Chapter 2 Review Extra Practice

1. A golfer hits a golf ball from the fairway. The function $h(t) = -5t^2 + 27t$ models the height of the golf ball, where $h(t)$ is the height in metres and t is the time it is in the air in seconds.
   a) Determine the average rate of change in the golf ball's height over the time interval $0 \leq t \leq 1$.
   b) Determine the average rate of change in the golf ball's height over the time interval $0 \leq t \leq 2$.
   c) Determine the average rate of change in the golf ball's height over the time interval $0 \leq t \leq 3$.
   d) Is the golf ball's average rate of change in height increasing, decreasing, or does it stay the same? Explain how you made your decision.

2. For the function $g(x) = -3x^2 + 4x - 6$, estimate the instantaneous rate of change for the given values of x.
   a) $x = -2$
   b) $x = 0$
   c) $x = 3$
   d) $x = 5$

3. Sketch the graph of each of the following functions. Draw a secant line on each sketch that you could use to estimate the slope of the tangent when $x = -2$. Use the results to estimate the slope of the line tangent to each of the functions when $x = -2$.
   a) $f(x) = 4x^2 + 8x - 1$
   b) $f(x) = 5^x - 1$
   c) $f(x) = -2x - 5$

4. Matthew leaves his house to go for a run. He ran at a constant speed of 10 km/h for 30 minutes. The path sloped upward, so he ran at a rate of 6 km/h for 15 minutes. At the top of the hill, he increased his speed to 8 km/h for 30 minutes. He stopped for 15 minutes to rest. Finally, he ran at a constant speed of 10 km/h for 30 minutes.

a) Sketch a graph of Matthew's distance versus time while running.
b) What is Matthew's average speed during the entire time that he ran?
c) What is Matthew's average speed between 15 and 45 minutes?
d) What is Matthew's instantaneous speed at 60 minutes?

5. Susan is a track-and-field athlete who is practising with the javelin. The table shows the height of the javelin and the time that it is in the air during one of her throws.

Time (s)	Height (m)
0	1.80
0.3	8.25
0.6	13.80
0.9	18.45
1.2	22.20
1.5	25.05
1.8	27.00
2.1	28.05
2.4	28.20
2.7	27.45
3.0	25.80
3.3	23.25

a) Plot the points on a graph and draw the curve of best fit.
b) Estimate at the speed at which the javelin is travelling at 2.3 s.