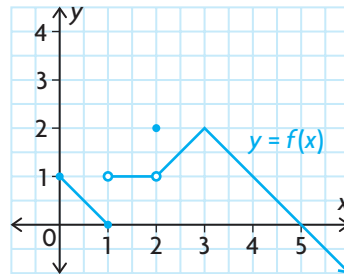


CHAPTER 1 TEST

1. Explain why $\lim_{x \rightarrow 1} \frac{1}{x-1}$ does not exist.
2. Consider the graph of the function $f(x) = 5x^2 - 8x$. Calculate the slope of the secant that joins the points on the graph given by $x = -2$ and $x = 1$.
3. For the function shown below, determine the following:



- a. $\lim_{x \rightarrow 1} f(x)$
 - b. $\lim_{x \rightarrow 2} f(x)$
 - c. $\lim_{x \rightarrow 4} f(x)$
 - d. values of x for which f is discontinuous
4. A weather balloon is rising vertically. After t hours, its distance above the ground, measured in kilometres, is given by the formula $s(t) = 8t - t^2$.
 - a. Determine the average velocity of the weather balloon from $t = 2$ h to $t = 5$ h.
 - b. Determine its velocity at $t = 3$ h.
 5. Determine the average rate of change in $f(x) = \sqrt{x+11}$ with respect to x from $x = 5$ to $x = 5 + h$.
 6. Determine the slope of the tangent at $x = 4$ for $f(x) = \frac{x}{x^2 - 15}$.
 7. Evaluate the following limits:
 - a. $\lim_{x \rightarrow 3} \frac{4x^2 - 36}{2x - 6}$
 - b. $\lim_{x \rightarrow 2} \frac{2x^2 - x - 6}{3x^2 - 7x + 2}$
 - c. $\lim_{x \rightarrow 5} \frac{x - 5}{\sqrt{x} - 1 - 2}$
 - d. $\lim_{x \rightarrow -1} \frac{x^3 + 1}{x^4 - 1}$
 - e. $\lim_{x \rightarrow 3} \left(\frac{1}{x-3} - \frac{6}{x^2 - 9} \right)$
 - f. $\lim_{x \rightarrow 0} \frac{(x+8)^{\frac{1}{3}} - 2}{x}$
 8. Determine constants a and b such that $f(x)$ is continuous for all values of x .

$$f(x) = \begin{cases} ax + 3, & \text{if } x > 5 \\ 8, & \text{if } x = 5 \\ x^2 + bx + a, & \text{if } x < 5 \end{cases}$$