

Scatter Story

Plot paired observations and explain the relationship.

HIGH SCHOOL • HSS-ID.B.6

CCSS.Math.Content.HSS-ID.B.6 "Represent data on two quantitative variables on a scatter plot, and describe how the variables are related."

NAME _____

DATE _____

DESCRIBE THE WHOLE PATTERN

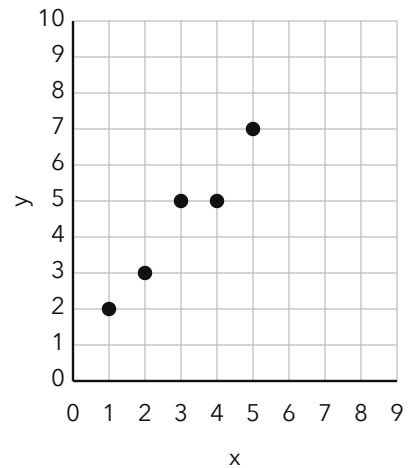
Plot one dot per observation, without joining dots. Describe direction, form (linear or curved), strength, and unusual points. Association may include scatter; observational data alone do not prove causation. These are classroom datasets.

WORKED EXAMPLE

For weekly exercise hours x and kilometers walked y , the graph shows (1, 2), (2, 3), (3, 5), (4, 5), (5, 7). Describe the pattern.

1. Read x as hours and y as kilometers.
2. Points rise and lie close to a straight line despite some scatter.

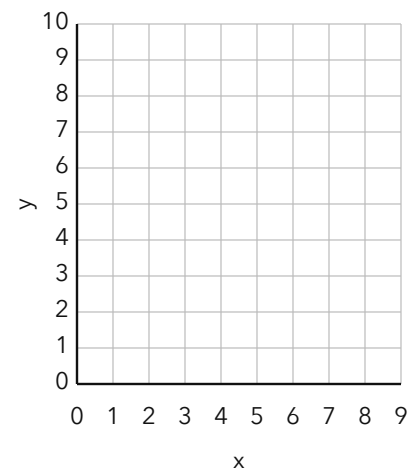
Answer: Strong positive, roughly linear association; causation is unproven.



PRACTICE 4 problems

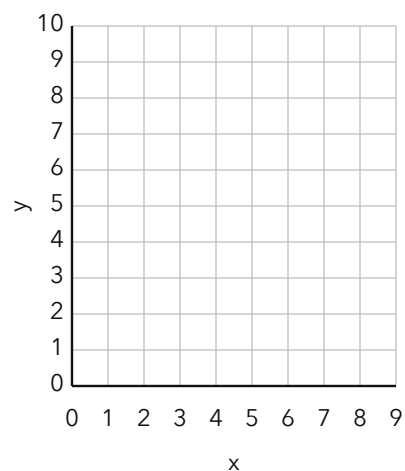
- 1** Plot these observations: training hours x and distance run in km y : (1, 2), (2, 3), (3, 3), (4, 5), (5, 5), (6, 6), (7, 8), (8, 7). Describe direction, form, and strength in context.

ANSWER _____



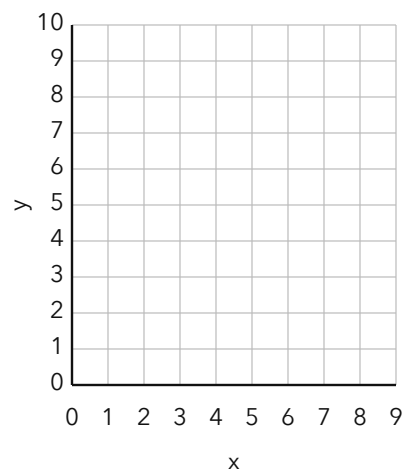
- 2** Plot bicycle age in years x and resale price in HUNDREDS of dollars y : (1, 9), (2, 8), (3, 8), (4, 6), (5, 6), (6, 4), (7, 3), (8, 3). Describe the pattern and interpret point (6, 4) in dollars.

ANSWER



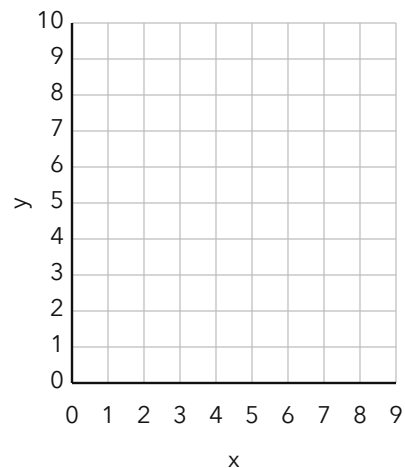
- 3** Plot time in seconds x and distance in meters y for a moving cart: (1, 1), (2, 1), (3, 2), (4, 3), (5, 4), (6, 6), (7, 8), (8, 10). Is a straight or curved pattern more appropriate? Explain using the changes in y .

ANSWER



- 4** Plot volunteer hours x and waiting time in minutes y : $(1, 6)$, $(2, 2)$, $(3, 8)$, $(4, 4)$, $(5, 9)$, $(6, 3)$, $(7, 7)$, $(8, 5)$. Describe the apparent association. Does this prove the variables can never be related?

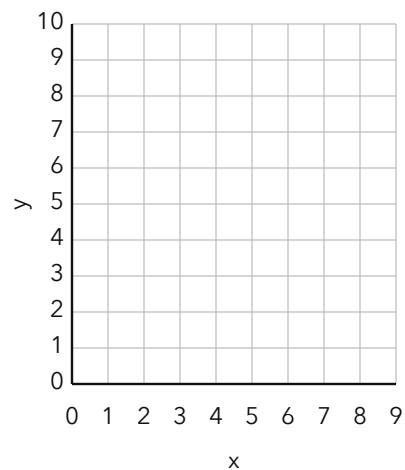
ANSWER



APPLY IT Show your work

- 1** A walking club records trail length in km x and walk duration in TENS of minutes y : $(1, 1)$, $(2, 2)$, $(3, 2)$, $(4, 3)$, $(5, 4)$, $(6, 4)$, $(7, 5)$, $(8, 2)$. Plot all points. Identify the unusual observation, describe the other points, and give a reason to investigate before removing it.

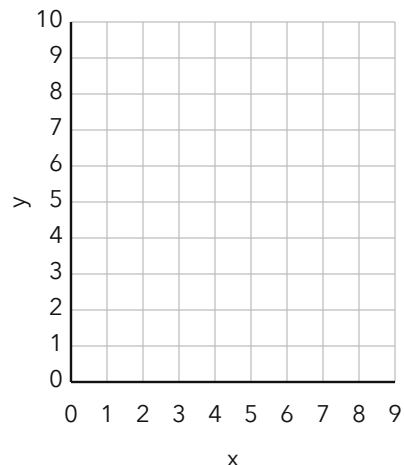
ANSWER



2

A machine's records pair running hours x with HUNDREDS of items produced y : (1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6), (7, 7), (8, 8). Plot them and describe the relationship. Estimate output at 4.5 hours. Explain why a prediction at 100 hours needs more caution.

ANSWER _____

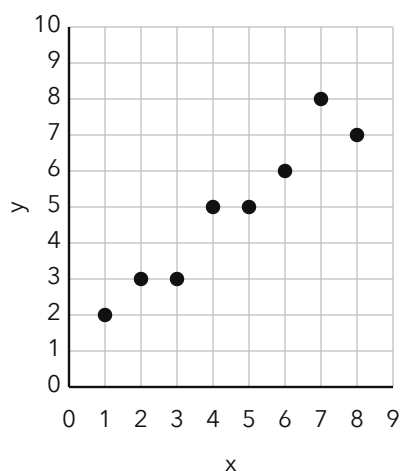


CHALLENGE One step up

Use your training-hours plot from Practice 1. A student claims, 'If every point is not on one line, there is no relationship. More training must cause every runner to go farther.' Explain both errors using the plotted evidence and the study design.

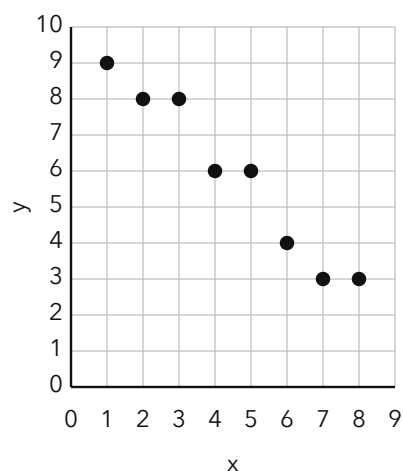
PRACTICE 1

A fairly strong positive, roughly linear association: runners with more training hours tend to run farther. The points show modest scatter, not an exact rule.



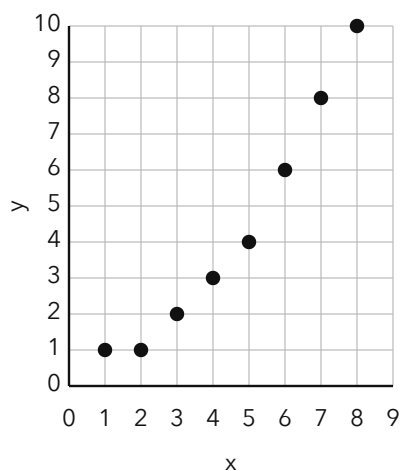
PRACTICE 2

A strong negative, roughly linear association: older bicycles tend to have lower resale prices. (6,4) means a 6-year-old bicycle priced at \$400.



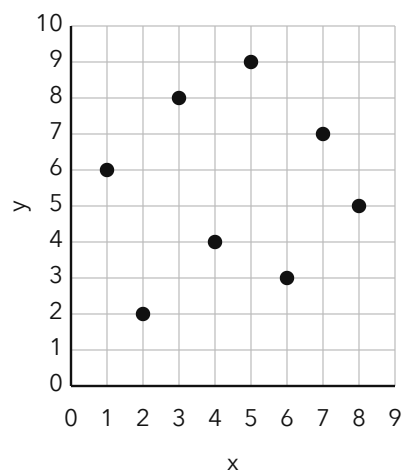
PRACTICE 3

A strong positive curved pattern. The distance increases more rapidly later, so a curve describes the observations better than a constant-rate straight line.



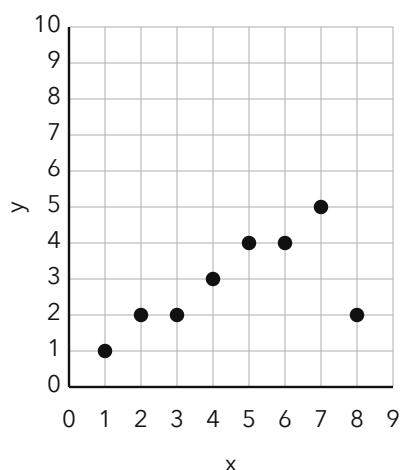
PRACTICE 4

Little apparent association in this sample: y varies widely without a clear increasing or decreasing pattern. Eight observations do not prove the variables can never be related.

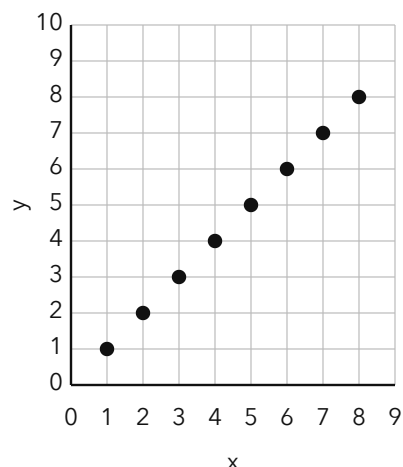


APPLY IT 1

(8,2), an 8-km walk recorded as 20 minutes, is unusual relative to the other observations. The other points show a fairly strong positive, roughly linear association. Check the duration, units, or circumstances; the point could be valid or erroneous. Report the unusual point and its influence rather than automatically deleting it.

**APPLY IT 2**

An exact positive linear pattern in the supplied data; about 450 items at 4.5 hours. The example follows $y = x$ in hundreds of items. 4.5 lies inside the observed range; 100 lies far outside it, where breakdowns or other changes could make the observed rate unreliable.

**CHALLENGE**

Scatter does not remove the fairly strong positive association; most points rise with x. The observations do not show that training causes the difference for every runner: fitness, measurement, and other factors may differ. An observational association is not a guaranteed individual or causal rule.

Graphs must use the stated scales and plot every ordered pair. Do not connect dots. Accept reasonable strength descriptions supported by the plotted scatter. Strength is not the steepness of a graph. Read 'hundreds of dollars/items' and 'tens of minutes' consistently. Avoid causal conclusions from these observational examples.