Math for Journalists Tipsheet
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Percentage:
Percentage change: Old number – new number, divided by old number
Percentage *increase:* The budget rose from $50 million (old number) in 2004 to $60 million (new number) in 2005. Therefore, $60 million-$50 million = $10 million divided by $50 million = .20 or 20 percent increase.
Percentage *decrease:* The budget fell from $60 million (old number) in 2004 to $50 million (new number) in 2005. Therefore, $60 million - $50 million = $10 million, divided by $60 million = .166 or 16.7 percent decrease.

(To convert a number to a percentage, move the decimal point two places to the right.)

Percentage *points:* The difference between two percentages.
A percentage point reflects a share of a larger number. (If 4 percent of babies are born prematurely, for example, then 4 of every 100 babies were born prematurely) If that rises from 4 percent to 5 percent, it is not a 1 percent increase, so the difference is described as an increase of one percentage point.

Rate:
The relationship between the number of incidents and population or some other base number, as opposed to the relationship between a number and 100. For example, a community's birth rate may by 65 per 100,000. If that were 65 of 100 it would be 65 percent. It is, in fact, .00065 percent – more often expressed as 65 per 100,000.

Average:
To find an average number, add a group of numbers together and divide by the sum of the numbers: 12 + 24 + 36 + 42 = 114
114 divided by 4 = average 28.5
This number is useful when all of the numbers are generally in the same range so an extreme number does not influence the average.

Median: The midpoint in a series of numbers; it varies depending on whether there are an odd or even number of items in the sequence:
In a series containing an odd number of items, the median is the number halfway between the highest and the lowest: 2 + 24 + 30 + 36 + 60. The median is 30, because there are two numbers higher and two numbers lower.
In a series containing an even number of items, the median is the number midway between the two middle numbers: 20 + 24 + 30 + 78. The median is 27:
(24 +3 0 = 54 ÷ 2 = 27)
This number is more useful when there is a number at the extreme (such as 78) that might otherwise distort the average. For example, if you are trying to show how old most of the people in a town are, and the majority range from 20-30 but one person is 78, the average will provide a distorted picture. (The average will be 38 when most of the ages are between 20 and 30).

Public Opinion Polls:

- Who sponsored the poll? Avoid polls generated by interest groups, as the results may be biased. If you must, identify the sponsoring group and its position on the issue fully.
- Are the questions neutral, or slanted to generate a certain response? The best questions address one topic and ARE limited to a "yes/no" answer, as broader questions generate less specific answers that are open to interpretation.
- How are respondents chosen? Polls generally should reflect a range of ages, races and other demographic factors. Participants should be chosen entirely at random. Calls should take place during both day and evening (so the poll isn't limited to those who are home during the day) and should include both listed and unlisted numbers.
- Because polls measure a sample of the population, there is a statistical probability of error. This probability is described as the "margin of error." The larger the sample, the smaller the margin of error and the more accurate the poll.
  If a poll shows that Candidate A has 52 percent of the vote, and Candidate Y has 49 percent of the vote, with a 3 percent margin of error, Candidate A may actually have anywhere from 49 percent (minus 3) to 55 percent of the vote (plus 3 percentage points). Candidate Y's total could be 52 percent or 46 percent. Because each candidate's total might be 49 percent, this race is too close to call: You would report that candidate A appears to be leading, but that the race is statistically too close to call.