

Fourth Year

GENERAL DIRECTIONS: Read and study the lesson below and answer WORKSHEETS 1.1 & 1.2. It is required that you submit these on July 2, 2009.

Lesson 1.2	Percentages
	OBJECTIVES: <ol style="list-style-type: none"> 1. To be able to use Polya's four step process to solve word problems involving percents. 2. To be able to work problems involving percents.



Shops use percentages in sales. Banks use them for loan rates. Weather forecasts use them to tell us the chances of rain.

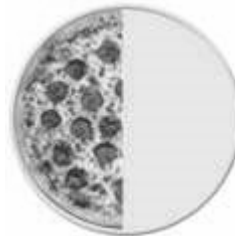
When you say "**Percent**" you are saying "**per 100**"

The Word

"Percent" comes from the Latin *Per Centum*. The Latin word *Centum* means 100, for example a Century is 100 years.

A Percentage can also be expressed as a *Decimal* or a *Fraction*

A Half can be written...
 As a percentage: 50%
 As a decimal: 0.5
 As a fraction: $\frac{1}{2}$

**Example:**

A Skateboard is reduced 25% in price in a sale. The old price was \$120. Find the new price

Solution:

$$\begin{aligned} &\text{Find 25\% of \$120} \\ &25\% = \frac{25}{100} \\ &\left(\frac{25}{100}\right) \times \$120 = \$30 \end{aligned}$$

25% of \$120 is \$30

So the reduction is \$30

Take the reduction from the original price

$$\$120 - \$30 = \$90$$

The Price of the Skateboard in the sale is \$90

Fractions and %

Pants are in the sale with 50% off the original price of £20. How much are they now?

If you said £10 well done! It is quite easy to find the answer if you can remember that finding 50% is the same as finding a half, or dividing by two.



Here are the fractions for some other percentages:

percentage	fraction	percentage	fraction
10%	$\frac{1}{10}$	50%	$\frac{1}{2}$
20%	$\frac{1}{5}$	75%	$\frac{3}{4}$
	25%		$\frac{1}{4}$

Example

To pass a national exam you need to get 75%. There are 40 questions altogether. How many do you need to get right?

75% is the same as $\frac{3}{4}$ so find $\frac{1}{4}$ of 40 then multiply by 3.

$$\frac{1}{4} \text{ of } 40 = 40 \div 4 = 10$$

$$= 3 \times 10 = 30$$

Therefore, you need to get **30** questions right to pass the exam.

TRANSLATING STATEMENTS INTO EXPRESSIONS

"One number is some percent of another number."

_____ is _____ % of _____.

Example:

8 is 50% of 16.

Every statement of percent therefore involves three numbers. 8 is called the **Amount**. 50% is the **Percent**. 16 is called the **Base**. *The Base always follows "of."*

AMOUNT= BASE X PERCENT

Example 1: How much is 37.5% of \$48.72?

Solution: We have the Percent, and we have the Base -- it follows "of." We are missing the Amount.

$$\begin{array}{l} \text{Base} \times \text{Percent} \\ \$ 48.72 \times 37.5\% \\ \$ 48.72 \times 0.375 \\ \boxed{\$ 18.27} \end{array}$$

Example 2: \$250 is 62.5% of how much?

Solution: The Base -- the number that follows "of" is unknown.

$$\begin{array}{l} \text{Amount} \div \text{Percent} \\ \frac{\$250}{62.5\%} \\ \frac{\$250}{0.625} \\ \boxed{\$ 400} \end{array}$$

Example 3: \$51.03 is what percent of \$405?

Solution: The Percent is unknown.

$$\begin{array}{l} \text{Amount} \div \text{Base} \\ \frac{\$51.03}{\$405} \\ \boxed{12.6\%} \\ \$51.03 \text{ is } 12.6\% \text{ of } \$405. \end{array}$$

Example 4: How much is 80% of \$124?

Solution: The amount is unknown.

$$\begin{array}{l} .80 \times \$124 \\ \boxed{} \end{array}$$

\$ 99.20

Uses of Percent

Amount of Sales Tax

Many states and cities (in the US) levy a sales tax on retail purchases. The sales tax is determined by finding a percentage of the purchase price. The percentage of tax called the tax rate varies between different cities and states.

*If the sales tax is 6% and a \$10.00 purchase is made, the sales tax is $\$10.00 \times 6/100$ or **\$0.60**.*

Sales Commissions

Sales commissions are paid to employees or companies that sell merchandise in stores or by calling on customers. The commission is meant to motivate sales persons to sell more. A commission may be paid in addition to a salary or instead of a salary. A common place that commissions are paid is in real estate marketing.

*A commission is generally a percentage of the sales price of an item. For example, if a salesperson receives a 10% commission on their sales and sells \$1500 worth of merchandise, they would earn **\$150** in commissions.*

Shipping and Handling

When a mail order is placed, a shipping and handling charge is often assessed to cover the packing and postage or shipping charges for getting the item to you. There is frequently a minimum charge that is the least you will pay for shipping and handling on small orders. If the order is more than the minimum, a shipping and handling charge is calculated as a percent of the total purchase price.

If the order is below the minimum, the minimum charge will apply. If the order is larger, the shipping and handling charge is a certain percent of the the purchase price. For example, if there is a minimum charge of \$2.00 on orders less than \$20.00 or 10% of the total order price, and your order is \$35.00, the shipping and handling would be $\$35.00 \times 10/100 = \3.50 . You would not pay the minimum charge because your order was more than \$20.00. Your total cost would be $\$35.00 + \$3.50 = \mathbf{\$38.50}$.

Try These!

A. Write the following as a fraction (in lowest term).

1. 72%

4. $\overline{33.6666}\%$

2. $\overline{2.6161}\%$

5. 1.5%

3. $\frac{1}{4}\%$

B. Write the following in percent.

1. $\frac{13}{25}$

4. $\frac{3}{11}$

2. $\frac{8}{200}$

5. $\frac{11}{10}$

3. $\frac{16}{20}$

C. Supply the correct information on the following blanks in each mathematical statement.

1. 5% of _____ is 33.

2. _____ of 65 is 12.

3. $2\frac{1}{2}\%$ of 85 is _____.

4. 0.23% of _____ is 75.

5. _____ of 12 is 105.

D. Solve the following:

- How much will you earn for \$ 231.89 of sales at 13% commission?
- How much will you earn for \$ 171.18 of sales at 5% commission?
- What is the sales tax on \$34.65 if the tax rate is 6%?
- What is the sales tax on \$50.03 if the tax rate is 5%?
- For a \$54.19 order with a rate of 20% and minimum charge of \$3.00. What is the total cost including shipping and handling?

Conquer These!

- When the petrol tank of a car is full, the weight of the petrol is $29\frac{1}{4}$ kg.
Given that 1 cm^3 of petrol weighs 0.78 g, calculate the volume of the tank in litres. (Note: 1000 cm^3 = 1 litre)
- When a discount of 15% of the marked price of an air- cleaner is given, the air cleaner is sold for \$ 323. Find the discount.
- In 1997, the total trade in Singapore was \$ 382 218 million. In 1998 the total trade dropped to \$ 353 627 million due to the Asian economic crisis.
 - Calculate the percentage drop in trade in 1998 as compared with 1997 figures. (Round off your answers to 2 decimal places)

- b. Given that the total gross domestic product in 1997 was \$ 141 262 million, how many times larger was the total trade figure as compared with the gross domestic product? (Express your answer in 4 significant figures)
4. In a sale, prices are reduced by 22.5%. The price of a wrist blood pressure monitor in the sale is \$ 170.50. Find its original price.
5. There are 600 boys and 400 girls in the school. One day, 2% of the students were absent. If 1% of the boys were absent, how many girls were present?
6. 240 boys and 180 girls sat for an examination. If 65% of the boys and 60% of the girls passed, what percentage of the total number of candidates passed?
7. In 2005, the price of a hand phone was \$ 480. In the year 2006, the price of the same hand phone was reduced by 15%.
- Find its new price in 2006.
 - The price of \$480 was actually a decrease of 25% over the price in 2004. Calculate the initial price in 2004.
8. An article was sold at a loss of 12% on its cost. If the cost price had been \$ 350, what would the selling price have been?
9. A man bought an article for \$ 360. At what price must he mark the article so that he can allow a discount of 10% of the marked price and still make a profit of 10% on the cost price?
10. A man's petrol bill for 2006 was \$ 3000. In 2007, the price of petrol was increased by 20% and his petrol consumption increased by 15%. Find his petrol bill for 2007.

Name: _____

Date: _____

Yr. & Section: _____

Score: _____ = _____ %

Worksheet 1.1**Answer the following in your notebook.**

A. A magic square is a square array of numbers in which every row and every column and both main diagonals have the same sum. Make your own 1 (3x 3) and 1 (4x 4) magic squares.

B. Try These!

- The number n is divisible by 4 if and only if its last two digits form a number divisible by 4. Test these numbers for divisibility by 4.
 - 7 124
 - 88 554
 - 12 345 678
- The number n is divisible by 8 if and only if its last three digits form a number divisible by 8. Test these numbers for divisibility by 8.
 - 12 474
 - 66 666
 - 765 432
- The number n is divisible by 9 if and only if the sum of its digits is divisible by 9. Test these numbers for divisibility by 9.
 - 67 463
 - 2 323 233
 - 98 577
- A number is divisible by 11 whenever $x-y$ is a multiple of 11, where x is the sum of the first, third, fifth, etc., digits, and y is the sum of the second, fourth, sixth, etc., digits. Are these numbers divisible by 11?
 - 21 825 364
 - 90 939 497
 - 7 436 912
- Convert the following to its equivalent fraction. Show your complete solution.
 - 0.675
 - 3.12312312...
 - 0.686868...
 - 0.125
 - 1.515151...
- Convert the following to its equivalent decimal. Show your complete solution.
 - $\frac{2}{7}$
 - $\frac{8}{18}$
 - $2\frac{4}{9}$
 - $\frac{8}{99}$

e. $3\frac{5}{6}$

Name: _____

Date: _____

Yr. & Section: _____

Score: _____ = _____ %

Worksheet 1.2**Answer the following in your notebook.****A. Write the following as a fraction (in lowest term).**

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5. 1.5%

3. $\frac{1}{4}\%$

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13. What is the sales tax on \$34.65 if the tax rate is 6%?

14. What is the sales tax on \$50.03 if the tax rate is 5%?

15. For a \$54.19 order with a rate of 20% and minimum charge of \$3.00. What is the total cost including shipping and handling?