

**Question 1 (2 points)**

The following variables are recorded for used cars in a dealership:

- Size of car (compact, midsize, full size)
- Make of car (Toyota, Chevrolet, Volkswagen, etc.)
- Price (in \$)

The variables are, respectively:

Question 1 options:

- A) categorical and nominal, categorical and ordinal, categorical and ordinal
- B) categorical and ordinal, categorical and nominal, categorical and ordinal
- C) categorical and nominal, categorical and nominal, quantitative
- D) categorical and ordinal, categorical and ordinal, quantitative
- E) categorical and ordinal, categorical and nominal, quantitative

**Question 2 (2 points)**

A researcher recorded the duration of storms in Tampa Bay, Florida one year. A frequency distribution of the duration of the storms (in minutes) is shown below:

Duration	Frequency
0-25	6
25-50	14
50-75	17
75-100	25
100-125	14
125-150	10
150-175	6
175-200	5
200-225	3
225-250	1
250-275	1

Which interval contains the third quartile of data values?

Question 2 options:

- A) 100-125
- B) 125-150
- C) 150-175
- D) 175-200
- E) None of the above

## **Information**

Questions 3 and 4 refer to the following:

The following are the weights (in pounds) of 54 university males:

137 141 142 143 148 149 149 150 150

152 152 154 156 157 157 157 158 158

158 159 159 160 161 162 162 162 162

164 165 165 165 165 165 166 166 166

167 167 167 168 168 170 172 172 173

174 174 175 177 180 181 183 184 193

**Question 3 (2 points)**

If we construct an outlier boxplot for weights, which values would be identified as outliers?

(If your answer is not completely correct, no partial credit will be given.)

Question 3 options:

- A) There are no outliers.
- B) 137
- C) 141
- D) 142
- E) 143
- F) 180
- G) 181
- H) 183
- I) 184
- J) 193

### Information

Questions 3 and 4 refer to the following:

The following are the weights (in pounds) of 54 university males:

137 141 142 143 148 149 149 150 150

152 152 154 156 157 157 157 158 158

158 159 159 160 161 162 162 162 162

164 165 165 165 165 165 166 166 166

167 167 167 168 168 170 172 172 173

174 174 175 177 180 181 183 184 193

### Question 4 (2 points)

If we constructed an outlier boxplot for this data set, the lines coming out of the box (the whiskers) would extend to which values?

Question 4 options:

- A) 141 and 184
- B) 141 and 193
- C) 140.5 and 184.5
- D) 148 and 177
- E) 137 and 193

**Question 5 (2 points)**

Consider the following two data sets:

$$A = \{1, 1, 10, 19, 19\}$$

$$B = \{1, 6, 10, 14, 19\}$$

Each of these data sets has a mean of 10. Explain why data set A has a larger standard deviation, without doing any calculations.

**Question 6 (2 points)**

After completing all of the term work except the final exam, John is trying to figure out what score he needs on the final exam to get a B+ in the course. A student must have a final grade of 75% to get a B+ in the course.

The coursework is weighted as follows:

Midterm exam: 35%

Assignments: 15%

Final exam: 50%

John's score on the midterm exam was 70% and his score on assignments was 84%. What score does John need on the final exam to end up with a final grade of 75% in the course? Give your answer with 1 decimal place.

Show your work to get full credit.

## Information

For each of Questions 7 to 11, is the given value of the correlation coefficient reasonable?

### Question 7 (1 point)

A study found a correlation of  $r = 0.7$  between gender and height.

Question 7 options:

- A) Reasonable
- B) Not reasonable

### Question 8 (1 point)

A study found a correlation of  $r = -0.7$  between amount of alcohol consumed and the reaction time it takes to brake.

Question 8 options:

- A) Reasonable
- B) Not reasonable

### Question 9 (1 point)

A study of adults found a correlation of  $r = 0$  between IQ scores and shoe size.

Question 9 options:

- A) Reasonable
- B) Not reasonable

## Information

For each of Questions 7 to 11, is the given value of the correlation coefficient reasonable?

### Question 10 (1 point)

A study found a correlation of  $r = 0.75$  between distance from the equator for North American cities and average January temperature.

Question 10 options:

- A) Reasonable
- B) Not reasonable

### Question 11 (1 point)

A study found a correlation of  $r = 1.00$  between temperature and ice cream sales.

Question 11 options:

- A) Reasonable
- B) Not reasonable



## Information

Questions 12 to 14 refer to the following:

We would like to determine how the horsepower of a car can help predict the car's gas mileage (in miles per gallon). The horsepowers and the gas mileages (in miles per gallon) for a sample of 10 cars are shown below:

Car	1	2	3	4	5	6	7	8	9	10
Horsepower	110	215	52	65	150	175	91	62	175	180
Gas Mileage	21	10.4	30.4	33.9	15.5	19.2	26	24.4	19.7	17.3

The least-squares regression line is calculated to be  $\hat{y}=35.42-0.11x$  and it is reported that 79.43% of the variation in gas mileage is explained by its regression on horsepower.

### Question 12 (1 point)

What is the correlation between horsepower and gas mileage?

HINT: Do not use the correlation formula to answer this question. There is a much faster way.

Enter only a numerical answer (**do not** show any work). Round your answer to 2 decimal places.

### Question 13 (1 point)

What is the residual for Car #6?

Enter only a numerical answer with 2 decimal places (**do not** show any work)

### Question 14 (1 point)

Interpret the value of the slope of the least-squares regression equation **in the context of this problem**.

**Question 15 (1 point)**

We would like to determine how a city's location can help predict its weather. The latitude (in degrees north of the equator) and the average January temperature (in degrees Celsius) are shown below for a sample of cities in the northern hemisphere:

City	Latitude	Avg. January Temp.
Paris, France	48.5	3
Manila, Phillipines	14.4	26
Tel Aviv, Israel	32.1	13
Mexico City, Mexico	19.3	14
Montreal, Canada	45.5	-9
Belgrade, Serbia	44.5	2
Dublin, Ireland	53.2	5
Bogota, Colombia	4.4	17
New York City, USA	40.4	1
Lagos, Nigeria	6.3	27
Delhi, India	28.4	15
Riga, Latvia	56.6	-4
Caracas, Venezuela	10.3	22
Athens, Greece	37.6	10
Kiev, Ukraine	50.3	-5
Hong Kong, China	22.2	17

In the Unit 2 practice questions above, the **predicted** average January temperature for Winnipeg (49.9 degrees north latitude) is -0.40 degrees Celsius. However, based on data from Environment Canada, the **actual** average January temperature for Winnipeg is -16.4 degrees Celsius. Why do we have this large discrepancy?