

*Important Concepts . . .*

# Preview Review



**Mathematics    Grade 8**

**W1 - Lesson 5: Working with Percents**

## Important Concepts of Grade 8 Mathematics

|                     |  |
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| W3 - Review         |  |
| W3 - Quiz           |  |

## 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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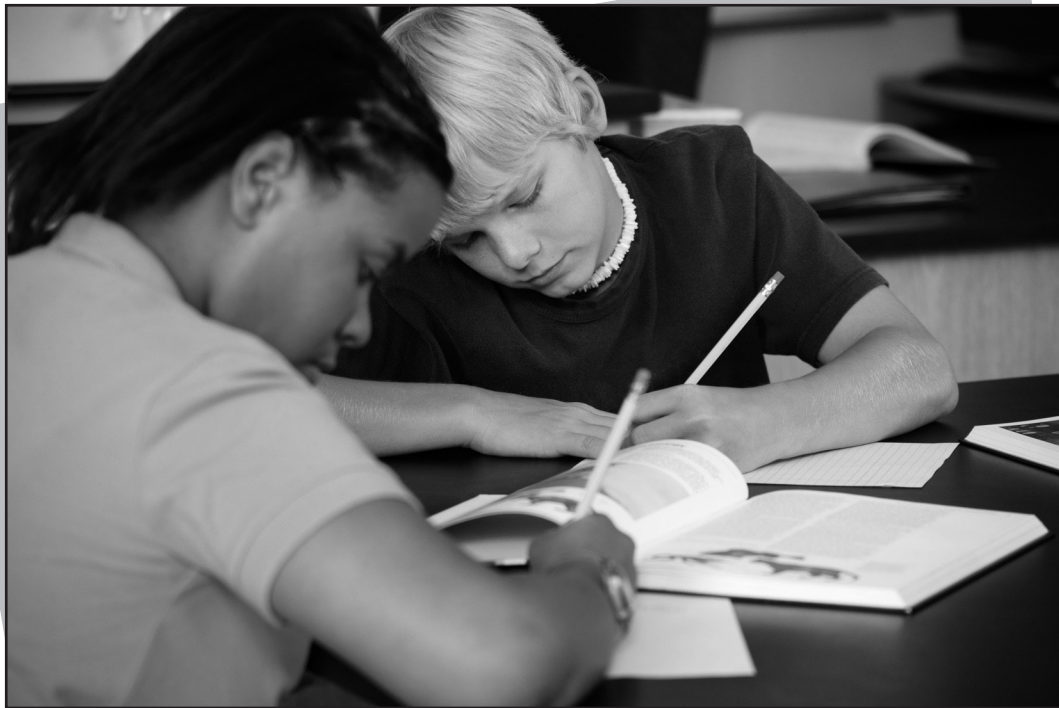
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# **Preview/Review Concepts for Grade Eight Mathematics**



***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%

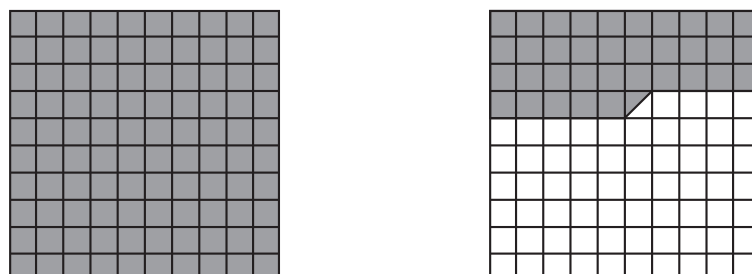
The word percent can be broken down into per-cent which literally means “per hundred.” A percent is used to represent a given part for every hundred and uses a % symbol to indicate that the number is a percent. On your last math test, you may have received a mark of 75%. This means that if 100 questions 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%.

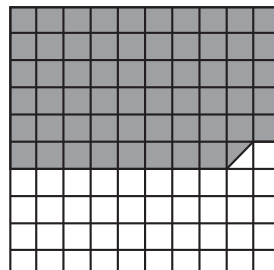
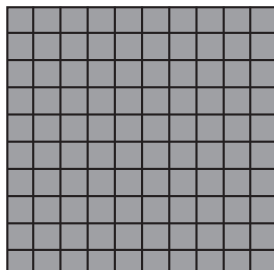
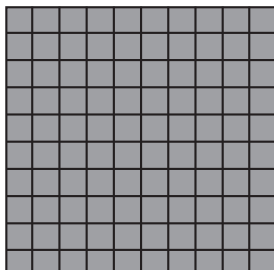


In this example, the completely shaded in grid represents 100%. The partially shaded in grid represents  $35\frac{1}{2}\%$ .

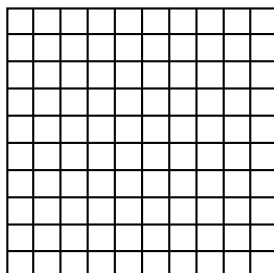
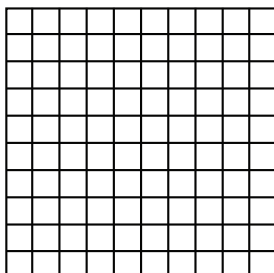
In total  $135\frac{1}{2}\%$  is represented by using the grid paper.

## Practice Questions

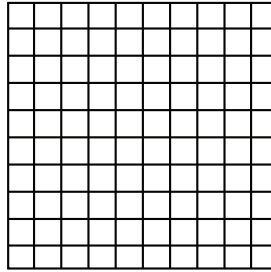
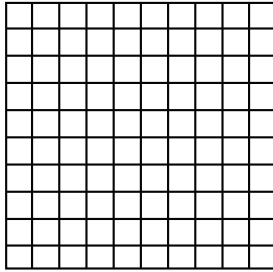
1. Represent the given diagram as a percent, as a decimal number, and in fraction form.



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.

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

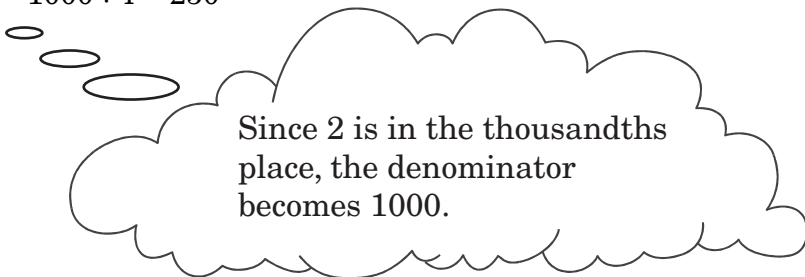
A decimal can also be expressed as a percent and in fraction form.

- 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.

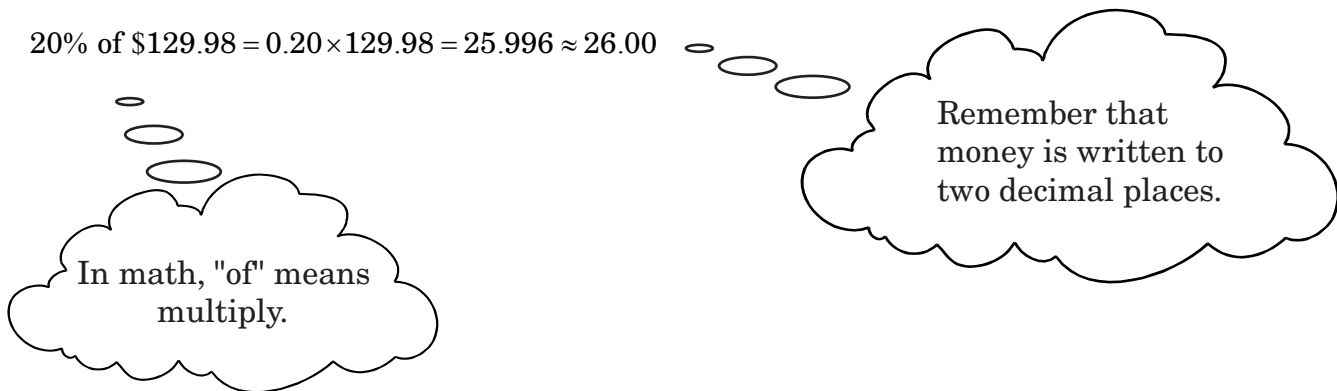
### Example 1

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.

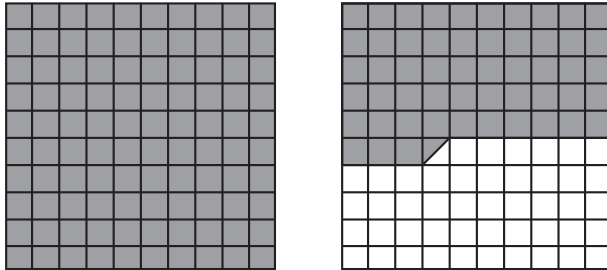
$$59.99 + 7.20 = \$67.19$$

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

1. An MP3 player in Regina costs \$19.99 and is discounted by 25%. What is the total cost of the MP3 player including all appropriate taxes? (The PST in Saskatchewan is 6%).
2. One summer, Chloe counted 320 ducks in a lake. The following summer Chloe noticed that only 80% of the ducks returned. How many ducks returned that following summer?

## Lesson 5: Assignment

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



2. 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.  $5\frac{3}{4}$





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?



