

Important Concepts . . .

Preview Review



Mathematics Grade 8

W1 - Lesson 5: Working with Percents

Important Concepts of Grade 8 Mathematics

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Materials Required

Protractor
Ruler
Calculator

**No Textbook
Required**

**This is a stand-
alone course.**

Mathematics Grade 8

Version 6

Preview/Review W1 - Lesson 5

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Preview/Review Concepts for Grade Eight Mathematics



W1 - Lesson 5:

Working with Percents

OBJECTIVES

By the end of this lesson, you will be able to:

- Determine the percent represented by a grid
- Represent a percent greater than 100 using grid paper
- Convert percents into decimals and fractions
- Convert decimals into percents and fractions
- Convert fractions into percents and decimals
- Solve problems involving percents

GLOSSARY

Percent – a given part for every hundred; for example, 25% means 25 for every 100.

W1 – Lesson 5: Working with Percents

Materials required:

- Paper, Pencil, Calculator, and Grid Paper

Part 1: Representing Percents Greater than 100%

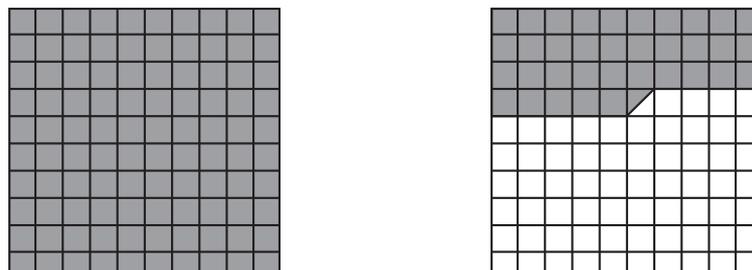
The word percent can be broken down into per-cent which literally means “per hundred.” A percent is used to represent a given part for every hundred and uses a % symbol to indicate that the number is a percent. On your last math test, you may have received a mark of 75%. This means that if 100 questions were written, you would have gotten 75 of them correct. You are used to seeing percents between 0-100, but it is possible to have a percent that is greater than 100.

If you own a business, you will likely increase the price of a product that you purchased in order to make a profit. If you double the price of the product you are marking up the price by 100%.

For example, if you buy a chair for \$75 and sell it for \$150, then you are adding 100% of the cost of the original product to itself and you make \$75 in profits. 75 is 100% of 75, so you have made a 100% profit. Similarly, if you sold the chair for \$225, the mark up in price is \$150. \$150 is 200% of 75, so you have made a 200% profit.

Another example is the work of a photographer. If you go to a portrait studio and ask for a picture to be enlarged, they have the ability to increase it by 150%. This means the picture you receive will be 1 and a half or 1.5 times as large as the original picture you gave them to enlarge.

Percents can be represented using a grid paper with one hundred squares. Each square that is shaded in represents 1%.

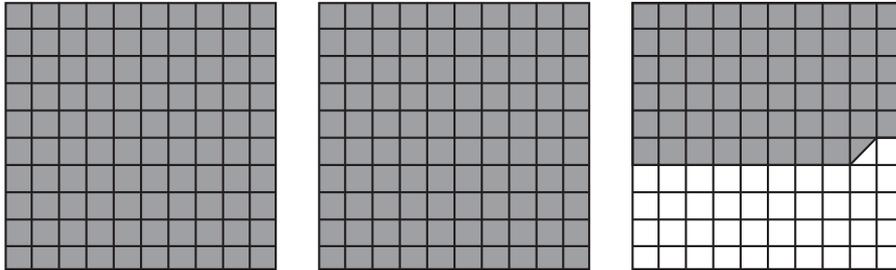


In this example, the completely shaded in grid represents 100%. The partially shaded in grid represents $35\frac{1}{2}\%$.

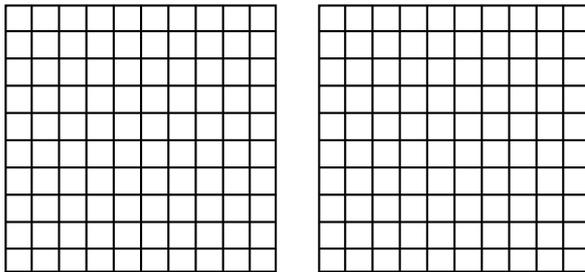
In total $135\frac{1}{2}\%$ is represented by using the grid paper.

Practice Questions

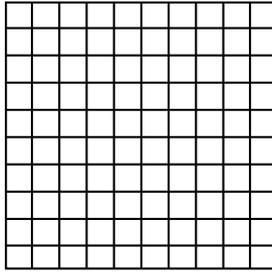
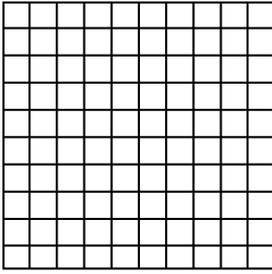
1. Represent the given diagram as a percent, as a decimal number, and in fraction form.



2. Represent 146% using the following grids.



3. Represent 121.5% using the following grids.



Part 2: Relating Percents, Decimals, and Fractions

A percent can also be expressed as a decimal number and in fraction form.

- To express a percent as a decimal, remove the percent symbol, and move the decimal point in the percentage two places to the left.

$$48\% = \underbrace{48}_{\text{move decimal 2 places left}} = 0.48$$

- To express a percent as a fraction, place the percent over 100 and drop the percent symbol. Then simplify the resulting fraction.

$$148\% = \frac{148}{100} = \frac{148 \div 4}{100 \div 4} = \frac{37}{25} = 1\frac{12}{25}$$

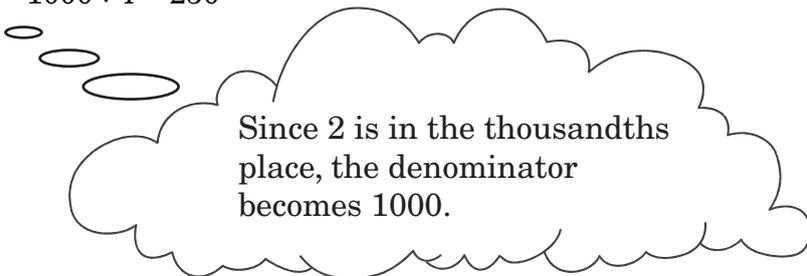
A decimal can also be expressed as a percent and in fraction form.

- To express a decimal as a percent, move the decimal point two places to the right and add a percent symbol at the end of the number.

$$0.572 = \underbrace{0.572}_{\text{move decimal 2 places right}} = 57.2\%$$

- To express a decimal as a fraction, place the decimal number over a denominator that is equal to the last place value in the decimal number and remove the decimal point. Then simplify the resulting fraction.

$$0.572 = \frac{572}{1000} = \frac{572 \div 4}{1000 \div 4} = \frac{143}{250}$$



Since 2 is in the thousandths place, the denominator becomes 1000.

A fraction can also be expressed as a percent and as a decimal number.

- To express a fraction as a decimal, divide the numerator by the denominator.

$$\frac{5}{8} = 5 \div 8 = 0.625$$

Mixed numbers can also be expressed as decimals by applying the same rules.

$$2\frac{4}{5} = 2 + (4 \div 5) = 2 + 0.80 = 2.80$$

- To express a fraction as a percent, divide the numerator by the denominator, and move the decimal point two places to the right. Then add a percent symbol behind the resulting number.

$$\frac{5}{8} = 5 \div 8 = 0.625 = 62.5\%$$

Mixed numbers can also be expressed as percentages by applying the same rules.

$$2\frac{4}{5} = 2 + (4 \div 5) = 2 + 0.80 = 2.80 = 280\%$$

Practice Questions

1. Express the following percents as a decimal number and in fraction form.

- a. 382%

- b. 166%

2. Express the following decimals as a percent and in fraction form.

a. 1.18

b. 2.05

3. Express the following fractions as a decimal number and a percent.

a. $3\frac{7}{10}$

b. $\frac{12}{5}$

Part 3: Problem Solving with Percents

To solve problems involving percents, you must convert the percent into a decimal first. Then it is possible to complete the calculations.

Example 1

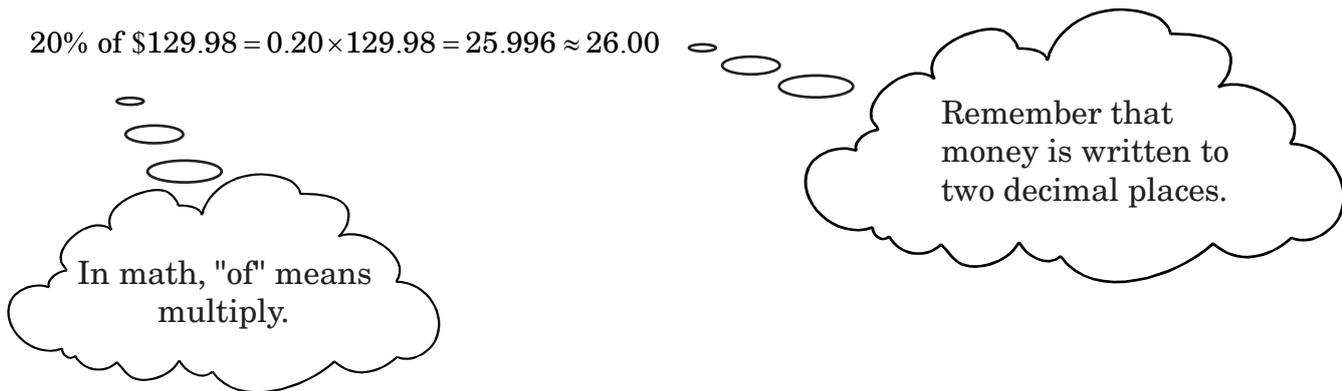
A clothing store is discounting all its out-of-season stock for 15% off the sale price. Isaiah wants to buy a jacket that is on sale for 20% off its original price. If the original price of the jacket is \$129.98, how much will it cost Isaiah to purchase the jacket before taxes?

Answer:

Step 1: Calculate the sale price after applying the 20% discount.

Convert 20% into a decimal and then complete the calculation.

$$20\% \text{ of } \$129.98 = 0.20 \times 129.98 = 25.996 \approx 26.00$$



Subtract the amount of the first discount from the original price of the jacket.

$$129.98 - 26 = \$103.98$$

Step 2: Calculate the final price after applying the 15% discount.

Convert 15% into a decimal and then complete the calculation.

$$15\% \text{ of } \$103.98 = 0.15 \times 103.98 = 15.597 \approx 15.60$$

Subtract the amount of the second discount from the sale price of the jacket.

$$\$103.98 - 15.60 = \$88.38$$

Isaiah will pay \$88.38 for the jacket.

Example 2

Megan lives in Victoria and wants to buy a new pair of shoes that cost \$59.99. How much will the shoes cost in total, including GST & PST? (The PST in British Columbia is 7%).

Answer:

Step 1: Calculate the amount of the GST.

Convert the GST into a decimal and complete the calculation.

$$5\% \text{ of } \$59.99 = 0.05 \times 59.99 = 2.9995 \approx 3.00$$

Step 2: Calculate the amount of the PST.

Convert the PST into a decimal and complete the calculation.

$$7\% \text{ of } \$59.99 = 0.07 \times 59.99 = 4.1993 \approx 4.20$$

Step 3: Calculate the total cost of the shoes.

Add the GST and the PST to the original price of the shoes.

$$\$59.99 + 3.00 + \$4.20 = \$67.19$$

Alternate solution:

Because the taxes are being taken off the same amount, they can be added together and the final price can be calculated in a fewer number of steps.

Step 1: Add the GST & PST together.

$$5\% + 7\% = 12\%$$

Step 2: Calculate the total cost of the shoes.

Convert the total taxes into a decimal and complete the calculation.

$$12\% \text{ of } \$59.99 = 0.12 \times 59.99 = 7.1988 \approx 7.20$$

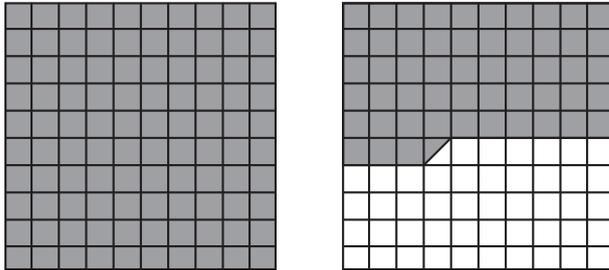
Add the amount of the taxes to the original price of the shoes.

$$59.99 + 7.20 = \$67.19$$

Megan will pay \$67.19 for the new pair of shoes.

Lesson 5: Assignment

- Determine the number represented by the following grid. Express the answer as a percent, a decimal number and in fraction form.



- Express the following percents as decimal numbers and in fraction form.

a. 121%

b. 34%

c. 279%

3. Express the following decimals as percents and in fraction form.

a. 1.56

b. 2.85

c. 5.42

4. Express the following fractions as decimal numbers and as percents.

a. $2\frac{5}{8}$

b. $\frac{18}{4}$

c. $5\frac{3}{4}$

5. Emma had 44 shots on goal during hockey practice and scored 11 times. What percent of her shots were saved?
6. There were 224 people in the movie theatre on Thursday night. Approximately 63% of them had popcorn. How many people in the theatre had popcorn that night?

7. The original price of a DVD player is \$148.99 and it is on sale for 15% off. There is a further 10% discount taken off at the cash register. What is the cost of the DVD player before taxes?

8. The price tag on a mountain bike in Ontario is \$114.00. What is the total cost of the bike including all applicable taxes? (The PST in Ontario is 8%).

9. What is the total cost of a leather jacket that costs \$399.00 and is on sale for 75% off, if it is purchased in Alberta? (There is no PST in Alberta).

10. The population of MetroTown was 570 000. The next year, the population increased by 10%. In the following year after that, the population increased by another 12%. What is the population of MetroTown now?

