


## \%, fractions, decimals, 1 out of...

- 12 is what percent of 16 ?
- numerator/denominator*100 (\% total)
- $12 / 16^{*} 100=75 \%$
- Percent to fraction
- (Least common denominator)
- $12 / 16$ LCD = ?
- 75/100 LCD = ?
- Percent to decimal
- \%/100
- $75 / 100=$ ?
- "One out of..."
- $1 / \%$ in decimal
- Express $0.63 \%$ into "one out of..."



## Percentage change

- Last year's budget was P83,251,980. This year, you're told, the budget will be cut to P80,754,421. By how many percent will the budget decrease?
(80,754,421-
$83,251,980) / 83,251,980 * 100=$ ?
- (New - Old)/Old*100



## Percentage change

- Last year's budget was P83,251,980. This year, you're told, the budget will be cut by $3 \%$. What will this year's budget be?
- 83,251,980*0.97
- Value*(1-\% in decimal)



## Percentage change

- This year's budget will be cut by $3 \%$ to P80,754,421. What was the previous budget?
- 80,754,421/.97
- Value/(1-\% in decimal)
- This year's budget will be increased by $3 \%$ to P80,754,421. What was the previous budget?
- 80,754,421*1.03
- Value*(1 + \% in decimal)



## \% - \%

- A Reuters Institute study found concern about false or misleading information online among adult Filipinos rising from 56\% last year to $64 \%$ this. How would you report the difference?
- Concern over online misinfo rose by:
- 8 percentage points (64\% - 56\%)
- 14.3\% (64-56)/56*100

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## Mean, median, mode

- Mean = simple average
- sum of numbers/count of numbers
- Median = middle value (typical)
- Sort all the values from lowest highest
- $(\mathrm{n}+1) / 2$ (odd)
- $n / 2$ and ( $n / 2$ )+1 (even)
- Mode = most common or frequent value



## Ratios

- Relationship between two numbers
- Ratio =a/b



## Rates

- Various functions but useful to compare two dissimilar places or events

COVID-19 infections in different countries

- Crimes in different capitals
- Deaths from various disease
- GDP


## Rates for small numbers

| location | Total cases as <br> of 9/15/2020 | population | total <br> cases/pop'n | \% (per 100) | cases per <br> 100,000 | cases per <br> million |
| :--- | ---: | ---: | :---: | :---: | ---: | ---: |
| Brunei | 145 | 449,002 | 0.000322938 | $0.0323 \%$ | 32 | 323 |
| Cambodia | 275 | $16,767,851$ | $1.64004 \mathrm{E}-05$ | $0.0016 \%$ | 2 | 16 |
| Indonesia | 225,030 | $275,501,344$ | 0.000816802 | $0.0817 \%$ | 82 | 817 |
| Laos | 23 | $7,529,477$ | $3.05466 \mathrm{E}-06$ | $0.0003 \%$ | 0 | 3 |
| Malaysia | 9,946 | $33,938,216$ | 0.000293062 | $0.0293 \%$ | 29 | 293 |
| Myanmar | 3,299 | $54,179,312$ | $6.08904 \mathrm{E}-05$ | $0.0061 \%$ | 6 | 61 |
| Philippines | 265,863 | $115,559,008$ | 0.002300669 | $0.2301 \%$ | 230 | 2,301 |
| Singapore | 57,454 | $5,637,022$ | 0.010192261 | $1.0192 \%$ | 1,019 | 10,192 |
| Thailand | 3,480 | $71,697,024$ | $4.85376 \mathrm{E}-05$ | $0.0049 \%$ | 5 | 49 |
| Vietnam | 1,063 | $98,186,856$ | $1.08263 \mathrm{E}-05$ | $0.0011 \%$ | 1 | 11 |

## Rates for large numbers

- GDP, national debt
- Per capita = Value / population (aka per person)

| Country | Population ('000) | GDP | Rank | GDP per capita | Rank |
| :--- | ---: | :--- | ---: | ---: | ---: |
| Brunei | 430.0 | 13,925 | 10 | 32,383 | 2 |
| Cambodia | $16,592.1$ | 27,165 | 8 | 1,637 | 9 |
| Indonesia | $272,248.4$ | $1,185,777$ | 1 | 4,355 | 5 |
| Lao PDR | $7,337.8$ | 19,635 | 9 | 2,676 | 8 |
| Malaysia | $32,576.3$ | 372,770 | 5 | 11,443 | 3 |
| Myanmar | $55,295.0$ | 72,863 | 7 | 1,318 | 10 |
| Philippines | $110,198.0$ | 393,612 | 4 | 3,572 | 7 |
| Singapore | $5,453.6$ | 394,579 | 3 | 72,352 | 1 |
| Thailand | $65,213.0$ | 505,890 | 2 | 7,758 | 4 |
| VietNam | $98,506.2$ | 361,962 | 6 | 3,675 | 6 |



## CPI, purchasing power, inflation

- $\mathrm{CPI}=$ change in the average retail prices of a fixed basket of goods and services commonly purchased by households relative to a base year
- You can use CPI to compute purchasing power of peso and inflation rate
- Adjusting for inflation

CPI Now
CPI Then
Value

## Minimum wage in Metro Manila

| Year | Wage | CPI |
| :--- | :--- | :--- |
| 2018 | 537 | 100.0 |
| 2022 | 570 | 115.3 <br> 2023 |
| Year | W10 | Wage |
| (as of Jun |  |  |
| 2023) |  |  |\(\left|\begin{array}{l}Purchasing <br>


power\end{array}\right|\)| 1.00 |  |  |
| :--- | :--- | :--- |
| 2018 | 537 | 0.87 <br> 2022 |
| 2023 | 610 | 0.83 <br> (as of Jun <br> 2023 ) |

(1) How much is the
minimum wage in Metro Manila in 2018 worth today? (CPI New/CPI Earlier)*Earlier Value
(2) How much is the new wage at real prices (2018)?

Value * Purchasing power now

## Google search

Google $\operatorname{sqrt(175^{*}12)^{\wedge }3}$
Simplify Formula (alculator Answer Images Shopping Books Maps (a)


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## Standard deviation

- How dispersed the data is around the mean
- What to remember

68\% of values within 1 standard deviation from the mean
95\% values within 2 standard deviations from the mean
$99.7 \%$ of values within 3 standard deviations from the mean

## Example

Average score $=\mathrm{P} 100 ; \mathrm{SD}=\mathrm{P} 17$
68\% = P83 to P117'95\% = \$66 to P134;
$99.7 \%=$ P45 to P151


A story of standard deviations
traveltips
The Snowiest Mountains:
Where to Ski, and When
Planning a ski or snowboarding vacation? Data can direct you to
the mountains most likely to have the best snow, either around
the holiday season or in the spring.


https://www.nytimes.co m/2019/11/27/travel/bes t-snow-skiing.html

