Worksheet 6.3 – Curves of Best Fit

Complete the following questions on this worksheet and check the answer key on the final page before submitting.

p.348

**In Summary**

**Key Idea**
- Sometimes a curve represents the trend or pattern in a scatter plot better than a line.

**Need to Know**
- You can use a curve of best fit to extrapolate and interpolate values.
- Extending a curve involves more guesswork than extending a line, so you can't be as sure of your predictions.
- Sometimes it's not clear whether a curve or line of best fit can be drawn. This could be because there is no relationship between the variables, or it could mean that more data need to be collected.

3. A basketball is dropped from a height of 200 cm. The table shows how high it bounces on each bounce.

<table>
<thead>
<tr>
<th>Bounce Number</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Height (cm)</td>
<td>200</td>
<td>120</td>
<td>72</td>
<td>44</td>
<td>26</td>
<td>16</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

a) Plot the data on a scatter plot.
b) Sketch a curve of best fit.

d) Does it make sense to use the curve of best fit for extrapolation? Explain.

8. A herd of caribou is moved to a small, remote island where they have no predators. Data on the population of the herd were collected for 6 years.

<table>
<thead>
<tr>
<th>Time (years)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>24</td>
<td>35</td>
<td>51</td>
<td>74</td>
<td>104</td>
<td>151</td>
<td>225</td>
</tr>
</tbody>
</table>

a) Sketch the data on a scatter plot.
b) Draw a line or curve of best fit through the plotted points. Explain which is more appropriate.

c) Describe the growth of the herd.

d) Predict the population of the herd after seven years.
9. In the Kingdom of Petrodalla, natural gas is the primary resource. The table shows the amount of natural gas produced each year.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Produced (millions of m³)</td>
<td>1.6</td>
<td>2.1</td>
<td>3.0</td>
<td>4.1</td>
<td>4.3</td>
<td>4.4</td>
<td>3.6</td>
<td>2.1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

a) Sketch the data on a scatter plot.

b) Draw a line or curve of best fit through the plotted points.

c) Describe how the production of natural gas changes over time.

d) Predict when natural gas production will decrease to zero.
Answer Key:

3.  a) and b) 

![Graph of Heights of Bounces]

- c) No. The data are discrete.
- d) Yes. You could extrapolate up to a certain point. But eventually, the ball will stop moving.

8.  a) and b) 

![Graph of Caribou Population]

- c) The herd’s population grew gradually at first, then at an increasing pace.
- d) about 325
9. a) and b) The plotted points seem to fall on a curve.

c) Production increases for the first 5 years or so, reaches a peak for a couple of years, then falls to near zero.
d) around 2017