1. **a)** 19   **c)** 13   **e)** 11.4
   b) 15   **d)** 12   **f)** 11.04

2. **a)** **i)** 15 m/s   **ii)** −5 m/s

   b) During the first interval, the height is increasing at 15 m/s; during the second interval, the height is decreasing at 5 m/s.

3. $f(x)$ is always increasing at a constant rate. $g(x)$ is decreasing on $(-\infty, 0)$ and increasing on $(0, \infty)$, so the rate of change is not constant.

4. **a)** 352, 138, 286, 28, 60, −34 people/h
   b) the rate of growth of the crowd at the rally
   c) A positive rate of growth indicates that people were arriving at the rally. A negative rate of growth indicates that people were leaving the rally.

6. 4; 4; the average rate of change is always 4 because the function is linear, with a slope of 4.

8. **a)** **i)** 750 people/year
      ii) 3000 people/year
      iii) 12 000 people/year
      iv) 5250 people/year
   b) No; the rate of growth increases as the time increases.
   c) You must assume that the growth continues to follow this pattern, and that the population will be 5 120 000 people in 2050.

9. −2 m/s

10. **a)** **i)** $2.60/sweatshirt
      ii) $2.00/sweatshirt
      iii) $1.40/sweatshirt
      iv) $0.80/sweatshirt
   b) The rate of change is still positive, but it is decreasing. This means that the profit is still increasing, but at a decreasing rate.
   c) No; after 6000 sweatshirts are sold, the rate of change becomes negative. This means that the profit begins to decrease after 6000 sweatshirts are sold.