

Algebra 1 - Scatter Plots, Lines of Fit and Two-Way Tables - Worksheet

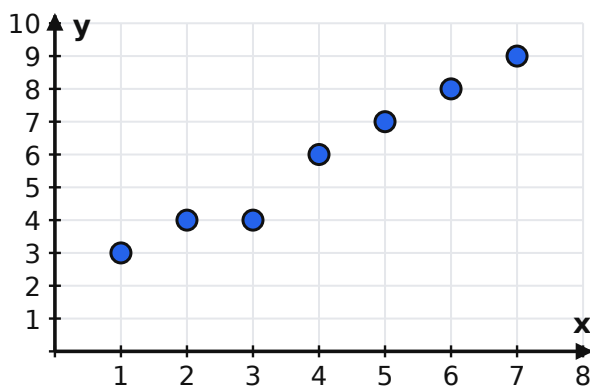
Common Core S-ID.B.5, S-ID.B.6, S-ID.C.7, S-ID.C.8, S-ID.C.9 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice scatter plots, lines of fit, and two-way tables (Common Core S-ID.B.5, S-ID.B.6, S-ID.C.7, S-ID.C.8, and S-ID.C.9). You will describe associations, interpret lines of fit, compute residuals, read correlation coefficients, and use two-way tables with relative frequencies. The first problems are short skill checks, and the last six are word problems that need several steps. Work in order and show every line of your work, because a bare answer earns little credit on a test.

Algebra 1 · Common Core State Standards: **S-ID.B.5, S-ID.B.6, S-ID.C.7, S-ID.C.8, S-ID.C.9**

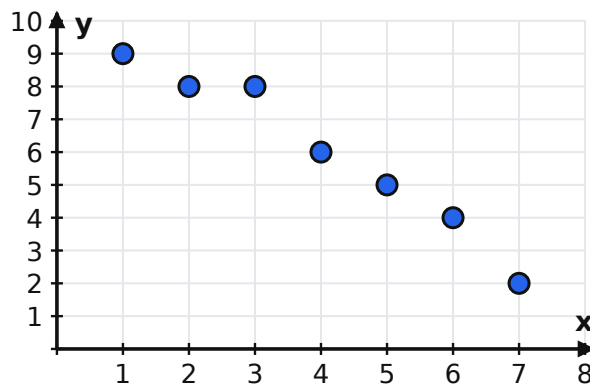
Exercise 1 - Positive association



A scatter plot.

Describe the association shown in the scatter plot: points move up from left to right.

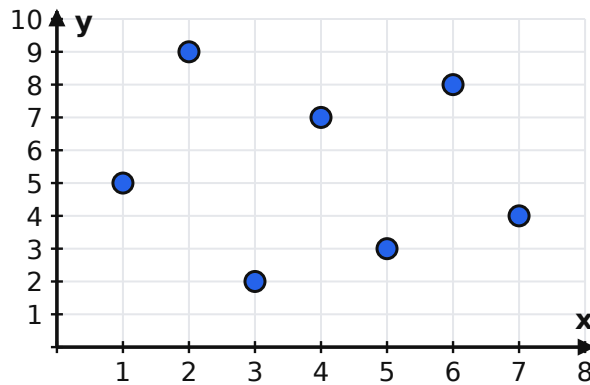
Exercise 2 - Negative association



A scatter plot.

Describe the association shown in the scatter plot: points move down from left to right.

Exercise 3 - No association



A scatter plot.

Describe the association shown in the scatter plot: points are scattered with no clear direction.

Exercise 4 - Equation of a line of fit

A line of fit passes through (2,10) and (8,34). Write its equation and predict the value of y when $x=5$.

Exercise 5 - Interpret the slope and intercept

A line of fit for test score y against hours studied x is $y=2.5x+40$. Interpret the slope and the y-intercept.

Exercise 6 - Predict from the line

A line of fit is $y = -3x + 50$. Predict y when $x = 7$, and find x when $y = 17$.

Exercise 7 - Compute a residual

A student's actual score was 31 and the line of fit predicted 28.4. Find the residual.

Exercise 8 - Residual from an equation

The line of fit is $y = 1.5x + 4$. For the data point $(6, 11)$, find the predicted value and the residual.

Exercise 9 - Residuals for three points

x	1	2	3
actual y	5	6	10

Actual values.

The line of fit is $y = 2x + 2$. Find the residuals for the data points $(1, 5), (2, 6), (3, 10)$.

Exercise 10 - Interpret correlation

Describe each correlation coefficient: (a) $r = 0.92$ (b) $r = -0.35$ (c) $r = 0.05$.

Exercise 11 - Correlation and causation

Ice cream sales and the number of sunburns are strongly positively correlated across summer weeks. Does eating ice cream cause sunburns? Explain.

Exercise 12 - Interpolation and extrapolation

A line of fit $y = 0.8x + 12$ was built from data with x between 10 and 40. Is a prediction at $x = 25$ reasonable? What about $x = 100$?

Exercise 13 - Complete a two-way table

	Walk	Bike	Total
Grade 7	30	20	?
Grade 8	10	40	?
Total	?	?	?

Missing totals.

Fill in the missing totals: Grade 7 has 30 walkers and 20 bikers. Grade 8 has 10 walkers and 40 bikers.

Exercise 14 - Joint and marginal frequencies

	Walk	Bike	Total
Grade 7	30	20	50
Grade 8	10	40	50
Total	40	60	100

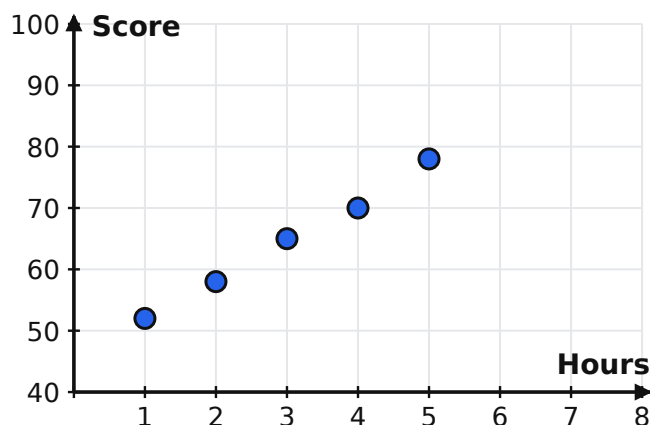
Walk or bike to school.

Use the completed table (100 students): find the joint relative frequency of grade 8 bikers and the marginal relative frequency of walkers.

Exercise 15 - Conditional frequency

Using the same table, what percent of grade 7 students walk? What percent of the walkers are in grade 7?

Exercise 16 - Least-squares line



Study hours and scores.

The data $(1,52), (2,58), (3,65), (4,70), (5,78)$ show hours studied and test scores. Technology gives the line $y = 6.4x + 45.4$ and $r \approx 0.999$. Predict the score for 4.5 hours and describe the strength of the relationship.

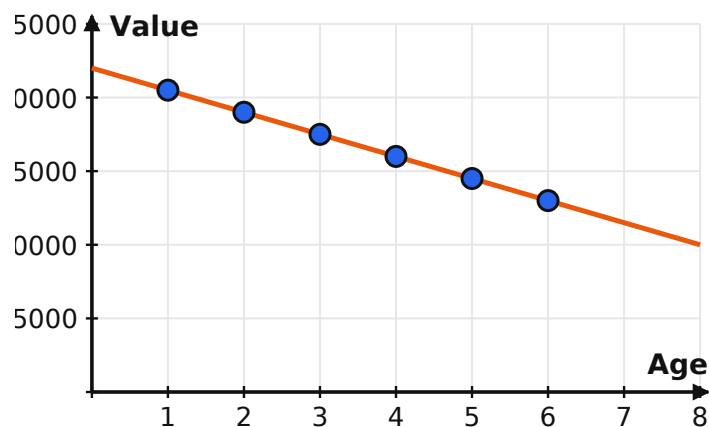
Exercise 17 - Line of fit in context

Day	10	30
Height (cm)	35	75

Two measurements.

A garden center records the height of a seedling: 35 cm at day 10 and 75 cm at day 30. Assuming a linear trend, write an equation for the height y after x days, interpret the slope, and predict the height at day 20.

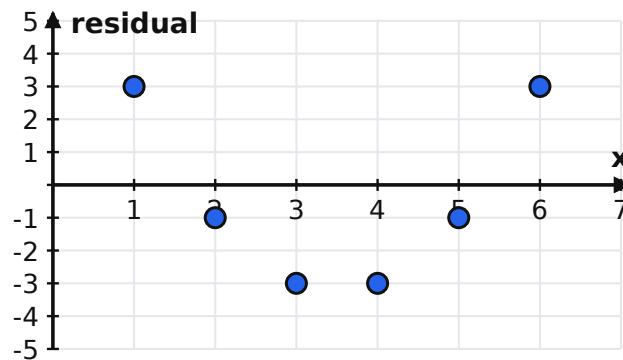
Exercise 18 - Used car values



Car value by age.

The value of a car (in dollars) is modeled by $y = -1500x + 22000$, where x is its age in years. Interpret the slope and y-intercept, find the value at 4 years, and find the age when the value is \$10,000.

Exercise 19 - Residual plot



A residual plot.

The residual plot shows a clear U-shaped pattern. Does a linear model fit well? Explain.

Exercise 20 - Breakfast and scores

A study finds that students who eat breakfast have higher test scores. Can we conclude that breakfast causes higher scores? Give one possible lurking variable.