

PERCENTAGES

Start by watching this 1-minute video on Why Percentages

<https://www.bbc.co.uk/teach/skillswise/percentages/z74vxyc>

A longer video to watch:

<https://www.homeschoolmath.net/teaching/percent/percent.php>

Percentage means per 100. In fractions it means something/100

$$42\% = \frac{42}{100}$$

$$95.3\% = \frac{95.3}{100}$$

$$61\% = \frac{61}{100}$$

This also means that

$100\% = \frac{100}{100} = 1$ whole – which is the whole amount. So 100% of something is ALL OF IT!

$10\% = \frac{10}{100} = \frac{1}{10}$ which is 1 tenth

$25\% = \frac{25}{100} = \frac{1}{4}$ which is 1 quarter

$50\% = \frac{50}{100} = \frac{1}{2}$ which is 1 half

Try this quiz:

https://www.transum.org/software/SW/Starter_of_the_day/Students/Percentages.asp



QUESTION 1

Find these percentage amounts of the figures listed

$$100\% \text{ of } 42 = \underline{\hspace{2cm}}$$
$$= \underline{\hspace{2cm}}$$

$$10\% \text{ of } 20 = \underline{\hspace{2cm}}$$
$$= \underline{\hspace{2cm}}$$

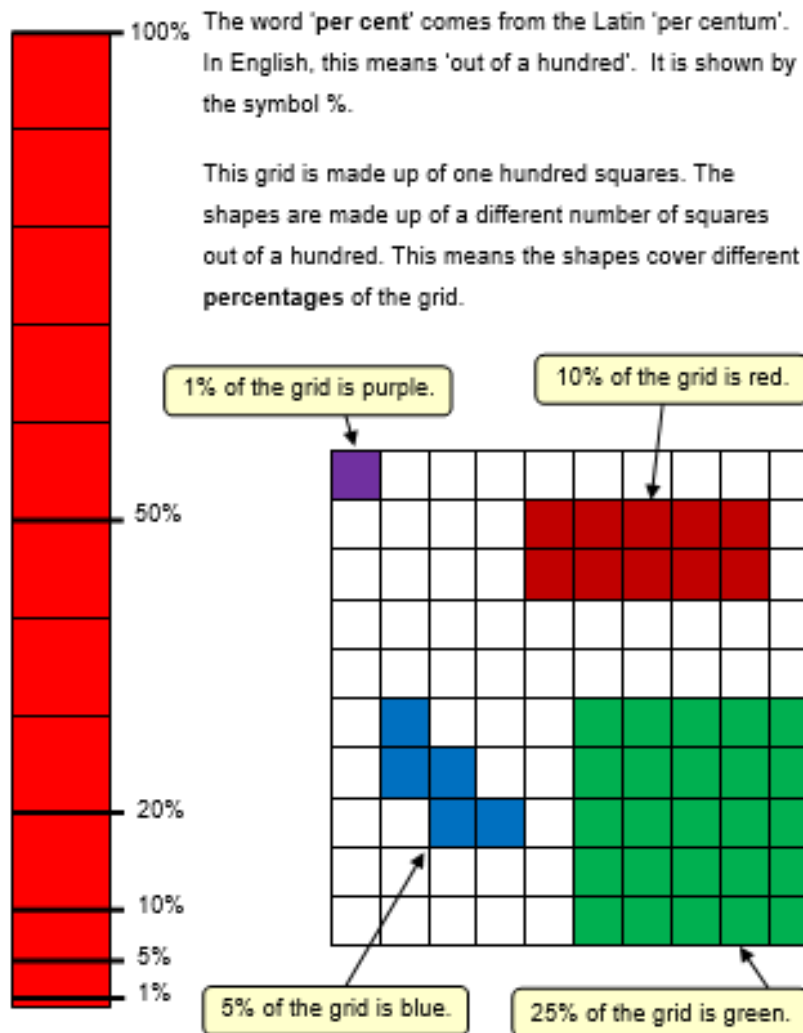
$$50\% \text{ of } 50 = \underline{\hspace{2cm}}$$
$$= \underline{\hspace{2cm}}$$

$$50\% \text{ of } 150 = \underline{\hspace{2cm}}$$
$$= \underline{\hspace{2cm}}$$

$$25\% \text{ of } 72 = \underline{\hspace{2cm}}$$
$$= \underline{\hspace{2cm}}$$

$$25\% \text{ of } 12 = \underline{\hspace{2cm}}$$
$$= \underline{\hspace{2cm}}$$

What is a percentage?



Why compare fractions and percentages? Watch the video here

<http://www.bbc.co.uk/skillswise/topic/comparing-fractions>



QUESTION 2

Find these percentage amounts of the figures listed (try to do these in your head)

a) 100% of 48 = _____ = _____

b) 100% of 36 = _____ = _____

c) 50% of 52 = _____ = _____

d) 50% of 38 = _____ = _____

e) 50% of 112 = _____ = _____

f) 50% of 1680 = _____ = _____

g) 50% of 280 = _____ = _____

h) 25% of 48 = _____ = _____

i) 25% of 40 = _____ = _____

j) 25% of 56 = _____ = _____

k) 25% of 400 = _____ = _____

l) 25% of 100 = _____ = _____

m) 25% of 200 = _____ = _____

n) 10% of 80 = _____ = _____

o) 10% of 860 = _____ = _____

p) 10% of 45 = _____ = _____

q) 10% of 56 = _____ = _____

r) 10% of 820 = _____ = _____

s) 10% of 11460 = _____ = _____

t) 1% of 1100 = _____ = _____

u) 1% of 2500 = _____ = _____



QUESTION 3

First find 10% of the following amounts, then find the amount listed. (try to do these in your head as much as possible)

AMOUNT	10%	20%	40%	80%
4420				
380				
100				
10				
940				
200				
56				



QUESTION 4

First find 10%, then 1% of the following amounts, then find the amount listed. (try to do these in your head as much as possible)

AMOUNT	10%	1%	2%	4%	5%	7%
360						
240						
1100						
1300						
5000						
10000						



QUESTION 5

Use a calculator to find the percentages of the following:

a) 13% of 279= _____ = _____

b) 18% of 492= _____ = _____

c) 99% of 990= _____ = _____

d) 54% of 260= _____ = _____

e) 12.5% of 1145.70= _____ = _____

f) 21.2% of 68203.42= _____ = _____

PERCENTAGE OFF

Percentage OFF something – Most often used with regards to money, sales and discounts

Percentage OFF something means find that percentage, and take it off the original price.

This is a two-step calculation.

EXAMPLE

What is 12% **off** 480

$$12\% \text{ of } 480 = 57.60$$

$$\text{So } 12\% \text{ off is } 480 - 57.60$$

$$422.40$$

Do you know of another way to decrease 480 by 12%?

Write the method down here:

WHAT PERCENTAGE IS?

What percentage is something?

To find the percentage something is of a whole, take $\frac{\text{what you want}}{\text{the total there is}} \times 100$.

EXAMPLE

What percent is 482 of 1780

$$\frac{\text{what you want}}{\text{the total there is}} \times 100$$
$$\frac{482}{1780} \times 100 = 27.08\%$$



QUESTION 6

1. What percentage of 65 is 13?

2. If 12 out of 21 students in a class are girls, then, to the nearest percent, what percent of the class is composed of girls?

3. In a laboratory test on 360 light globes, 16 globes were found to be defective. What percentage were satisfactory (to one decimal place)?

4. After three rounds of a basketball competition, a basketball team had scored 300 points and had 360 points scored against them. Express the points scored by the team as a percentage of the points scored against them.

5. In a population of $3\frac{1}{4}$ million people, 2115000 are under the age of 16. Calculate the percentage, to two decimal places, of the population who are under the age of 16.

PERCENTAGE INCREASE AND DECREASE

When increasing or decreasing a quantity by a given percentage, the percentage increase or decrease is always calculated as a percentage of the original amount.

Example: Sally's daily wage of \$175 is increased by 15%. Calculate her new weekly wage.

$$\begin{aligned} 15\% \text{ of } 175 &= \frac{15}{100} \times 175 \\ &= 26.25 \end{aligned}$$

$$\begin{aligned} \text{Sally's new salary} &= 175 + 26.26 \\ &= \$201.25 \end{aligned}$$

5. Due to the closure of a large business in the area, a school is expecting an 11% drop in its student numbers for the next year. If the current enrolment is 684 students, what is the anticipated enrolment for the next year?

Try this quiz:

https://www.transum.org/software/SW/Starter_of_the_day/Students/PercentageChange.asp

FINDING THE WHOLE FROM A GIVEN PERCENTAGE

If a percentage of an amount is known, then the whole amount can be found by using the unitary method. This involves dividing to find 1% then multiplying by 100 to find 100%

Example: If 15% of an unknown number is \$9, find the whole amount

1% is 9 divided by 15 = \$0.6 (or 60 cents)

The whole (100%) = 0.6×100
= \$60 ie \$9 is 15% of \$60

Example: A TV discounted by 20% now sells for \$2100. What was the original price?

A 20% discount means that that \$2100 is 80% of the original price. The original price is 100% and 20% off leaves 80%.

1% is 2150 divided by 80 = 26.25

The whole (100%) = 26.25×100 = \$2625



QUESTION 8

1. Find the whole amount if 75% is 150 km.

2. 245 students at a school voted for a new uniform. If this is 35% of the school population, what is the school population?

3. The cost of a holiday is discounted by 25%. The holiday now costs \$4800. What was the original cost of the holiday?

4. The profit on an iPod is 65% of the cost price. If the profit is \$106, find the cost price correct to the nearest dollar

QUESTION 1

Thomas told me that there was to be a big clearance sale of books, and they were 50% off the already 50% off prices. I said – are you serious? They are giving them away for free?

Are the books free? Support your answer using mathematics.

QUESTION 2

When doing moderate exercise, a relatively fit person should have a heart rate between 120-170 (for under 20 year olds). This is between 60% and 85% of the maximum heart rate.

What is the maximum heart rate for this age group?