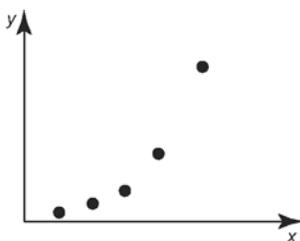


Section 5.5 Select a Mathematical Model

- If the second differences of a set of data are nearly constant, which model—linear, quadratic, or exponential—would be most appropriate to represent the data?
- Which model—linear, quadratic, or exponential—seems most appropriate for this scatter plot?



- The table shows the total operating revenue for golf courses and country clubs in Canada each year from 1998 to 2004.

| Year | Operating Revenue (\$, billions) |
|------|----------------------------------|
| 1998 | 1.625 |
| 1999 | 1.607 |
| 2000 | 1.716 |
| 2001 | 1.805 |
| 2002 | 1.881 |
| 2003 | 2.048 |
| 2004 | 2.224 |

Source: Statistics Canada, CANSIM Table 361-0002
Database: E-STAT

- Create a scatter plot of the data. Let 1998 be year 0.
- From the scatter plot, which model appears most appropriate: linear, quadratic, or exponential? Give a reason for your answer.
- Generate a model for the data. Represent the model using a graph and an equation.
- Use the model to predict the operating revenue in 2005.

- A telecommunications company recently launched a year long advertising campaign to promote their brand of cellular telephones. The monthly number of new cellular telephone subscribers is shown in the table.

| Month | Number of New Subscribers |
|-------|---------------------------|
| 1 | 6 500 |
| 2 | 7 150 |
| 3 | 7 870 |
| 4 | 8 650 |
| 5 | 9 520 |
| 6 | 10 470 |
| 7 | 11 520 |
| 8 | 12 670 |

- Calculate the first and second differences, and the ratios.
 - Which model appears most suitable for the data: linear, quadratic, or exponential? Justify your answer.
 - Sketch a scatter plot of the data.
 - Generate a suitable model for the data. Represent the model using a graph and an equation.
 - Use the graph to predict the month in which there will be approximately 15 000 new subscribers.
 - Use the equation to predict the number of new subscribers in month 12.
- Examine each pattern. Which relation does each pattern model? Explain.

