5

BASIC TYPES OF QUANTITATIVE COMPARISONS

SOLUTIONS

1. Identify the type of quantitative comparison used in each of the following statements.
    a. Value
    b. Difference
    c. Ratio
    d. Percentage change
    e. Difference
    f. Ratio
    g. Rank (median is the 50th percentile)
    h. *Z*-score
    i. Value (in this case, the units of measurement are percentage points)
    j. Rank

3. Indicate whether each of the following statements is correct. If not, rewrite the second part of the sentence to agree with the first; changes shown in **bold**.
    a. "Brand X lasts longer than Brand T, with an average lifetime 60% **longer than** Brand T's."
    b. Correct as written.
    c. "The ratio of flour to butter in shortbread is 2:1; it uses twice as much **flour as butter**."
    d. Correct as written.
    e. "Nadia's test score was higher than **84%** of students nationwide ($Z = 1.0$). (Sixty-six percent are within 1 standard deviation of the mean [e.g., ± 1 standard deviation], but you must also include those below $z = -1.0$ to answer this question correctly.)
    f. "A panel of 200 consumers rated ISP A four to one over ISP B. In other words, four **times as many** panelists preferred Company A as their Internet service provider."
    g. Correct as written.
    h. Correct as written.
    i. "The value of mutual fund ABCD tripled since last year, going **from 33 to 100**."

5. Additional information shown in **bold**.
    a. "In the US in 2011, median income for Asian households was about twice **that for black households."**
    b. "Median income for Hispanic households was $6,395 higher **than that for black households**."
    c. "White households ranked second **in terms of median income, below only Asians and Pacific Islanders**."
    d. "**Median income for** Asian households was 20% higher **than that for white households**."

7. With a comparison value of $200:
   - "25% of the original price" (i) and "marked down 75%" (vi) have the same meaning. Both correspond to a price of $50, equivalent to a ratio of 0.25.
   - "costs 25% less than . . ." (ii), "priced 25% off" (iv), "75% of the original price" (vii), and "costs 75% as much as . . ." (viii) correspond to a price of $150, equivalent to a ratio of 0.75.
   - "costs 25% more than . . ." (iii) and "125% of the original price" (v) correspond to a price of $250 and a ratio of 1.25.

9. In table 5C, fill in the *z*-score for height for each boy in the sample.

Table 5c. Heights of a sample of six-year-old boys

Name	Height (cm)	*Z*-score
David	117.51	0.50
Jamal	113.90	–0.26
Ryan	124.81	2.03
Luis	115.45	0.07
JC	112.73	–0.50

Note: Standard population: mean = 115.12 cm; SD = 4.78 cm.

   a. Ryan is approximately two standard deviations above the average height for a six-year-old boy, while Luis is just about average and JC is about half a standard deviation below average for his age.
   b. David and JC are half a standard deviation taller and shorter than the average six-year-old boy, respectively.
   c. Mike stands 119.90 cm tall.