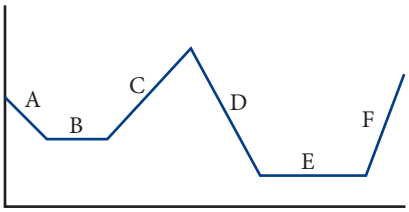
5 Review

5.1 Linear Models, pages 268-281

1. Consider this graph.



Which parts show

a) a positive rate of change?

b) a negative rate of change?

c) a zero rate of change?

2. The city roads department ordered 2000 m^3 of sand to use on the roads during the winter. The volume of sand at the end of each week is shown.

Week	Volume of Sand (m^3)
0	2000
1	1922
2	1836
3	1755
4	1682
5	1598
6	1520
7	1442
8	1338

a) Describe the relationship between the volume of sand remaining and the week.

b) Create a scatter plot of the data.

c) Add a line of best fit to the graph. Write the equation for the line.

d) Predict how many weeks, in total, the sand will last.

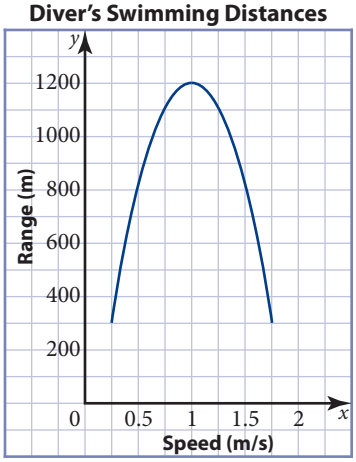
e) What are appropriate units for the rate of change of volume of sand remaining with respect to the week?

5.2 Quadratic Models, pages 282-293

3. Is this relation linear, quadratic, or neither? Explain how you know.

x	y
0	45
1	44
2	41
3	36
4	29

4. The distance that a scuba diver can swim on one tank of compressed air and the speed at which she is swimming is shown in the graph.



a) Describe the relation between range and speed in words.

b) Use the graph to estimate the range at a swim speed of 0.5 m/s.

c) What speed appears to result in the maximum range? What is this range?

d) What are appropriate units for the rate of change of range with respect to speed?

e) Is the rate of change of range with respect to speed increasing, constant, or decreasing? Explain.

5.3 Exponential Models, pages 294-305

5. Avi invested $1000 in a five-year GIC that paid 5% interest per year, compounded annually. Make a table showing the value of the GIC at the end of each year of the term.

6. A magazine article implies that the population of Canada geese in the city has been growing exponentially. The article includes the estimated goose population for the last six years. Does the population growth appear to be exponential? Justify your answer.

Year	Goose Population
1	1190
2	1250
3	1310
4	1380
5	1455
6	1530

5.4 Analyse Graphical Models, pages 310-319

7. The table shows the average yearly electricity consumption per household for a medium-sized city.

Year	Electricity Consumption (kWh)
0	2420
1	2470
2	2520
3	2570
4	2620
5	2670

a) Show that the data can be represented by a linear model and by an exponential model.

b) Use technology to determine a linear and an exponential model. Write the equation for each model.

c) What might the electricity consumption be in 15 years? Which model predicts a higher demand? Explain how you know.

d) Use technology to graph each model. Extend each graph to determine the demand after 15 years.

5.5 Select a Mathematical Model, pages 320-331

8. Ralph is considering starting his own Web design business in his town. There are already several similar companies and he is concerned that there might not be enough business in the future. He conducted some research and determined the number of businesses with Web sites in the town seems to be growing.

Year	Number of Businesses with Web Sites
2000	256
2001	287
2002	317
2003	341
2004	368
2005	383
2006	397
2007	414

a) Create a scatter plot of the data.

b) Which model appears the most suitable: linear, quadratic, or exponential? Give reasons for your answer.

c) Develop a suitable model.

d) Predict the trend for businesses using Web sites and write a short note advising Ralph what he should do.