Percentages

Contemporary Math

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TTU

07 July 2015

Percent (Definition)

- **Percents** are pervasive in **Finance** (this chapter), Probability & Statistics.

Percent (Conversions)

PERCENT	DECIMAL	FRACTION
2%	0.02	$\frac{2}{100}$
12%	0.12	$\frac{12}{100}$
243%	2.43	$\frac{243}{100}$

Percent (Conversions)

PERCENT	DECIMAL	FRACTION
2.5%	0.025	$\frac{2.5}{100} = \frac{25}{1000}$
12.5%	0.125	$\frac{12.5}{100} = \frac{125}{1000}$
243.5%	2.435	$\frac{243.5}{100} = \frac{2435}{1000}$

Percent (Conversions)

PERCENT	DECIMAL	FRACTION
2.57%	0.0257	$\frac{2.57}{100} = \frac{257}{10000}$
12.57%	0.1257	$\frac{12.57}{100} = \frac{1257}{10000}$
243.57%	2.4357	$\frac{243.57}{100} = \frac{24357}{10000}$

Percent (Conversions)

PERCENT	DECIMAL	FRACTION
0.2%	0.002	$\frac{0.2}{100} = \frac{2}{1000}$
0.12%	0.0012	$\frac{0.12}{100} = \frac{12}{10000}$
0.243%	0.00243	$\frac{0.243}{100} = \frac{243}{100000}$

Percent (Conversions)

PERCENT	DECIMAL	FRACTION
0.02%	0.0002	$\frac{0.02}{100} = \frac{2}{10000}$
0.012%	0.00012	$\frac{0.012}{100} = \frac{12}{100000}$
0.0243%	0.000243	$\frac{0.0243}{100} = \frac{243}{1000000}$

Percents (Example)

WEX 8-1-1: In a bag of 24 blocks, 37.5% of the blocks are green. How many blocks are green?

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$$0.375(24) = 9 \implies \boxed{\text{There are 9 green blocks}}$$

$$\left(\begin{array}{c} \text{The symbol} \implies \text{is read "which implies that"} \\ \text{More will be said while covering } \textbf{Logic} \text{ (Ch4)} \end{array} \right)$$

Percents (Example)

WEX 8-1-2: In a bag of 21 blocks, 8 are red.
What percent of the blocks are red?

Percents (Example)

WEX 8-1-2: In a bag of 21 blocks, 8 are red.
What percent of the blocks are red?

$$\frac{8}{21} = 0.380952381 \approx 0.3810 \implies \boxed{38.10\% \text{ of the blocks are red}}$$

Percent Change (Definition)

Definition

$$(Percent\ Change) = \frac{(New\ Amount) - (Base\ Amount)}{(Base\ Amount)}$$

$$(New\ Amount) = (Base\ Amount) \times [1 + (Percent\ Change)]$$

$$(Base\ Amount) = \frac{(New\ Amount)}{1 + (Percent\ Change)}$$

IMPORTANT: Always write the $(Percent\ Change)$ quantity in **decimal form**.

"**Percent Increase**" means a **positive percent change**.
"**Percent Decrease**" means a **negative percent change**.

REMARK: Books often write "percent **of** change" – I'll never write or say "of".

Percent Change (Lexicon)

The following phrases all represent a **15% increase**:

- up 15%
- buy 15% of
- 15% rise
- 15% pay raise
- 15% markup
- 15% appreciation
- 15% tax
- 15% inflation

The following phrases all represent a **9% decrease**:

- down 9%
- sell 9% of
- 9% fall
- 9% pay cut
- 9% markdown
- 9% depreciation
- 9% deflation

Percent Change (Example)

WEX 8-1-3:

A car dealership with 150 cars sells 12% of its inventory in one month. How many cars remain after one month?

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WEX 8-1-3:
A car dealership with 150 cars sells 12% of its inventory in one month. How many cars remain after one month?

$$\begin{aligned}
(\textit{New Amount}) &= (\textit{Base Amount}) \times [1 + (\textit{Percent Change})] \\
&= 150[1 + (-0.12)] \\
&= 150(1 - 0.12) \\
&= 150(0.88) \\
&= 132
\end{aligned}$$

$\therefore$ 132 cars remain after one month

Percent Change (Example)

WEX 8-1-4:

Bob purchases some stock in March of 2013.
Six months later, the stock's worth $2000, which is 23% higher than in March.
How much was the stock worth in March?

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How much was the stock worth in March?

$$
\begin{aligned}
(\textit{Base Amount}) &= \frac{(\textit{New Amount})}{1 + (\textit{Percent Change})} \\
&= \frac{2000}{1 + 0.23} \\
&= \frac{2000}{1.23} \\
&= 1626.016260 \\
&\approx 1626.02 \quad (\text{Round to } \textbf{nearest penny})
\end{aligned}
$$

$\therefore$ The stock was worth $1626.02 in March

Percent Change (Example)

WEX 8-1-5:
The price of gasoline increases from $3.92/gallon to $4.27/gallon in 3 weeks. What is the percent of increase in the price of gasoline?

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The price of gasoline increases from \$3.92/gallon to \$4.27/gallon in 3 weeks. What is the percent of increase in the price of gasoline?

$$
\begin{aligned}
(\textit{Percent Change}) &= \frac{(\textit{New Amount}) - (\textit{Base Amount})}{(\textit{Base Amount})} \\
&= \frac{4.27 - 3.92}{3.92} \\
&= \frac{0.35}{3.92} \\
&= 0.089285714 \\
&\approx 0.0893 \quad (\text{Round decimal to } \textbf{four} \text{ decimal places...}) \\
&= 8.93\% \quad (\text{...so that the percent has two decimal places.})
\end{aligned}
$$

$\therefore$ The price of gasoline increased 8.93%

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