Sect 4.3 – Introduction to Percents

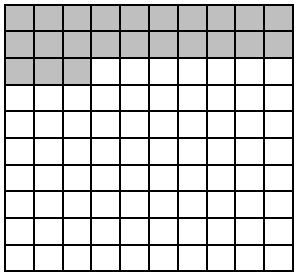
Objective 1: Understanding Percents

The word percent comes from the Latin phrase "per centum" which means “out of 100” or “per 100”. We use the symbol “%” to denote a percent. Thus, we can write fourteen percent as 14%.
Some examples are:

Percent	Interpretation
1) 87% of the students receive financial aid	87 out of every 100 students receive financial aid.
2) Sales tax rate is 8%	$8 in sales tax is charged for every $100 purchased.
3) 4.5% of the material went to waste.	4.5 lb out of every 100 lb of material went to waste.
4) The city spent 135% of the original estimate for a project.	The city spent $135 for every $100 of the original estimate for a project.

Consider the following figures and answer the questions:

Ex. 1



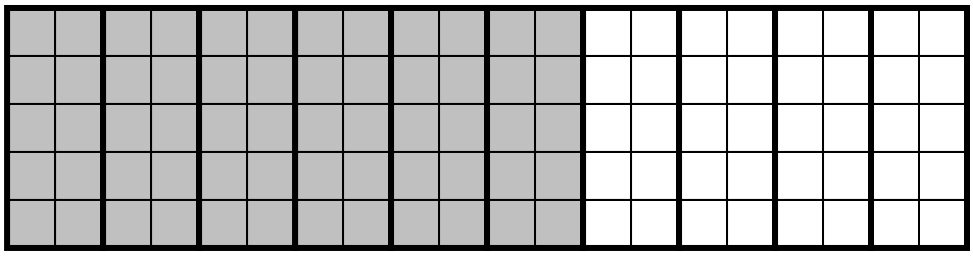
a) What percent of the figure is shaded?
b) What percent of the figure is not shaded?

Solution:

a) Since 23 out of 100 blocks are shaded, then 23% is shaded.
b) Since 77 out of 100 blocks is not shaded, then 77% is not shaded.

Notice that 23 out of 100 is also equal to the fraction $\frac{23}{100}$ and 77 out of 100 is equal to $\frac{77}{100}$.

Ex. 2



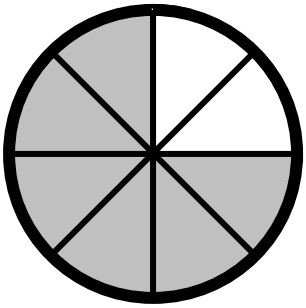
a) What percent of the figure is shaded?
b) What percent of the figure is not shaded?

Solution:

a) Since $\frac{60}{100}$ of the blocks are shaded, then 60% is shaded.

b) Since $\frac{40}{100}$ of the blocks are not shaded, then 40% is not shaded.

Ex. 3



a) What percent of the figure is shaded?
b) What percent of the figure is not shaded?

Solution:

a) Since 6 out of eight slices are shaded, then the fraction that is shaded is $\frac{6}{8} = \frac{3}{4}$. To find the percent, we need to find the numerator of the fraction that has a denominator of 100:

$\frac{3}{4} = \frac{p}{100}$ (cross multiply)

$300 = 4p$ (divide by 4)

$p = 75\%$.

So, 75% of the pie is shaded.

b) Since 100 – 75 = 25, then 25% is not shaded.

Objective 2: Converting a percent to a fraction.

Converting a Percent to a Fraction:

$P\% = \frac{P}{100}$ or $P \div 100$

Write the following as a fraction:

Ex. 4a 65% Ex. 4b 0.5%

Ex. 4c 144% Ex. 4d $16\frac{1}{3}\%$

Ex. 4e 0.015%

Solution:

a) Take $65 \div 100$ and then write your answer as a fraction.

$0.65 = \frac{65}{100} = \frac{13}{20}$.

b) Take $0.5 \div 100$ and then write your answer as a fraction.

$0.005 = \frac{5}{1000} = \frac{1}{200}$.

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c) Take $144 \div 100$ and then write your answer as fraction.

$1.44 = 1\frac{44}{100} = 1\frac{11}{25}$.

d) Take $16\frac{1}{3} \div 100$ and then simplify.

$\frac{49}{3} \bullet \frac{1}{100} = \frac{49}{300}$.

e) Take $0.015 \div 100$ and then write your answer as fraction..

$0.00015 = \frac{15}{100000} = \frac{3}{20000}$.

(Note, converting 0.00015 into a fraction on a calculator does not work. This one you have to do by hand.)

To convert fractions into percents, instead of dividing by 100, we will multiply by 100%

Objective 3: Converting a fraction to a percent.

Converting a Fraction to a Percent:

F = F•100%

Write the following as a percent:

Ex. 5a $\frac{2}{5}$ Ex. 5b $3\frac{3}{8}$

Ex. 5c $6\frac{4}{7}$ Ex. 5d $\frac{11}{12}$

Solution:

a) Multiply $\frac{2}{5}$ by 100% and simplify: $\frac{2}{5}\bullet\frac{100\%}{1} = \frac{2}{1}\bullet\frac{20\%}{1} = 40\%$.

b) Multiply $3\frac{3}{8}$ by 100% and simplify: $3\frac{3}{8}\bullet\frac{100\%}{1} = \frac{27}{8}\bullet\frac{100\%}{1}$
$= \frac{27}{2}\bullet\frac{25\%}{1} = \frac{675\%}{2} = 337\frac{1}{2}\%$ or 337.5%.

c) Multiply $6\frac{4}{7}$ by 100% and simplify: $6\frac{4}{7}\bullet\frac{100\%}{1} = \frac{46}{7}\bullet\frac{100\%}{1}$
$= \frac{4600\%}{7} = 657\frac{1}{7}\%$.

d) Multiply $\frac{11}{12}$ by 100% and simplify: $\frac{11}{12}\bullet\frac{100\%}{1} = \frac{11}{3}\bullet\frac{25\%}{1}$
$= \frac{275\%}{3} = 91\frac{2}{3}\%$.

Converting between percents and decimals works in a similar fashion to converting between fractions and percents. To convert a percent to a decimal, divide the percent by 100.

Objective 4: Converting a percent to a decimal.

Converting a Percent to a Decimal:

P% = P ÷ 100

This will move the decimal point two places to the left.

We can use money as an analogy for converting percents to decimals. Since 56¢ = $0.56, then 56% = 0.56. The percent is our cent and the dollar is our decimal.

Write the following as decimals:

Ex. 6a 765% Ex. 6b 7%
Ex. 6c 5.32% Ex. 6d 46.3%

Solution:

a) 765% = 765 ÷ 100 = 7.65.

b) 7% = 7 ÷ 100 = 0.07.

c) 5.32% = 5.32 ÷ 100 = 0.0532.

d) 46.3% = 46.3 ÷ 100 = 0.463.

Just like working with fractions, to convert a decimal into a percent, multiply the decimal by 100%.

Objective 5: Converting a decimal to a percent

Converting a Decimal to a Percent:

D = D•100%
This will move the decimal two places to the right.

Again, we can use money as an analogy for converting percents to decimals. Since $0.56 = 56¢, then 0.56 = 56%. The dollar is our decimal and the percent is our cent.

Write the following as a percent:

Ex. 7a 0.9 Ex. 7b 34
Ex. 7c 0.3 Ex. 7d 9.548
Ex. 7e 0.0005

Solution:

a) 0.9 = 0.9(100%) = 90%.

b) 34 = 34(100%) = 3400%.

c) 0.3 = 0.3(100%) = = 30%

d) 9.548 = 9.548(100%) = 954.8% = 954.8%.

e) 0.0005 = 0.0005(100%) = 0.05%.