

Reading Two-Way Tables and Scatter Plots

Grade 9 – Algebra 1 math · Test · Standards: S-ID.B.5, S-ID.B.6, S-ID.C.7, S-ID.C.8, S-ID.C.9

Name: _____ Date: _____ Class: _____

This test has 8 questions worth 20 points. Allow 45 minutes and work without notes. A calculator is allowed. Show each step and write answers in context so that partial credit can be given.

Standards: S-ID.B.5, S-ID.B.6, S-ID.C.7, S-ID.C.8, S-ID.C.9 · **Level:** Grade 9 Algebra 1

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Two-Way Table (3 points)

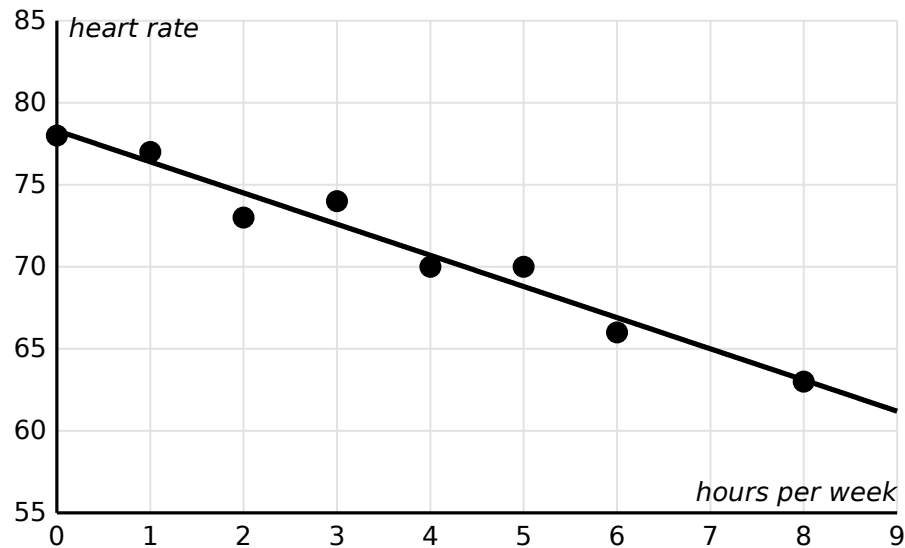
The table shows club choices of 120 students.

	Drama	Robotics	Total
Grade 11	33	27	60
Grade 12	21	39	60
Total	54	66	120

- Find the joint relative frequency of Grade 12 students in robotics. (1 point)
- Find the marginal relative frequency of students in drama. (1 point)
- Find the conditional relative frequency of robotics among Grade 11 students. (1 point)

Question 2 Heart Rate and Workouts (3 points)

The scatter plot shows weekly hours of workout x and resting heart rate y in beats per minute. The line of best fit is $\hat{y} = -1.9x + 78.3$.



Resting heart rate and workouts.

- Describe the direction and strength of the association. (1 point)
- Interpret the slope in context. (1 point)
- Predict the heart rate for 5 hours of workout. (1 point)

Question 3 Find Residuals (2 points)

A model is $\hat{y} = 2.5x + 10$.

- At $x = 6$ the actual value is 28. Find the residual. (1 point)
- At $x = 10$ the actual value is 31. Find the residual. (1 point)

Question 4 Interpret a Correlation Coefficient (2 points)

A data set has $r = -0.92$.

- Describe the direction and strength of the relationship. (1 point)
- A student says that x causes y to decrease. Respond to the student. (1 point)

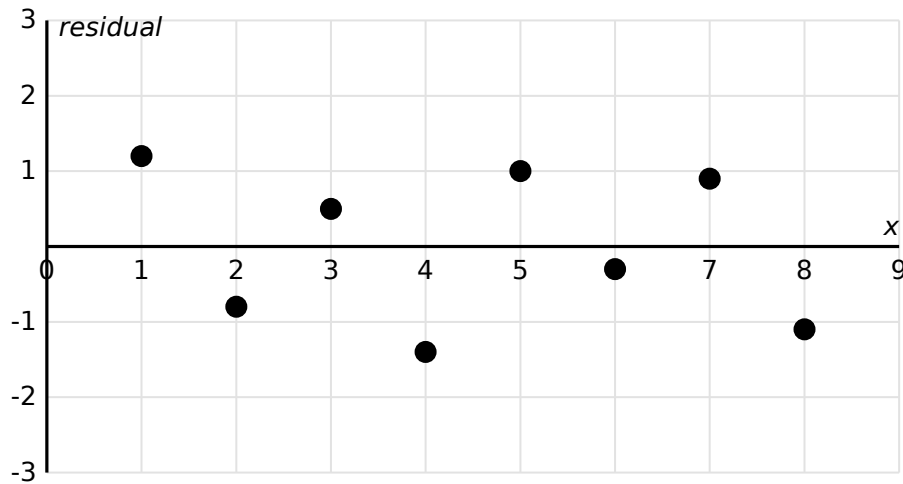
Question 5 Line Through Two Points (3 points)

A caterer's cost follows a linear trend. The cost for 2 guests is \$14 and the cost for 8 guests is \$50.

- Find the slope and say what it means. (1 point)
- Write an equation for the cost y of x guests. (1 point)
- Predict the cost for 12 guests. (1 point)

Question 6 Residual Plot (2 points)

A residual plot for a linear model is shown.



Residual plot of a linear model.

- Is a linear model appropriate? (1 point)
- Justify your answer. (1 point)

Question 7 Correlation and Causation (3 points)

A school study finds $r = 0.45$ between eating breakfast and test scores.

- Interpret r . (1 point)
- Can we conclude that breakfast causes higher scores? Explain. (1 point)
- Name a possible lurking variable. (1 point)

Question 8 Compare Two Models (2 points)

Two lines are fitted to the same four points. Model A has residuals 4, -1 , 2, -3 . Model B has residuals 1, 2, -1 , -2 . Which model fits better? Show the calculation.