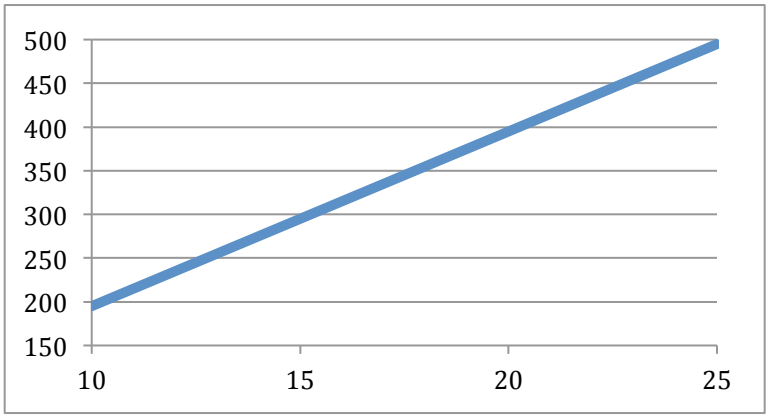
Supplement to Chapter 8: ANOTHER "WHAT CAN GO WRONG"

Don't jump to conclusions about a graph without looking at the scales on the axes. Graphs in printed materials and in computer output usually have the scales on the axes adjusted to make the information plotted take up most of the graph window. Consequently, *the axes may not intersect at the origin*, and *the axes may have different scales.*

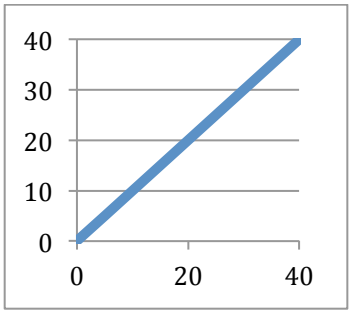
Here are some examples where neglecting to look at the scales on the axes may prompt you to jump to erroneous conclusions.

1. What is the y-intercept of this line?

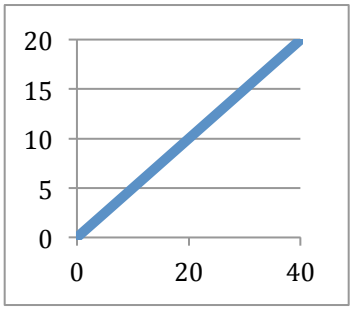


2. Which of these graphs show (part of) the line y = x?

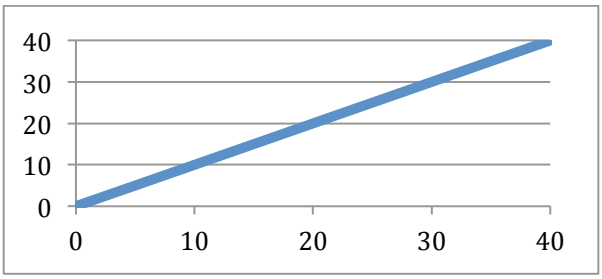
a.



b.



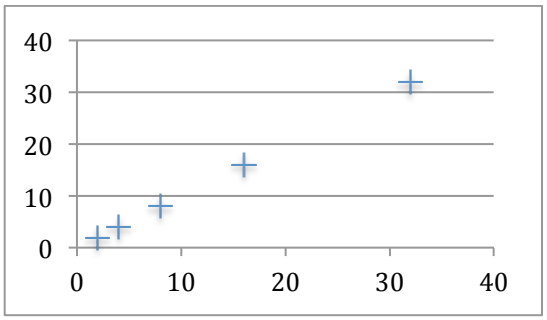
c.



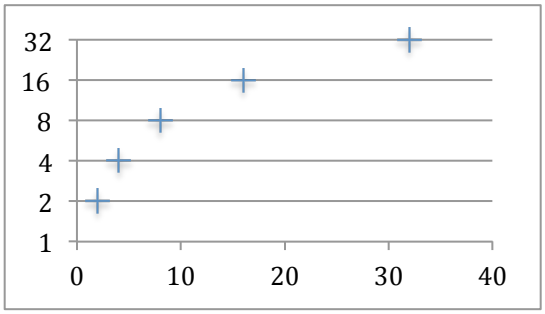
Answers: 1. -5 2. a and c only

An additional complication is that in some situations, it is common (and/or desirable) to use a log scale on one or more axes. (More on this in Chapter 10.) The logs might be natural logs, or base 10, or base 2. The following four graphs show the same data, but in different scales. Which scales are log scales in each graph? How does changing from a regular to a log scale affect the shape of the graph?

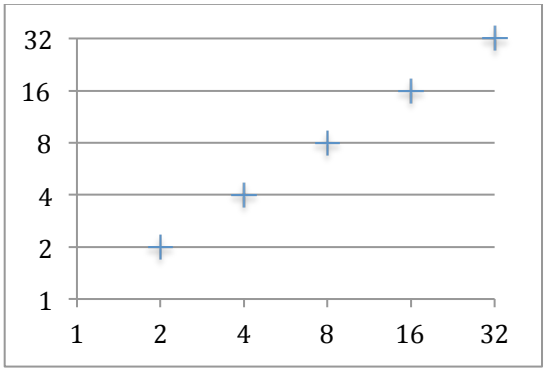
a.



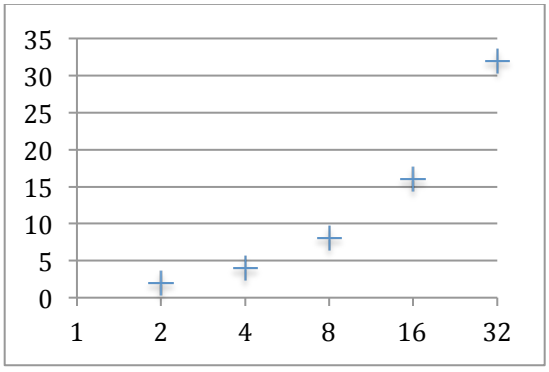
b.



c.



d.



Here are some examples on the web where log scales are used. (Why do you think they are used? How would the graph look without using the log scale?)

- Income distribution: http://www.gapminder.org/downloads/income-distribution-2003/
- Sales: http://blogs.mccombs.utexas.edu/the-most/2010/08/20/log-scale/
- Electromagnetic spectrum: http://serc.carleton.edu/details/images/3786.html
- Page requests for Wikipedia: http://en.wikipedia.org/wiki/File:Daily_page_requests_for_wikipedia.org_logscale.png

Logarithmic scales are so common in some fields that the logarithmic units have special names. These include: Richter scale for earthquake magnitude, decibels for loudness, and pH for acidity/alkalinity.