

Name: \_\_\_\_\_

### 5.7 Check for Understanding (Logarithmic Scales)

1.) Read the yellow textbook and then state if you would use a linear or a logarithmic scale to plot the data.

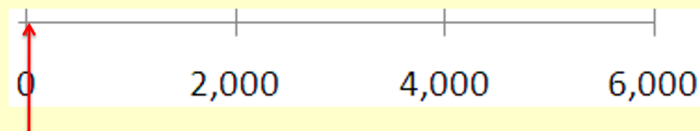
#### When to use logarithmic a scale – short answer

When the values of a variable span more than 2\* orders of magnitude, use a logarithmic scale.

#### When to use logarithmic a scale – a more complete answer

When the values of a variable span more than 2\* orders of magnitude, on a linear scale you will not be able to differentiate between the number 2 orders of magnitude below the maximum and any number below that number; use a logarithmic scale.

Example: 60 is 2 orders of magnitude below the max of 6,000

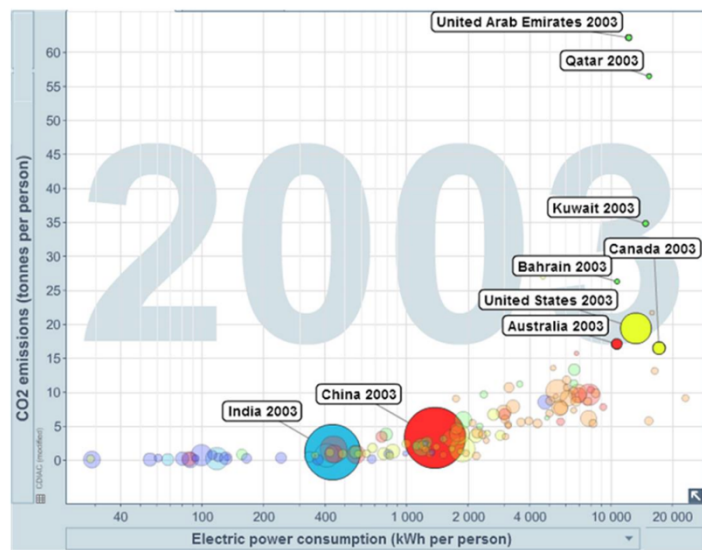


60 is here; difficult to tell the difference between 60 and any number lower than 60.

\* Note: 2 orders of magnitude is a “rule of thumb”.

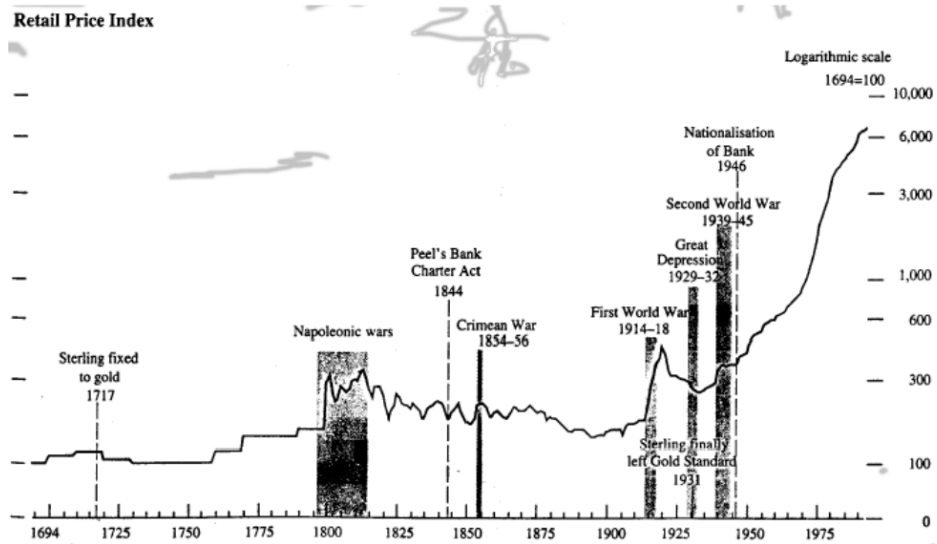
- a) Years from 1990 – 2010
- b) Years from 1500 – 2000
- c) Population of a country (all countries in the world included in the data set)
- d) Fuel efficiency of a passenger vehicle in miles per gallon
- e) How much a person is in debt
- f) Age of death of a human, rounded to the nearest year.
- g) Number of total heartbeats of a human in a lifetime.

2.) Consider the Gapminder graph below. What type of scales are used on the x-axis and y-axis. Why are they used?



Source: Gapminder Foundation, CO2 Emissions vs. Electricity Consumption, <http://graphs.gapminder.org/world>, 7/1/09

3.) Consider the graph below: A retail price index for UK 1694 – 1994. Explain in a complete sentence, why Holter used a logarithmic scale.



Source: A historical perspective on monetary statistics in Norway, Jon Holter, [http://www.norges-bank.no/stat/historiske\\_data/en/hms/c2.pdf](http://www.norges-bank.no/stat/historiske_data/en/hms/c2.pdf), 3/4/05.

4.) Note that the graph above has a zero on the logarithmic scale. Is it mathematically correct to have zero be on a logarithmic scale?

5.) Estimate the y-coordinates of the red and yellow points circled on the scatter plot.

