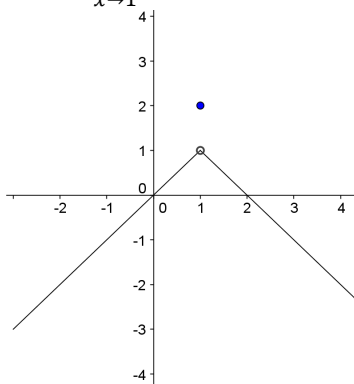


Chapter 2 Practice Test – Calculus

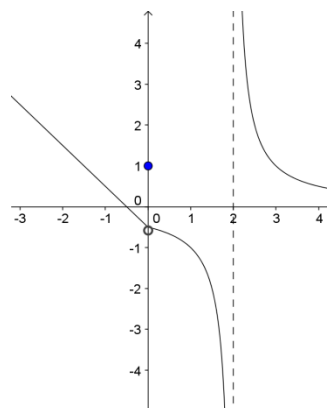
1. a) Find $\lim_{x \rightarrow 1} f(x)$ for the function graphed below.



- b) Sketch the graph of a function that satisfies the following conditions:

$\lim_{x \rightarrow \infty} f(x) = 2$, $\lim_{x \rightarrow -\infty} f(x) = +\infty$, $\lim_{x \rightarrow 2^+} f(x) = -\infty$, $\lim_{x \rightarrow 2^-} f(x) = \infty$, and has zeroes at $x = 0$, 3 .

2. Evaluate $\lim_{x \rightarrow -4} \frac{x^2 - 16}{x + 4}$.
3. What is the end behaviour of $y = \frac{8x - 2}{3x + 5}$?
4. True or False. A graphing calculator can be used to show that $f(x) = \left(6 + \frac{1}{x}\right)^x$ has a horizontal asymptote.
5. True or False. $\lim_{x \rightarrow \infty} \frac{3}{x^2} = \lim_{x \rightarrow 0^+} 4x^3$.
6. If $\lim_{x \rightarrow a} f(x) = 3$ and $\lim_{x \rightarrow a} g(x) = 2$, then evaluate $\lim_{x \rightarrow a} [-3[f(x)]^2 + 4g(x)]$.
7. $\lim_{x \rightarrow -2} 5 =$
8. $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} =$
9. $\lim_{x \rightarrow 4} \frac{1}{x - 4} =$
10. If $f(x) = \begin{cases} x^3, & x \leq 1 \\ 2x, & x > 1 \end{cases}$, what is $\lim_{x \rightarrow 1} f(x)$?
11. For $f(x)$ graphed to the right,
 - a. for what values of x is the function continuous?
 - b. for what values of x does the limit exist?



12. Where is $f(x) = \frac{x+3}{x^2+8x+15}$ discontinuous?

13. What value(s) of k will make the function $f(x) = \begin{cases} kx + 2, & x \leq 4 \\ x^2, & x > 4 \end{cases}$ continuous everywhere?

14. True or False. $f(x) = \frac{1}{x-5}$ has a removable discontinuity at $x = 5$.

15. True or False. It can be shown, by The Intermediate Value Theorem, that $x^3 + 2 = 0$ has at least one solution on the interval $[-2, 2]$.

16. $\lim_{x \rightarrow 0} \frac{\sin(-6x)}{\sin(7x)} =$

17. $\lim_{x \rightarrow 0} \frac{\tan(x)}{\sin(x)} =$

18. $\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{\sin(x)} =$

19. $\lim_{x \rightarrow \infty} \frac{(3x+1)^x}{\sin(x)} =$

20. What is the average rate of change of the function $y = 5x^2$ over the interval $[1, 3]$?

21. What is the instantaneous slope of $y = 2x^2$ at $x = 1$?

22. An object moves along the x-axis according to the function $x(t) = t^2 - 2t$. What is the instantaneous rate of change at $t = 3$ seconds?

23. Find the equation of the tangent line to the curve $y = \frac{2}{1-2x}$ at the point $(1, -2)$.