

## Quantifying Change and Comparisons

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Two ways to talk about change:

Absolute change: This describes the actual increase or decrease in a value

$$\text{Absolute change} = \text{new value} - \text{old value}$$

Relative Change: This describes the size of the absolute change between two values

$$\text{Relative Change} = \frac{\text{absolute change}}{\text{old value}} = \frac{\text{new value} - \text{old value}}{\text{old value}}$$

1. Suppose the price of a new computer is usually \$1,200. There is a one-day sale and the computer is on sale for \$900.
  - a. What is the absolute change in the cost of the computer?
  - b. What is the relative change in the cost of the computer?
2. Consider the following two items:
  - A notebook costing \$1.00
  - A car costing \$20,000
  - a. If each item has an increase in price of 50% what is the new cost of each item.
  - b. If you were considering purchasing these items would the absolute change in cost or the relative change in cost be more important to you? Explain your reasoning.

Ways to compare two numbers:

Absolute difference: This is the difference between the two things you are comparing

$$\text{Absolute difference} = \text{compared value} - \text{reference value}$$

Relative difference: This is the difference as a fraction of the base value

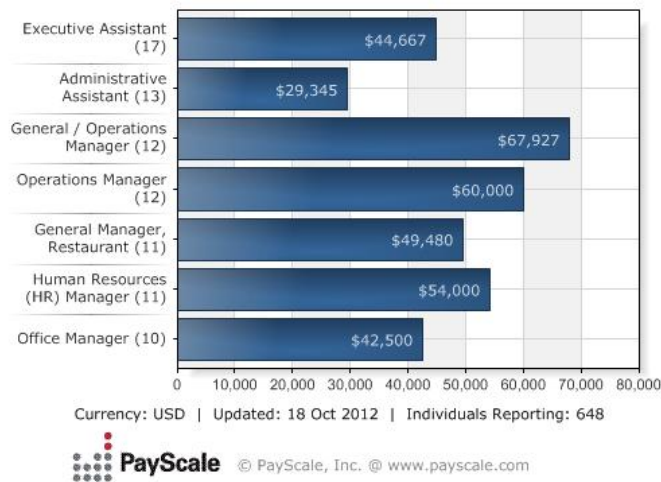
$$\text{Relative difference} = \frac{\text{compared value} - \text{reference value}}{\text{reference value}}$$

3. For \$45 per month Cricket has a cell phone plan that provides unlimited calling, texting, and data. A similar plan at T-Mobile is \$60.00.
  - a. What is the absolute difference in the two plans? Include this value in a sentence that compares the two plans.
  - b. Cricket's plan is what percent less expensive than T-Mobile's plan?
  - c. T-Mobile's plan is what percent more expensive than Cricket's plan?
  - d. If you worked for T-Mobile, what value would you want to use to compare the two plans? Why?
  - e. If you worked for Cricket, what value would you want to use to compare the two plans? Why?

Determine both the absolute change and the relative change for each situation described below. Then use each value in a sentence that indicates what it means.

- The average debt for a graduate of the Class of 2011 weighed in at \$26,600 – 5 percent higher than for the Class of 2010, according to a report out Thursday by The Institute for College Access & Success. (from The Christian Science Monitor, October 18, 2012)
- The Massachusetts unemployment rate rose to 6.5 percent for September -- up from 6.3 percent in August. (BostonHerald.com Accessed on October 12: <http://bostonherald.com/business>)
- Overall, welfare spending as measured by obligations has grown from \$563 billion in fiscal 2008 to \$746 billion in fiscal 2011. (Washington Times, October 18, 2012)
- Consider the displays of information below. For each job, determine the absolute difference and the relative difference in salary for those with an AA and a BBA. Split the work up among the members of your group. For which job does the bachelor degree make the most difference? Would you rather know the absolute increase or the relative increase when considering pursuing a college education? Be prepared to support your answer by referring to the data.

### Median Salary by Job – Degree: Associate of Arts (AA), Business (United States)



### Median Salary by Job – Degree: Bachelor of Business Administration (BBA) (United States)



Homework: Find an article or advertisement that allows you to determine or identifies both absolute and relative change or absolute and relative difference. Write a paragraph that describe the situation, reports the values and conveys what each value means.