

PERCENT

Percent means 'per one hundred' or 'out of one hundred.' It refers to the number of parts out of one hundred. 47% means 47 parts out of 100 or $47/100$. Remember that the percent symbol (%) is a unit.

Percent to decimal

Percents can be changed to a decimal by simply dividing by 100. $84\% = 84 \div 100 = 0.84$

Practice changing the percent to a decimal:

- | | |
|----------|-----------|
| 1) 29% | 5) 1.78% |
| 2) 31.6% | 6) 100% |
| 3) 125% | 7) 0.98% |
| 4) 7.2% | 8) 47.63% |

Decimal to percent

Decimals can be changed into percent form by multiplying by 100. $0.38 = 0.38 \times 100 = 38\%$

Practice changing the decimal into a percent:

- | | |
|----------|-----------|
| 1) 0.39 | 5) 0.0371 |
| 2) 0.465 | 6) 0.001 |
| 3) 0.07 | 7) 0.999 |
| 4) 1.25 | 8) 1.00 |

Part of total

To find the part of a given amount or quantity:

1. change the percent to a decimal
2. multiply the decimal times the quantity (total)

Practice finding the part of amount (total):

- 1) 25% of 20.0 kg
- 2) 60% of 78 mL
- 3) 5% of 39 s
- 4) 50% of 361 L
- 5) 2.6% of 94 cm
- 6) 125% of 155 people

Percent of total

In order to determine how the amount a portion of a total represents in terms of percent:

1. Divide the part by the total and multiply by 100 (don't forget % as unit)
2. Round to sig figs using only the part and total values

$$\% = \frac{\text{part}}{\text{total}} \times 100$$

Practice problems finding percent of total:

- 1) A candy bar contains 14g fat. This total fat is 3.0g saturated fat and 11g unsaturated fats. What percent of the candy bar is saturated fat? What percent is unsaturated fat?
- 2) The volume of a solution containing acid and water is 85.0mL. If it contains 18mL of acid, what percent of the solution is acid?
- 3) The ice cream container is 2.36 kg and there is 0.26 kg of chocolate chips in it, what percent of the ice cream is chocolate chips?

Percent Difference

In order to compare measurements (values) using percent difference:

1. Find the absolute value of the difference b/w values (lg-sm)
2. Determine the average of the lab results by adding the values together and dividing by the number of values given
3. Divide the difference by the average and multiply by 100
4. Round to sig figs (using only lab results) and label w/ % unit

$$\% \text{ difference} = \frac{\text{difference b/w lab results}}{\text{average of lab results}} \times 100$$

Practice percent difference:

- 1) Sally measured the length to be 34.5cm. She measured again using a different ruler and found it to be 33.9cm. What is the percent difference b/w her measurements?
- 2) Lulu determined the mass to be 117.6g and Sophie found it to be 119.2g. What is the percent difference between their measurements?

Percent Error

Percent error is very important. It allows us to determine error in our values. We can compare a measured value to the correct (actual, theoretical) value by:

1. Find the absolute difference b/w the lab result and the correct value (lg-sm)
2. Divide the difference by the correct value and multiply by 100
3. Round to sig figs (using only the lab and correct values) and label w/ % unit

$$\% \text{ error} = \frac{\text{difference b/w lab result and correct value}}{\text{correct value}} \times 100$$

Practice percent error

- 1) I found the density of the rock to be 9.5g/cm³. The rock's density is really 9.0g/cm³. What is my percent error?
- 2) Louisa measured the volume chemical solution to be 632.1mL. It was actually 630.0mL. What is the percent error?