

Lecture 2

Thursday, September 5, 2024 5:41 PM

Last time: 3 ways to represent percentage: as %, as decimal, as fraction.

We also talked about how to convert one to another.

Some interesting examples:

$$\underline{\text{Ex}} \quad 0.24242424\dots = x \approx 24.24\%$$

How to convert x into a fraction?

$$\text{Trick: } 100x = 24.242424\dots = 24 + x \rightsquigarrow 99x = 24 \rightsquigarrow x = \frac{24}{99} = \frac{8}{33}$$

$$\underline{\text{Ex}} \quad 0.3333\dots = x$$

$$10x = 3.333\dots = 3 + x \rightsquigarrow 9x = 3 \rightsquigarrow x = \frac{3}{9} = \frac{1}{3}$$

* Usage of percentage: percentage is used to compare or to describe the change.

Ex The highest SAT score is 1600 You got 1150 So, you got

$$\frac{1150}{1600} = 0.71875 \approx 71.88\%$$

of the total score.

Last year, you got only 1050, which was $\frac{1050}{1600} = 0.65625 \approx 65.63\%$

of the total score. Your score has increased by $71.88\% - 65.63\%$

= 5.25 percentage points. [absolute change]

Your score has increased by $\frac{71.88\% - 65.63\%}{65.63\%} = \frac{5.25\%}{65.63\%} \approx 0.08 = 8\%$.

[relative change]

My score last year is only $\frac{1050}{1150} \approx 91.30\%$ of my score this year.

My score last year is $\frac{1150 - 1050}{1150} = \frac{100}{1150} \approx 8.7\%$ lower than my

score this year.

* Percentage of percentage

Ex The inflation rate in the US in 2020 is 1.4%, in 2021 is 7%, in 2022 is 6.5%. The inflation rate has increased from 2021 to 2022

by $\frac{6.5\% - 7\%}{7\%} = \frac{-0.5}{7} \approx -0.0714 = -7.14\%$

Ex HW1 is 10% of total homework score.

Total homework score is 30% of total course score.

So, HW1 is worth $10\% \times 30\% = 300\% = 3\%$ of total course score.

Ex Inflation rate has risen by 400% to 7% from 2020 to 2021. What was the inflation rate in 2020?

7% is $(100 + 400)\% = 500\%$ of the inflation rate in 2020.

So, the inflation rate in 2020 is $\frac{7\%}{500\%} = \frac{7}{500} = 0.014 = 1.4\%$

[work on worksheet]