Statistical Reasoning for Everyday Life

Chapter 2 (Measurement in Statistics) Exam, form A

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Identify the following variables as either qualitative or quantitative in #1 and #2.

1) The state in which people live.
   A) Qualitative B) Quantitative

2) The size of your house.
   A) Qualitative B) Quantitative

Identify the number as either continuous or discrete in #3 and #4.

3) The average height of all freshmen entering college in a certain year is 68.4 inches.
   A) Continuous B) Discrete

4) The number of eggs in a goose nest is 8.
   A) Continuous B) Discrete

Determine which of the four levels of measurement is most appropriate.

5) Temperatures in degrees Fahrenheit of the ocean at various depths.
   A) Ratio B) Interval C) Ordinal D) Nominal

Two statements are given in #6. Select the statement for which a ratio of the measurements is meaningful. State "Neither" or "Both" if appropriate.

6) 1 - Kasheta ran the race in 22.3 sec, and Louisa ran the same race in 26.4 sec.
   2 - Juan gets out of school at 2:45 PM, and Aito gets out of school at 3:15 PM.
   A) Kasheta ran the race in 22.3 sec, and Louisa ran the same race in 26.4 sec.
   B) Neither
   C) Both
   D) Juan gets out of school at 2:45 PM, and Aito gets out of school at 3:15 PM.

Select the description that most completely classifies the given variable in #7.

7) Soft drink sizes: small, medium, large
   A) Qualitative, nominal B) Quantitative, ordinal
   C) Quantitative, ordinal, discrete D) Qualitative, ordinal

8) A digital scale reads 0.01 g when it is empty. Identify the potential error in the measurements made on this scale as random or systematic.
   A) Random B) Systematic

9) Totals are determined by rounding to tenths. Identify the potential error as random or systematic.
   A) Random B) Systematic

10) The results of a poll are stated as follows: "Based on a survey of 156 randomly selected students, 90% of the student body of 2870 students agree that no student should have to take final exams in two consecutive exam periods". If 2578 students actually agree, then what is the absolute error in the reported result?
   A) 5 students B) 287 students
   C) 0.17% D) 292 students

11) A state patrolman's radar indicates that your car is traveling 70 miles per hour; you had the cruise control set at 65 mph. What is the relative error?

A) 5 mph B) 7.1% C) 7.7% D) 0.929

12) According to a specification, the nominal length of a particular manufactured part is 5.4523 cm. Quality control randomly selects one of the parts, and four different quality control technicians measure its length. Their measurements are 5.3234 cm, 5.11259 cm, 5.351 cm, and 5.45 cm. Which measurement is the most accurate?

A) 5.3234 B) 5.11259 C) 5.351 D) 5.45

13) Compared with a metric scale that has grams as the smallest division, a scale with milligrams as the smallest division

A) will guarantee measurements that are more accurate, but not necessarily more precise.

B) will guarantee measurements that are more precise and more accurate.

C) will guarantee measurements that are more precise, but not necessarily more accurate.

D) will not guarantee measurements that are more accurate or more precise.

14) A poll was taken of a random sample of 1189 college students. Of these students, 789 reported that they had a drinking binge (more than 10 drinks in an evening) in the past month. Select the most believable conclusion.

A) About 66.358% of college students indulged in binge drinking last month.

B) Of the 23,456,321 college students in the country, 15,565,212 indulged in binge drinking last month.

C) About 65% of college students indulge in binge drinking.

D) About 65% of college students indulged in binge drinking in the past month.

15) Convert $\frac{5}{16}$ to a percent.

A) 31.25% B) 0.3125% C) 3.125% D) 0.03125%

16) Convert –0.45 to a percent.

A) –45% B) –0.0045% C) –4.5% D) 0.45%

17) Humanities majors spend an average of $115 per course on books. Mathematics majors spend an average of $70 per course on books. What is the percent difference between the two amounts relative to the amount for mathematics majors (round to the nearest percent)?

A) 64% B) 39% C) –64% D) –39%

18) Boys spend an average of $400 on back-to-school clothes. Girls spend an average of $1,032. How much less is the boy's average expenditure, relatively, than the girl's expenditure (round to the nearest percent)?

A) 61% B) 158% C) –158% D) 39%

19) Suppose that the cost of a statistics text was $50 in 1985 and is $100 in 2000. What is the 'Statistics Text Index' number, rounded to the nearest tenth, for the 2000 edition with the 1985 price as the reference value?

A) 20.0 B) 200.0 C) 50.0 D) 2.0

20) A part of the CPI is given below:

Year	1975	1980	1985	1990	1995
CPI	53.8	82.4	107.6	130.7	152.4

Suppose a week's groceries in 1980 cost $70. What would these groceries cost, to the nearest dollar, 10 years later?

A) $38 B) $44 C) $111 D) $129

Statistical Reasoning for Everyday Life

Chapter 2 (Measurement in Statistics) Exam, form B

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Identify the following variables as either qualitative or quantitative in #1 and #2.

1) A person's height in feet.
   A) Qualitative B) Quantitative

2) A person's political affiliation.
   A) Qualitative B) Quantitative

Identify the number as either discrete or continuous in #3 and #4.

3) The number of books available from Amazon.com is 227,362.
   A) Discrete B) Continuous

4) An athlete runs 100 meters in 10.7 seconds.
   A) Discrete B) Continuous

Determine which of the four levels of measurement is most appropriate in #5.

5) Ages of survey respondents.
   A) Ratio B) Interval C) Ordinal D) Nominal

Two statements are given in #6. Select the statement for which a ratio of the measurements is meaningful. State "Neither" or "Both" if appropriate.

6) 1 - Kim pulled weeds at the rate of twenty weeds per minute, and Jorge pulled 18 weeds per minute.
   2 – Anna Lisa swam 45 yards underwater, and Marissa swam 35 yards underwater.
   A) Anna Lisa swam 45 yards underwater, and Marissa swam 35 yards underwater.
   B) Kim pulled weeds at the rate of twenty weeds per minute, and Jorge pulled 18 weeds per minute.
   C) Neither
   D) Both

Select the description that most completely classifies the given variable in #7.

7) Preference ratings: as in "Rate the item of most importance to you a 5 and that of least importance a 1"
   A) Qualitative, ordinal B) Quantitative, ordinal
   C) Quantitative, ordinal, discrete D) Qualitative, nominal

8) A computer uses voice recognition software. Identify a misinterpreted word as a systematic or random error.
   A) Systematic B) Random

9) Identify the potential error in recording arrival times for interstate highway trips as random or systematic.

A) Systematic B) Random

10) The size of an e-mail file is stated as 210 kB, but the file size is actually 220.5 kB. What is the absolute error?

A) 5% B) 10% C) 10.5 kB D) -10.5 kB

11) The pickup time of an answering machine is set at 5 rings, but the machine picks up after 4 rings. What is the relative error?

A) –1 ring B) 4 to 6 rings C) –25% D) –20%

12) The approximate value of π is 3.1415927. Which of the following experimentally determined values is the most precise?

A) 3.14 B) 3.247 C) 3.412114 D) 3.3245

13) Compared with a stopwatch that gives readings as --. - seconds, a stopwatch that gives readings as --. -- seconds is

A) more accurate, but not necessarily more precise.

B) more precise and more accurate.

C) not necessarily more precise or more accurate.

D) more precise, but not necessarily more accurate.

14) A botany student counted 11 blades of grass in one square centimeter of lawn and measured the lawn as a rectangle 61 m by 31 m. She reported that there were 208,010,000 blades of grass in the lawn. The precision of her conclusion

A) correctly represents her measurements.

B) is less than her measurements warrant.

C) could be greater if she used a more precise calculator.

D) is excessive given her measurements.

15) Convert 13% to decimal form.

A) 0.013 B) 0.13 C) 1.3 D) 13

16) Convert 5.65 to a percent.

A) 565% B) 5.65% C) 0.565% D) 56.5%

17) Research shows that 14% of 6th graders in K-6 schools have tried cigarettes and 61% of 7th graders in 8-9 or 7-9 middle schools have tried cigarettes. What is the absolute increase, to the nearest percent?

A) 77% B) 336% C) 436% D) 47%

18) Research shows that 14.3% of persons 20-25 years old vote and 59.9% of persons 60-65 years old vote. What is the absolute increase from the younger group to the older group, to the nearest point.

A) 76 points B) 319 points C) –46 points D) 46 points

19) Suppose that the cost of a statistics text was $55 in 1985 and is $90 in 2000. What is the 'Statistics Text Index' number, rounded to the nearest tenth, for the 1985 edition with the 2000 price as the reference value?

A) 0.6 B) 163.6 C) 1.6 D) 61.1

20) A part of the CPI table is given below:

Year	1975	1980	1985	1990	1995
CPI	53.8	82.4	107.6	130.7	152.4

Suppose an actuary's salary was $86,000 in 1995. What would the salary have to have been in 1975 if it had just kept up with inflation (round to the nearest $1000)?

A) $244,000 B) $30,000 C) $58,000 D) $128,000

Statistical Reasoning for Everyday Life

Chapter 2 (Measurement in Statistics) Exam, form C

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Identify the following variables as either quantitative or qualitative in #1 and #2.

1) Brand of basketball shoes worn by a team.
   A) Quantitative B) Qualitative
2) Outcome of tossing a coin.
   A) Quantitative B) Qualitative

Identify the number as either continuous or discrete in #3 and #4.

3) The average speed of cars passing a busy intersection between 4:30 P.M. and 6:30 P.M. on a Friday is 32.3 mi/h.
   A) Continuous B) Discrete
4) The total number of scam emails you receive in a month is 7.
   A) Continuous B) Discrete

Determine which of the four levels of measurement is most appropriate in #5.

5) Political party preference of survey respondents.
   A) Nominal B) Ordinal C) Interval D) Ratio

Two statements are given in #6. Select the statement for which a ratio of the measurements is meaningful. State "Neither" or "Both" if appropriate.

6) 1 The fertilized grass grew 2.9 inches in a week; the unfertilized grass grew 1.8 inches in the same week.
   2 The single-stage model rocket went up 287 ft; the two-stage model rocket went up 412 ft.
   A) The single-stage model rocket went up 287 ft; the two-stage model rocket went up 412 ft.
   B) The fertilized grass grew 2.9 inches in a week; the unfertilized grass grew 1.8 inches in the same week.
   C) Neither
   D) Both

Select the description that most completely classifies the given variable in #7.

7) Number of wins by the NFL teams in the NFC Central division
   A) Quantitative, nominal B) Quantitative, interval
   C) Qualitative, interval D) Quantitative, ratio
8) A cook estimates one-third of a cup in a cup measuring cup marked in quarters. Assuming that the cook knows how big 1/3 is, relative to 1/4 and 1/2, identify the potential measurement error as systematic or random.
   A) Systematic B) Random
9) A person is always late for class. Identify the potential error as random or systematic.
   A) Systematic B) Random

10) Rather than use the two scoops of coffee recommended by the manufacturer, a coffee aficionado uses three scoops of coffee per pot. What is the relative error?

A) –50% B) $-33\frac{1}{3}\%$ C) 50% D) $33\frac{1}{3}\%$

11) A pharmacist puts 32 pills into a prescription order that calls for 30 pills. What is the absolute error?

A) –6.7% B) –2 pills C) 2 pills D) 6.7%

12) The approximate value of π is 3.1415927. Which of the following experimentally determined values is the most accurate?

A) 3.14 B) 3.3245 C) 3.412114 D) 3.247

13) Which of the following statements is correct?

A) "Precise measurement" means the same thing as "accurate measurement".

B) An accurate measurement must be precise.

C) A precise measurement must be accurate.

D) A precise measurement is not necessarily accurate.

14) A poll was taken of a random sample of 1189 college students. Of these students, 789 reported that they had a drinking binge (more than 10 drinks in an evening) in the past month. Select the most believable conclusion.

A) About 66.358% of college students indulged in binge drinking last month.

B) Of the 23,456,321 college students in the country, 15,565,212 indulged in binge drinking last month.

C) About 65% of college students indulge in binge drinking.

D) About 65% of college students indulged in binge drinking last month.

15) Convert 1779% to decimal form.

A) 177.9 B) 17.79 C) 1.779 D) 177,900

16) Convert 0.0195% to decimal form.

A) 0.000195 B) 1.95 C) 0.195 D) 19.5

17) A professor's checking account balance a year ago was $1470. Currently, it is $1040. Calculate the relative percentage change to the nearest percentage point.

A) –41% B) 29% C) 41% D) –29%

18) Research shows that 15.5% of persons 20-25 years old vote and 63.5% of persons 60-65 years old vote. What is the relative change from the younger group to the older group, to the nearest percent?

A) –48% B) 76% C) 310% D) 48%

19) Suppose that the cost of a statistics text was $60 in 1985 and is $90 in 2010. What is the 'Statistics Text Index' number, rounded to the nearest tenth, for the 2010 edition with the 1985 price as the reference value?

A) 150 B) 66.7 C) 100.0 D) 50

20) A part of the CPI table is given below:

Year	1975	1980	1985	1990	1995
CPI	53.8	82.4	107.6	130.7	152.4

What is the percent increase of a market basket of goods from 1975 to 1985? Round the percent to the nearest integer.

A) 100% B) 200% C) 54% D) 50%

Statistical Reasoning for Everyday Life

Chapter 2 (Measurement in Statistics) Exam, form D

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Identify the following variables as either quantitative or qualitative in #1 and #2.

1) A player's number on her soccer jersey
   A) Quantitative B) Qualitative
2) The number of textbooks owned by a student
   A) Quantitative B) Qualitative

Identify the number as either continuous or discrete in #3 and #4.

3) The number of DIRECT TV customers
   A) Continuous B) Discrete
4) The voltage of the electricity in a power line
   A) Continuous B) Discrete

Determine which of the four levels of measurement is most appropriate in #5.

5) A librarian rates fives books on an "ease of reading" scale from 1 (easy) to 10 (hard).
   A) Nominal B) Ordinal C) Interval D) Ratio

Two statements are given in #6. Select the statement for which a ratio of the measurements is meaningful. State "Neither" or "Both" if appropriate.

6) 1 - Jan earned a B on her test and Bob earned a C.
   2 - Bob wears size 9 shoes and Earl wears size 13.
   A) Jan earned a B on her test and Bob earned a C.
   B) Bob wears size 9 shoes and Earl wears size 13.
   C) Neither
   D) Both

Select the description that most completely classifies the given variable in #7.

7) A Prostate Specific Antigen (PSA) test is useful in detecting prostate cancer in men. A sample of blood is analyzed and the concentration of PSA is reported in nanograms per milliliter. Values less than 4.0 are considered normal and values over 10.0 indicate that further tests are needed. The best classification of the PSA variable is
   A) Nominal B) Qualitative, Ordinal
   C) Quantitative, Continuous D) Quantitative, Discrete
8) Amtrak passenger trains are often late in arriving at their destinations. Identify the potential error in arrival time as systematic or random.
   A) Systematic B) Random

9) A recipe for grape jelly calls for 4 pounds of grapes. The jelly maker estimates the 4 pounds of grapes by standing on a bathroom scale with and without the grapes. The scale only shows the weight to the nearest pound. Identify the error in the weight as systematic or random.

A) Systematic B) Random

10) The grape jelly maker in the previous problem actually uses 3 pounds, 12 ounces of grapes instead of the 4 pounds called for by the recipe. What is the relative error? (There are 16 ounces in a pound.)

A) 4 ounces B) –4 ounces C) 6.25% D) –6.25%

11) A golfer estimates that the distance to the hole for his next shot is 200 yards. The actual distance is exactly 212 yards. What is the relative error?

A) -12 yards B) –6.0% C) 6.0% D) –5.7%

12) Avogadro's number is the number of molecules of a substance in a quantity of the substance measured in grams equal to its atomic weight. It can only be determined by chemistry or physics experiments. It is named after Amadeo Avogadro, who postulated in 1811 that this number was the same for all substances. Various values for this constant have been determined experimentally. Some of them are 6.02×10^{23}, 6.022×10^{23}, and $6.02214199 \times 10^{23}$. The 10^{23} means that you have to move the decimal point 23 places to the right. Which of these values is the most accurate?

A) 6.02×10^{23} B) 6.022×10^{23} C) $6.02214199 \times 10^{23}$ D) We can't tell.

13) Compared to a scale that measures your weight to tenths of a pound, a scale that measures your weight to the nearest ounce is

A) more precise and more accurate.

B) less precise, but may be more accurate.

C) more precise, but may be less accurate.

D) less precise and less accurate.

14) A company that manufactures tubeless tires sampled 342 tires from a day's production of 27,114 tirts. Seven tires in the sample were found to be defective. Select the most believable conclusion.

A) About 2.047% of the day's production was defective.

B) Of the 27,114 tires produced that day, 555 were defective.

C) A little over 2% of all tires produced by the plant that day were defective.

D) A little over 3% of all tires produced by the plant that week were defective.

15) Convert 112.463% to decimal form.

A) 1.12463 B) 11.2463 C) 1124.63 D) 11246.3

16) Convert 0.1963 to a percent.

A) 0.001963% B) 0.01963% C) 1.963% D) 19.63%

17) After a year of weight training, Harold's weight changed from 172 pounds to 185 pounds. What is his percent increase in weight to the nearest tenth?

A) 13.0 pounds B) 8.0% C) 7.6% D) 7.0%

18) On September 28, 2012 the average price of a gallon of regular unleaded gas in Eau Claire, WI was $3.89 while in Appleton, WI, the average price was $3.74. What is the percentage difference in price in Appleton (to the nearest tenth of a percent) relative to the price in Eau Claire?

A) –3.9% B) 3.9% C) –4.0% D) 4.0%

19) Suppose that the cost of a statistics text was $45 in 1980 and $76 in 2005. What is the Statistics Text Index number, rounded to the nearest tenth, for the 1980 edition with the 2005 price as the reference value?

A) 0.6 B) 5.9 C) 59.2 D) 168.9

20) A part of the CPI table is given below:

Year	1975	1980	1985	1990	1995	2000	2005
CPI	53.8	82.4	107.6	130.7	152.4	172.2	195.3

Suppose that a statistician's salary was $64000 in 1985. What would the salary have to be in 2005 to keep up with inflation (rounded to the nearest $1000)?

A) $125,000 B) $69,000 C) $116,000 D) $35,000