

Section E

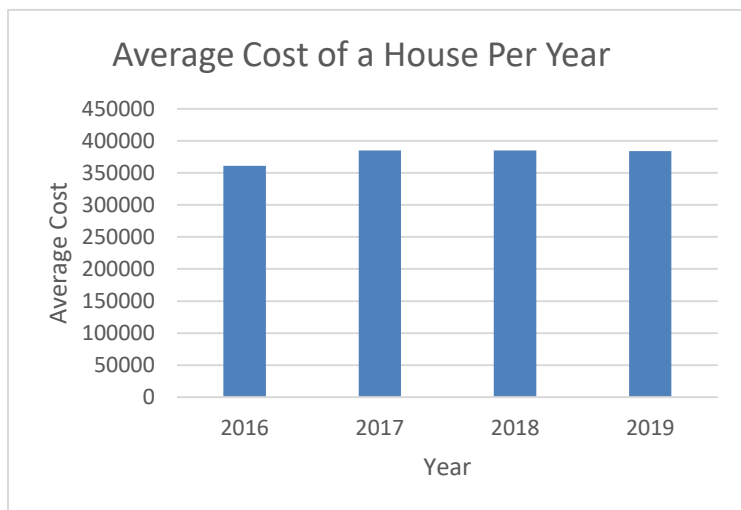
Misleading Graphs

Statistical graphs, when properly used, are powerful forms of communication. Unfortunately, when graphs are improperly used, they can misrepresent the data and lead people to draw incorrect conclusions.

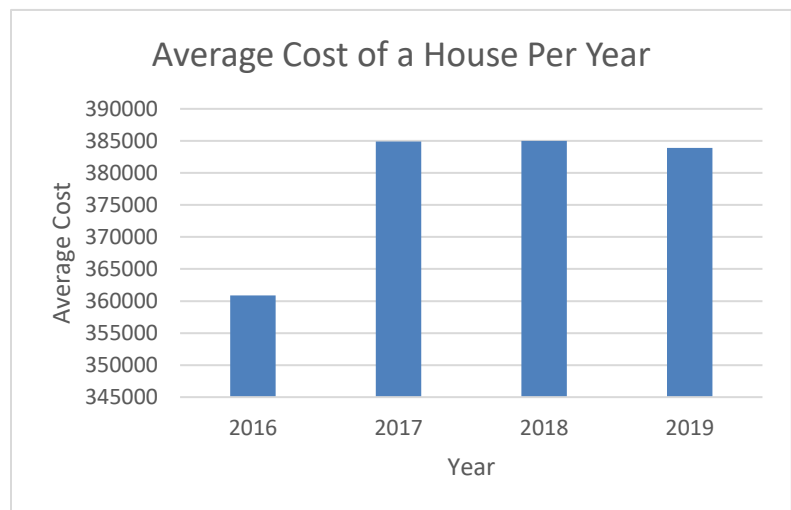
Three of the most common forms of misrepresentation:

- 1) Incorrect position of the vertical scale
- 2) Incorrect sizing of graphical images
- 3) Misleading perspective for three-dimensional diagrams

1) The baseline of a graph or plot is the value at which the horizontal axis intersects with the vertical axis. With graphs or plots that represent how much or how many of something, it may be misleading if the baseline is not at zero.



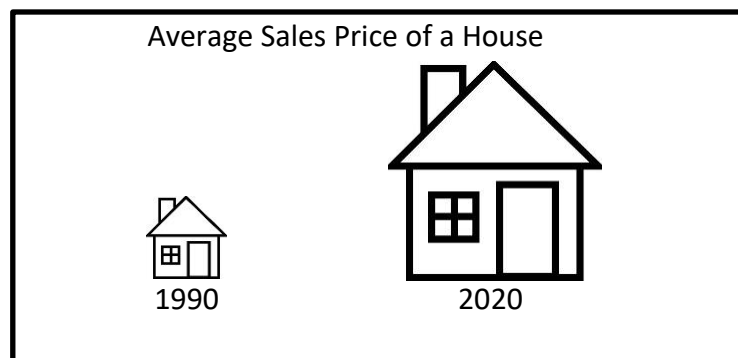
Correct: Baseline starts at zero



Misleading: Baseline does not start at zero

2) Area Principle: When amounts are compared by constructing an image for each amount, the areas of the images must be proportional to the amounts. For example, if one amount is twice as much as another, its image should have twice as much area as the other image.

The average sales price of a house in 1990 was \$149,800 and in 2020 the average sales price of a house had risen to \$389,400. Note that the price in 2020 is about 2.6 times the price in 1990.



Misleading: Since the house representing 2020 is more than 2.6 times bigger than the house representing 1990.

3) 3-D graphs are often drawn as though the reader is looking down on them. This makes the bars look shorter than they really are.

