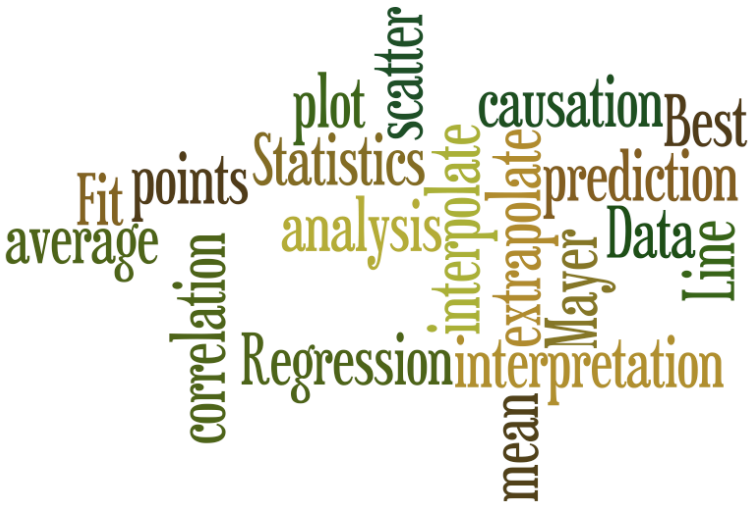
Lesson 3:

Percentile Rank



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Percentile Rank

Percentile is a measure of position (a ranking)

It ranks one of the data values in a position out of 100, hence percentile.

It tells you what percentage of the total data population is equal to or below the specific data value

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R_{100} is how <u>you</u> compare to everyone else!

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On the provincial math, history and science exams, you will be assigned a percentile rank

example: Your math percentile rank is 71 (and this **<u>will</u>** appear on your official transcript). It means that 71% of the Quebec population did **equal to or worse** than you.

The higher your percentile rank, the better you did!

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To calculate Percentile Rank

$$\text{Percentile of } x = R_{100} = \left(\frac{\text{number of data values less than } x + \frac{\text{number of data values equal to } x}{2}}{\text{total number of values}} \right) \times 100$$

example 1. weight of people applying for a jockey job

Determine what percentile 142 falls into, in the distribution below.

$$\underbrace{100, 103, 105, \ldots, 137,}_{75 \text{ values}} \quad \underbrace{142, 142, 145, \ldots, 156}_{50 \text{ values}}$$

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Step 1: Write the beginning of the formula with the value in place of x.

Step 2: *Carefully* count the values for each category and place them in the formula.

**Tip: Remember to include the values that you cannot see but are implied by the brackets*

'Number of data values less than x' → Count how many values come before x
'Number of data values equal to x' → Count how many values are the same as x
'Total number of values' → Count all of the values, including x

Step 3: Perform the calculations for percentile, showing your work for each step.

Step 4: If the percentile is not an integer, round up to the nearest integer

*****Note:*** *no matter what value is in the decimal,* ***always round up*** *at this step*

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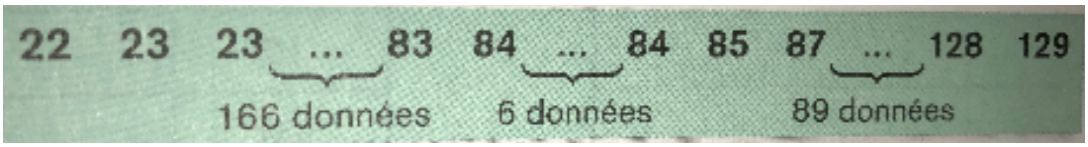
example 2 minutes spent studying on Sunday



What is the rank of someone who spends 84 minutes studying?

$$\text{Percentile of } x = \left(\frac{\text{number of data values less than } x + \frac{\text{number of data values equal to } x}{2}}{\text{total number of values}} \right) \times 100$$

you will round UP to nearest whole number

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It is also possible to find out the position of the data value that is in a particular rank:

$$\text{postion of data value} = \frac{\text{percentile}}{100} \times \text{total number of values}$$

you will round DOWN to nearest whole number

example 1

Determine which value lies in the 39th percentile in the distribution below.

$$\underbrace{42, 44, 47, \ldots, 73, 74, 76,}_{55 \text{ values}} \quad \underbrace{81, 84, 84, \ldots, 112, 114}_{80 \text{ values}}$$

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example:

Answer the following questions using the distribution below.

212, 214, 217, …, 246, 247, 249, 251, 255, 258, …, 307, 309

40 values 70 values

a. What is the percentile of the number 258? _____

b. What data value corresponds to the 35th percentile? _____

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example:

Given the list of data values below, what is the Percentile Rank of 28?

24, . . . , 27 28, 28, 28, . . . , 100

22 data values 78 data values

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example:

In order to be considered for admission to a prestigious music school, applicants must take a theory test. The results of the test will dictate whether or not the applicant moves to the next step in the application process, based on the table below.

Test Result	Application Status
In the 30th percentile or lower	No interview
Between the 30th and 85th percentile	Interview wait list
Above the 85th percentile	Guaranteed interview

This year's test results are listed below. How many applicants will be put on the wait list?

88 75 91 77 79 83 84 67 71 90 84 72 87
93 95 73 68 70 75 82 88 91 55 76 71 84

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example

The results of the 198 students who wrote a math test are listed below in increasing order.

$\underbrace{48, 48, 49, \ldots, 79, 79}_{163 \text{ results}} \quad \underbrace{80, 81, 81, \ldots, 100}_{35 \text{ results}}$

Jill's result was 80. What was her percentile rank?

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example:

Determine what percentile 142 falls into, in the distribution below.

$$\underbrace{100, 103, 105, \ldots, 137,}_{75 \text{ values}} \quad \underbrace{142, 142, 145, \ldots, 156}_{50 \text{ values}}$$

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