

## What's Going On?

**Checking In**

**Minds on**

Percent Change and Per Capita

**Action!**

Percentiles and Weighted Means

**Consolidation**

When are we getting our tests back?

**Learning Goal - I will be able to calculate various statistical measures.**

**Minds on**

## Per Capita

Canada's population is currently estimated at 35,344,962. The country's total area is 9,984,670 km<sup>2</sup>.

If each person had an equal share of land, how much land would we each have?

**0.28 km<sup>2</sup> / person**

**This is a per capita statistic.**

A hand-drawn diagram of a square. The square is drawn with blue lines. The top and bottom sides are labeled with the number 530. The left and right sides are also labeled with the number 530. Inside the square, the text  $A = 0.28$  is written. There are small tick marks on each of the four sides of the square.

## Minds on

### Per Capita

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If each person had an equal share of land, how much land would we each have?

**0.28 km<sup>2</sup> / person**

**This is a per capita statistic.**

### Per Capita

- Means "for each head"
- In stats, it is the average **per person**

**Minds on**

## Percent Change

The table below shows a company's profits each year for five years.

Year	Profit (\$)
2005	186,000
2006	364,000
2007	728,000
2008	212,000
2009	-22,000

*doubled*

The company has claimed that their profits increased ~~200%~~ from 2006 to 2007.

*100%*

Do you agree, why or why not?

No! Their profits increased 100%!



## Percent Change

The table below shows a company's profits each year for five years.

<b>Year</b>	<b>Profit (\$)</b>
2005	186,000
2006	364,000
2007	728,000
2008	212,000
2009	-22,000

What is the percent change in profit from 2005 to 2006?

$$\frac{364,000 - 186,000}{186,000} \times 100\%$$

$$= 0.957 \times 100\%$$

$$= 95.7\%$$

There was a 95.7% increase.

## Minds on

### Percent Change

#### Percent Change

- Measures a change in value over time
- Calculated as:

$$\frac{\textit{new value} - \textit{old value}}{\textit{old value}} \times 100\%$$

## Action!

# Percentiles and Weighted Mean

## Percentile

- A number between 1 and 99 indicating the percent of the population with a score less than, or equal to, a specific value

## Percentile Rank

- The percent of the population with a score less than a specific score

**Action!**

# Percentile

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Grade	52	39	70	68	50	83	83	86	76	90	61	87	74	80	87	35	56	69	51

Determine what score is in the 75th percentile in this class.

50  
 35 39 51 52 56 61 68 69 70

74 76 80 83 83 86  
 67 67 90

19 people

$n \times p$

$19 \times 0.75 = 14.25$

∴ 15 person

Therefore, the 75th percentile is a score of 83%.



**Action!**

# Percentile Rank

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Grade	52	39	70	68	50	83	83	86	76	90	61	87	74	80	87	35	56	69	51

Student #14 got their midterm report card and began bragging that they were in the 80th percentile.

Put them in their place!

80th percentile

who 80th percentile is

$$n \times P$$

$$19 \times 0.8 = 15.2 \quad (16^{th} \text{ person})$$

$$P = \left( \frac{L + 0.5E}{n} \right) \times 100$$

L = 12  
(12 people got less than 80)

E = 1  
(no one else got 80%)

$$P = \left( \frac{12 + 0.5(1)}{19} \right) \times 100$$

n = 19  
(there are 19 people in the class)

$$P = \left( \frac{12.5}{19} \right) \times 100$$

$$P = 66$$

Person 14 is, in fact, in the 66th percentile.

**Action!**

# Percentile and Percentile Rank

## Percentile

The position of a score with a specific percentile is

Average of  $n \times p$  and  $(n \times p) + 1$  *if  $n \times p$  is a whole number*   
*what score/person is the nth percentile*

$n \times p$  rounded up if  $n \times p$  is a decimal

*n is number of people/entries*  
*p is the percentile as a decimal*  
*- 75th percentile:  $p = 0.75$*

## Percentile Rank

$$p = \left( \frac{L + 0.5E}{n} \right) \times 100$$

*\* what percentile am I?*

p is the percentile rank

L is the number of scores less than the given score

E is the number of scores equal to the given score

n is the total number of scores

*\* never less than 1*

**Action!**

## Weighted Mean

In MPM1D, your term mark is worth 70%, EQAO is worth 10%, your culminating is worth 5% and your exam is worth 15%.

A grade 9 gets 223/280 for their term mark, 76/90 on EQAO, 122/130 on their culminating and 112/140 on their exam.

What is their final mark?

**SEE HANDOUT**

## Action!

# Weighted Mean

## Weighted Mean

- A mean in which each component has a different weighting factor.
- To calculate a weighted mean, multiply each value by its weighting factor, then divide by the sum of the factors.

## Consolidation

Getting your tests back, with a catch!

In this course, marks are weighted by category.

Knowledge - 30%

Application - 30%

Thinking - 20%

Communication - 20%

**Determine your ACTUAL mark on the test!**

**Consolidation**

Homework!

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1 - 4, 8, 9