Writing Linear Equations/Linear Regression

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

1) Slope = −1, y-intercept = 0
2) Slope = \( \frac{1}{4} \), y-intercept = 1

Write the slope-intercept form of the equation of the line through the given point with the given slope.

3) through: (−2, 0), slope = −1
4) through: (1, 3), slope = 6

Write the slope-intercept form of the equation of the line through the given points.

5) through: (−3, 1) and (−5, 5)
6) through: (−2, 4) and (−1, 3)

Write the standard form of the equation of the line through the given point with the given slope.

7) through: (−4, −2), slope = −\( \frac{1}{2} \)
8) through: (4, 4), slope = \( \frac{3}{2} \)

Write the slope-intercept form of the equation of the line described.

9) through: (1, 0), parallel to \( y = 2x - 4 \)
10) through: (−2, −1), parallel to \( y = −4 \)

11) through: (2, 5), parallel to \( y = −2 \)
12) through: (−4, −1), parallel to \( x = 0 \)

13) through: (−4, 3), perp. to \( y = 4x − 4 \)
14) through: (1, −5), perp. to \( y = \frac{1}{6}x − 3 \)

15) through: (−3, 5), perp. to \( x = 0 \)
16) through: (−2, 0), perp. to \( y = 1 \)
17) As the number of farms has decreased in the United States, the average size of the remaining farms has grown larger, as shown in the table.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Acre Per Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>139</td>
</tr>
<tr>
<td>1920</td>
<td>149</td>
</tr>
<tr>
<td>1930</td>
<td>157</td>
</tr>
<tr>
<td>1940</td>
<td>175</td>
</tr>
<tr>
<td>1950</td>
<td>216</td>
</tr>
<tr>
<td>1959</td>
<td>303</td>
</tr>
<tr>
<td>1969</td>
<td>390</td>
</tr>
<tr>
<td>1978</td>
<td>449</td>
</tr>
<tr>
<td>1987</td>
<td>462</td>
</tr>
<tr>
<td>1997</td>
<td>487</td>
</tr>
</tbody>
</table>

a) Make a scatterplot of the data, letting x represent the number of years since 1900.

b) Manually find a line of best fit in slope-intercept form. Write down the two points used to find this line.

c) Use a graphing calculator to find the line of best fit. Round to the nearest hundredth if necessary.

d) Predict the average acreage in 2000 and 2010. Round to the nearest whole number.

e) What was the average acreage in 1810 (to the nearest integer)? Is this reasonable? Explain why or why not.
Writing Linear Equations/Linear Regression

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

1) Slope = \(-1\), y-intercept = 0
   \[ y = -x \]

2) Slope = \(\frac{1}{4}\), y-intercept = 1
   \[ y = \frac{1}{4}x + 1 \]

Write the slope-intercept form of the equation of the line through the given point with the given slope.

3) through: \((-2, 0)\), slope = -1
   \[ y = -x - 2 \]

4) through: \((1, 3)\), slope = 6
   \[ y = 6x - 3 \]

Write the slope-intercept form of the equation of the line through the given points.

5) through: \((-3, 1)\) and \((-5, 5)\)
   \[ y = -2x - 5 \]

6) through: \((-2, 4)\) and \((-1, 3)\)
   \[ y = -x + 2 \]

Write the standard form of the equation of the line through the given point with the given slope.

7) through: \((-4, -2)\), slope = \(-\frac{1}{2}\)
   \[ x + 2y = -8 \]

8) through: \((4, 4)\), slope = \(\frac{3}{2}\)
   \[ 3x - 2y = 4 \]

Write the slope-intercept form of the equation of the line described.

9) through: \((1, 0)\), parallel to \(y = 2x - 4\)
   \[ y = 2x - 2 \]

10) through: \((-2, -1)\), parallel to \(y = -4\)
    \[ y = -1 \]

11) through: \((2, 5)\), parallel to \(y = -2\)
    \[ y = 5 \]

12) through: \((-4, -1)\), parallel to \(x = 0\)
    \[ x = -4 \]

13) through: \((-4, 3)\), perp. to \(y = 4x - 4\)
    \[ y = -\frac{1}{4}x + 2 \]

14) through: \((1, -5)\), perp. to \(y = \frac{1}{6}x - 3\)
    \[ y = -6x + 1 \]

15) through: \((-3, 5)\), perp. to \(x = 0\)
    \[ y = 5 \]

16) through: \((-2, 0)\), perp. to \(y = 1\)
    \[ x = -2 \]
17) As the number of farms has decreased in the United States, the average size of the remaining farms has grown larger, as shown in the table.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Acre Per Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>139</td>
</tr>
<tr>
<td>1920</td>
<td>149</td>
</tr>
<tr>
<td>1930</td>
<td>157</td>
</tr>
<tr>
<td>1940</td>
<td>175</td>
</tr>
<tr>
<td>1950</td>
<td>216</td>
</tr>
<tr>
<td>1959</td>
<td>303</td>
</tr>
<tr>
<td>1969</td>
<td>390</td>
</tr>
<tr>
<td>1978</td>
<td>449</td>
</tr>
<tr>
<td>1987</td>
<td>462</td>
</tr>
<tr>
<td>1997</td>
<td>487</td>
</tr>
</tbody>
</table>

a) Make a scatterplot of the data, letting x represent the number of years since 1900.

b) Manually find a line of best fit in slope-intercept form. Write down the two points used to find this line.

c) Use a graphing calculator to find the line of best fit. Round to the nearest hundredth if necessary.

d) Predict the average acreage in 2000 and 2010. Round to the nearest whole number.

e) What was the average acreage in 1810 (to the nearest integer)? Is this reasonable? Explain why or why not.

b) answers vary  c) y=4.72x+37.93  d) 2000: 510; 2010: 557  e) -387 acres; no, can't have negative acreage; equation is only a model and is less accurate the farther away it is from the actual data