

# Newsroom Math Crib Sheet

By Prof. Steve Doig, Arizona State University

<https://rudataj.files.wordpress.com/2015/02/newsroommathcribsheet.pdf>

## To convert a fraction into a decimal:

- Divide the top number by the bottom number
- Examples:  $5/8 = 0.625$      $17/64 = 0.265\dots$

## To convert a decimal into a percentage:

- Multiply by 100 (or simply move the decimal two places to the RIGHT)
- Examples:  $0.658 = 65.8\%$      $1.255 = 125.5\%$

## To turn a percentage into a decimal:

- Divide by 100 (or simply move the decimal two places to the LEFT)
- Examples:  $43.7\% = 0.437$      $148.2\% = 1.482$

## To get X% of Y:

- Turn X% into a decimal, then *multiply* it by Y
- Example:  $20\%$  of  $90 = 0.20 * 90 = 18$      $130.5\%$  of  $45 = 1.305 * 45 = 58.7\dots$

## To compare X and Y using percentages (X is what percent of Y?):

- X is  $(X/Y * 100)$  percent of Y
- Example: 5 and 8:  $5/8 = .625 = 62.5\%$ , so 5 is 62.5% of 8
- Example: 8 and 5:  $8/5 = 1.6 = 160\%$ , so 8 is 160% of 5

## To compare X and Y using percentage differences:

- X is  $((X/Y - 1) * 100)$  MORE/LESS than Y
- Use MORE THAN if the answer is positive, and LESS THAN if it's negative
- Example: 5 and 8:  $5/8 - 1 = .625 - 1 = -0.375 = -37.5\%$ , so 5 is 37.5% less than 8
- Example: 8 and 5:  $8/5 - 1 = 1.6 - 1 = .6 = 60\%$ , so 8 is 60% more than 5

## To compare a NEW number with an OLD number using percentage change:

- NEW has increased/decreased  $((\text{NEW}/\text{OLD} - 1) * 100)$  percent since OLD
- Use INCREASED if the answer is positive, and DECREASED if it's negative
- Example: This year's \$8 million budget is a 60% increase over last year's \$5 million budget.
- Example: This year's \$5 million budget is a 37.5% decrease from last year's \$8 million budget.

## To calculate rates (the number of events per some standard unit):

- Do this to account for different size populations
- $\text{RATE} = (\text{EVENTS} / \text{POPULATION}) * (\text{"PER"} \text{ Unit})$
- Example Problem: If there were 320 murders in a population of 1,937,086, what is the murder rate per 100,000?
  - First, divide the 320 murders by  $1937086 = 0.0001652\dots$
  - Now multiply  $0.0001652\dots$  by  $100,000 = 16.5$  murders per 100,000 population

## To calculate the effect of inflation using the Consumer Price Index (CPI):

$$\frac{\text{Price Now}}{\text{Price Then}} = \frac{\text{CPI Now}}{\text{CPI Then}}$$

- With this formula, all you need is any three of the numbers to calculate the fourth.
- Example: CPI now = 229.5; CPI in 1965 was 31.6; price of gas in 1965 was \$0.30 per gallon.  
 $X / 0.30 = 229.5 / 31.6$   
 $X = (229.5 / 31.6) * 0.30 = 7.26 * 0.30 = \text{gas in 1965 cost the equivalent of } \$2.18 \text{ per gallon}$

## Newsroom statistics:

- Mean (average): Add the numbers, then divide by how many numbers there are
- Median: Sort the numbers in order, then find the middle value
- Sampling error margin:  $1/\sqrt{N}$  (example: sample of 625:  $1/\sqrt{625} = 1/25 = 0.04 = +/- 4 \text{ points}$ )

## Crowd estimating:

- Calculate area in square feet (length X width)
- Divide by 10 for a loose crowd (people are at arm's length)
- Divide by 7.5 for a tight crowd (people are more shoulder to shoulder)