Algebra 1 4.5

Investigate relationships between quantities by using scatterplots

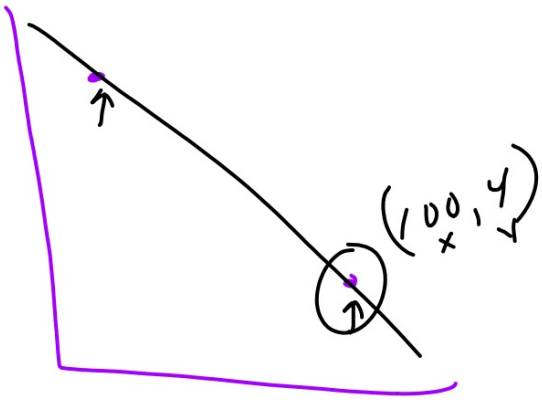
Use lines of fit to make and evaluate predictions

bivariate data
line of fit (prediction equation)
independent variable (x)
Dependent variable (y)
interpolation
extrapolation
correlation

$(20, 9)$
$(100, 4)$

$y = mx + B$

$y = -\frac{1}{16}x + B$




$m = \frac{\text{rise}}{\text{run}} = \frac{4-9}{100-20} = \frac{-5}{80} = -\frac{1}{16}$

$\frac{9-4}{20-100} = \frac{5}{-80} = -\frac{1}{16}$

$4 = -\frac{1}{16} \cdot 100 + B$

$4 = -6\frac{1}{4} + B$

$6\frac{1}{4} \quad 6\frac{1}{4}$

$10\frac{1}{4} = B$

(B) $y = -\frac{1}{16}x + 10\frac{1}{4}$

$y = -\frac{1}{16}x + \frac{41}{4}$

$x = 50$

$y = -\frac{1}{16} \cdot 50 + 10\frac{1}{4}$

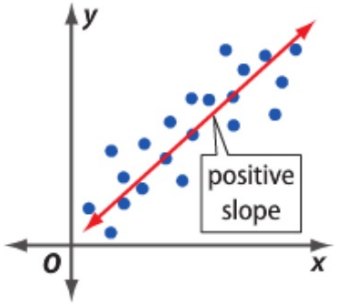
$y = 7\frac{1}{8}$

est: 7 park trips

explain

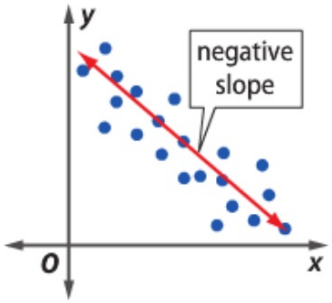
## ConceptSummary Scatter Plots

### Positive Correlation



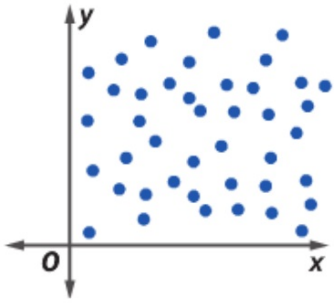

As $x$ increases, $y$ increases

### Negative Correlation




As $x$ decreases, $y$ decreases

### No Correlation




$x$ and $y$ are not related

**GuidedPractice**

**2. MUSIC** The table shows the dollar value in millions for the sales of CDs for the year. Make a scatter plot and determine what relationship exists, if any.

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| Sales | 13,215 | 12,909 | 12,044 | 11,233 | 11,447 | 10,520 | 9373 | 7452 | 5471 |

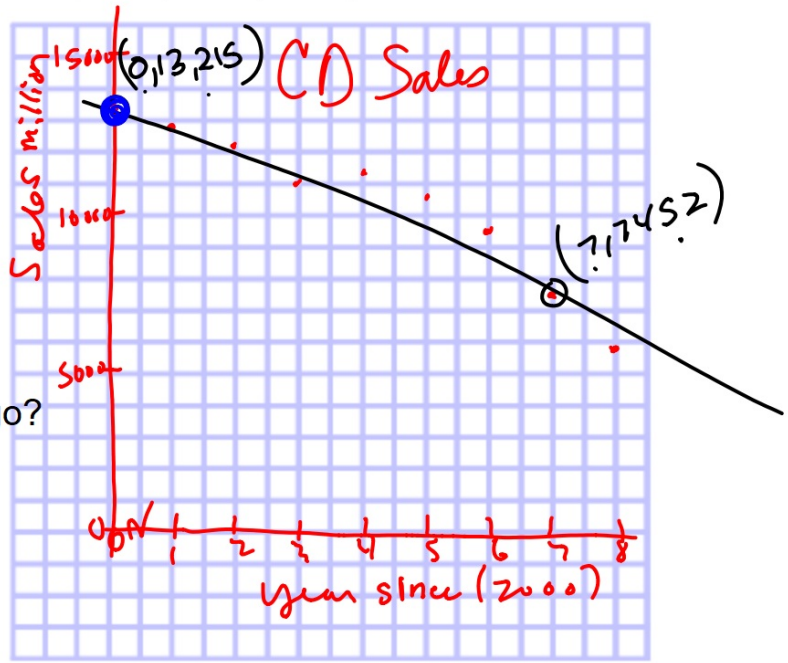
0 1 2 3 4 5 6 7

$m = \frac{7452 - 13{,}215}{7 - 0}$

$m = \frac{-5763}{7} = -823$

$y = mx + B$

Graph
Where would a reasonable line go?
Use 2 points on the line
Write an equation




$y = -823x + B$

$13{,}215 = -823(0) + B$

$13{,}215 = B$

$y = -823x + 13{,}215$

$m$ $B$

## Guided Practice

**3. MUSIC** Use the equation for the line of fit for the data in Guided Practice 2 to estimate CD sales in 2015.

$y = -823x + 13{,}215$

$y = -909.5x + 13818$

$y = -1062x + 1346?$

$y = -1063x + 21{,}419$