## Per Capita

In Statistics, Per Capita means the average per person in a population.
Example 1 Many business, health, and economics statistics are expressed as per capita figures. In March 2008, the national wealth of Canada was $\$ 5702000000$ 000. The national debt was $\$ 23000$ 000 000. The population of Canada was 33223840.
a. What was Canada's per capita wealth?
b. What was Canada's per capita debt?
c. Net worth is calculated as total assets (wealth) minus total liabilities (debt). What was Canada's per capita net worth?

## Percent Change

Percent change measures a change in value over time.

$$
\text { Percent Change }=\frac{\text { new value }- \text { old value }}{\text { old value }} \times 100
$$

Example 2 The table shows a company's profits each year for five years, as reported in a newspaper.

| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Profit (\$) | 186000 | 364000 | 728000 | 212000 | -22000 |

a. Calculate the percent change in profit
i. from 2005 to 2006
ii. from 2008 to 2009
b. The company's financial report stated: "There was a $200 \%$ increase in profits from 2006 to 2007 ". Is this true?
c.

## Percentile and Percentile Rank

A percentile is a number between 1 to 99 indicating the percent of the population with a score less than or equal to a specific value.

A percentile rank is the percent of the population with a score less than a specific score.

## To find the percentile rank:

1. Sort the scores from least to greatest.
2. Use the formula $p=\left(\frac{L+0.5 E}{n}\right) \times 100$ where $p$ is the percentile rank
$L$ is the number of scores less than a particular score
$E$ is the number of scores equal to the score (including itself)
n is the number of scores

Example 3 The table gives the scores on a high school math contest, ranked from lowest to highest.

| Score | 5 | 8 | 9 | 11 | 11 | 11 | 13 | 14 | 16 | 17 | 18 | 19 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Rank | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

a. Determine the percentile rank of each score
i. 14
ii. 11

## To find the score that corresponds to a particular percentile:

1. Calculate $n \times p$
2. If $n \times p$ is a whole number:

The position of the score is the mean or average of $n \times p$ and $(n \times p)+1$
If $n \times p$ is a decimal number:
Round the number up to find the position of the score
3. Find the score using its position by counting from the lowest score

Example 4 For the contest scores in Example 3, which score is in the
a. $75^{\text {th }}$ percentile?
b. $95^{\text {th }}$ percentile?

## Weighted Mean

A weighted mean is used when each component in a calculation has a different weighting factor.

To calculate a weighted mean: Multiply each value by its weighting factor, add them up, then divide by the sum of the factors.

Example 5 The weightings for the 4 categories of achievement on assessments in this course are: Knowledge 40\%, Application 30\%, Thinking 15\%, and Communication 15\%. What is your overall mark if you get a test back with the following result:
K: 2-
A: $3 \mathrm{~T}: 3+$
C: 2

