 5 2/3
44. \$.22/check
45. 75 L
46. \$502.20
47. 29 min 10 sec
48. \$109.68
49. \$2.25
50. \$50,000
51. 42.6%
52. 4.9%
53. \$80,000
54. 3/5
55. \$66,666.67
56. a. 36.165 m² b. 59.302 m²
57. 8 hrs 17 min
58. 200.96 cm²
59. 18.3 ft²
60. 4.9 yds²
61. a. $y = 30.58x + 154.20$ b. \$154.20 c. \$765.80
62. a. $y = 4.27x + 329.60$ b. \$329.60 c. \$457.70

Applied Problems – Quiz

Fractions

1. In Chloe's Clothing Store, a suit sells for \$180 with a profit of \$80. Represent the fraction of profit to selling price as a fraction in lowest terms.
2. If Chloe's cost for a pair of shoes is \$50 and this is $\frac{2}{5}$ of the selling price, determine the selling price.
3. Chip's Computers is a wholesaler of computer keyboards. He purchases the keyboards for \$19 each. In order to cover his essential bills and make a profit, he needs to set the selling price at $\frac{13}{10}$ of the cost. Find the selling price for the keyboard.
4. Each keyboard weighs $2\frac{9}{80}$ pounds, how much will a shipment of 50 keyboards weigh? Write as a mixed number.
5. How many hours of overtime (overtime being defined as hours worked beyond 40 hours) did a telemarketer work selling keyboards given the following time sheet:
Monday - $9\frac{3}{4}$ hours
Tuesday - $8\frac{1}{2}$
Wednesday - $10\frac{1}{4}$
Thursday - 7
Friday - $7\frac{3}{4}$
6. There are ten firms that make up the market for the computer keyboard industry in the United States. The combined sales for these firms in 1999 were \$56,700,000. The "ClickyKey" company had sales of \$6,350,000. ClickyKey has what fractional share of the nation-wide keyboard market? (Reduce to lowest terms.)

Decimals

1. You work 40 hrs/week and you received a \$.36/hr pay raise. Calculate how much more your weekly paycheck will be with the new raise?
2. Employees at ClickyKey Company get time-and-a-half for hours worked beyond the normal 40-hour work week. If Clarence gets \$11.75 per hour and works 44.5 hours, what will his total pay be for the week?
3. Keyboard boxes cost \$.275 per unit. If a recent shipment of boxes cost \$412.50, how many boxes were purchased?
4. 235,295 candles were made this week at the Jack-Be-Quick Candle Co. If each candle sells for \$.85, find the gross sales for this week's production.
5. The Jack-Be-Quick Candle Co. had the following costs for production:
\$0.066/candle for materials, \$0.315/candle for labor and \$0.219/candle for shipping.
Find the total cost of production for a candle.
6. The Jack-Be-Quick Candle Co. rents cold storage from a cheese company for \$88.75/day if the entire area is used or pays \$51.10/day if only the small cooler is rented. Find the yearly cost of cold storage if the entire area is used 205 days and the small cooler is used the remainder of the year.
7. The accounting department assigned each accountant 42 business accounts to oversee. The average value of each account was \$543.25. There are four accountants in the department. What is the total value of the accounts that the department oversees?

Percents

1. $\frac{1}{8}$ of sales at Molly's Material are from sales from sewing machines, while 22% come from custom work. The rest of the profits come from material. What percent of the profits come from material? (nearest tenth percent)
2. 18% of sales at Molly's Material Shop are from corduroy sales. If \$1222 worth of business last month was from corduroy, what was the total amount of all sales last month? Round to the nearest dollar.
3. Molly's Material Shop pays up to 4.8% of your wages into a 401K retirement account. If your gross wages last year were \$18,543, what is the maximum amount the store will match? (Round answer to nearest cent.)
4. At Molly's Material Shop, the past year you contributed \$100 every month to your 401K retirement account. If your gross wages last year were \$18,543, what percent of your wages were put into the 401K account? (Round answer to nearest tenth)
5. Molly's Material Shop had gross receipts from sales worth \$81,466.67 last year. This year gross sales were up \$14,508.21 more than last year. What is the percent increase from last year? (Round answer to nearest tenth.)
6. Myra bought melon colored material totaling \$32.76 for her mother. Find the sales tax for this purchase at Molly's Material Shop if sales tax rate is 5.5%. (Round answer to nearest cent)
7. Molly pays \$1450 per month for shop rent. What percent of the gross receipts is annual rent, if gross receipts last year were \$81,466.67? (Round answer to nearest tenth.)

Measurement

1. There are 38.654 meters of ribbon on a spool. 150 centimeters of ribbon are required to make a bow. Find the number of 150 centimeter lengths in the spool.
2. 327 cu ft of cement is used to pour an access ramp in front of Molly's Material Shop. How many cubic yards is this? Round to one decimal place.
3. A bolt of fabric contains 15 yards of cloth. How many 18 inch wide pieces can be cut from this bolt?
4. A bolt of fabric contains 15 yards and is to be shipped to Canada. How many meters are contained on this bolt?
5. A bottle of fabric cleaner contains 8.4 oz. How many milliliters are in the bottle?
6. Molly's Material Shop sells bolt ends of fabric that are 110" long. How many yards and inches is this?
7. One piece of fabric measures 1 yd 3", another piece of fabric measures $\frac{7}{8}$ yd and a third measures $2\frac{1}{4}$ yds. Find the total amount of fabric in yds and fractions of a yard.

Formulas

1. A computer monitor wholesaler purchases monitors for \$125 each. In order to cover essential bills and make a profit, a margin of 30% is needed. What selling price should the monitors be set to make a 30% margin?
Use the formula: $SP = CP \div (1 - \%M)$, where SP = selling price, CP = cost price, and %M = margin as a %. Round answer to nearest cent.
2. Your firm sells staplers. In end-consumer sales dollars, the company sold 2.5 million dollars worth of staplers. The “Office Supplies Manufacturers of America” trade association published a report stating that end-consumers purchased 10.3 million dollars worth of staplers. What is your firm’s market share percent? Use the formula: $\text{Market Share Percent} = \text{Company Sales} \div \text{Total Sales in Market} \times 100$. Round to nearest tenth.
3. DeeDee’s has the following allocation of space in their store layout: clothing = 340 square feet, equipment = 560 square feet, and office space = 100 square feet. What is the ratio of office space to total store floor space? Reduce ratio to lowest common denominator.
4. The interest on a loan to DeeDee’s was \$420. The loan ran for 3 months at 6.1% interest rate. What was the principal amount? (Use this formula: $P = \frac{I}{RT}$) Note: Time is in terms of years.

5. Larry Keller agreed to repay an education loan of \$5,400 to his father plus 7.5% interest. The loan was paid back in two years and six months. Calculate the interest paid using the following formula: $I = PRT$
6. In a large insurance firm, 320 of the 400 employees have 10 or more years of experience. What is the ratio of employees with less than 10 years experience to those who have 10 or more years of experience? Reduce ratio to lowest common denominator.

Geometry

1. How many *square feet* of cardboard are needed to make a six-sided keyboard box for the ClickyKey Company if a box must measure 1.5' by 6.5" by 1.75"? (Ignore calculations for tabs and flaps.) Round to nearest tenth.
2. Calculate the volume in *cubic inches* for a keyboard box measuring 1.5' by 6.5" by 1.75". Round to one decimal place.
3. Batman shopped at Molly's Material Shop for cape replacement fabric. His circular-shaped cape has a 5' 6" diameter. How many square yards of fabric does he need to buy? Round to one decimal place.
4. In a display for new fabrics at Molly's Material Shop, there is a piece of fabric that measures 3 yds. by 44". Find the area in square feet for this piece of fabric.

Algebra

1. The Rodriguez Company determined that the cost of manufacturing 50 units of a product is \$190.50 and that of manufacturing 65 units is \$226.80.
 - a. Find the cost-volume equation (assuming linear).
 - b. What is the fixed cost?
 - c. Calculate the cost of producing 70 items.