

Put your solutions on this page.

Do not use your phones or calculators.

(1) $\lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1}-1} =$

(5) $\lim_{x \rightarrow 1} \frac{1-a^2}{1-a} =$

(2) $\lim_{x \rightarrow \frac{1}{2}} \frac{|2x-1|}{2x-1} =$

(6) $\lim_{a \rightarrow 4} \frac{2-\sqrt{a}}{4-a} =$

(3) $\lim_{x \rightarrow 3} \sqrt{x-3} =$

(7) $\lim_{x \rightarrow 2} \frac{8-a^3}{2-a} =$

(4) $\lim_{x \rightarrow 3^+} \sqrt{x-3} =$

(8) $\lim_{x \rightarrow 1} \frac{1-\frac{1}{a}}{1-a} =$

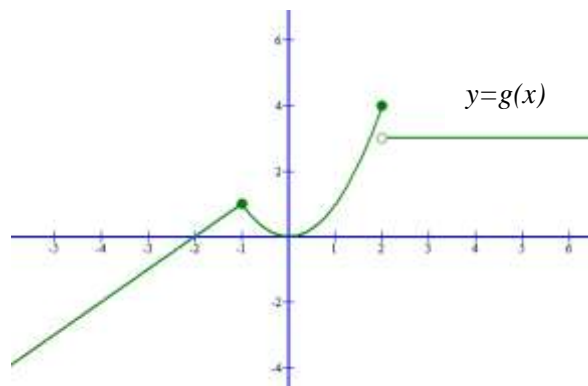
(9) $\lim_{x \rightarrow -1} g(x) =$ _____ in the graph shown.

(10) $\lim_{x \rightarrow -1} g(x)$ _____ in the graph shown.

(11) $\lim_{x \rightarrow 2} g(x) =$ _____ in the graph shown.

(12) $\lim_{x \rightarrow 2^-} g(x) =$ _____ in the graph shown.

(13) $\lim_{x \rightarrow 2^+} g(x) =$ _____ in the graph shown.



(14) Draw the graph of a single function that has all of these properties:

• $\lim_{x \rightarrow -4^+} f(x) = 2$

• $\lim_{x \rightarrow 0} f(x) = 0$

• $f(-4) = 0$

• $f(0) = 2$

(15) Compute these limits:

a. $\lim_{x \rightarrow -\infty} \frac{2x^3-1}{x^2+1} =$

d. $\lim_{x \rightarrow \infty} \frac{2x^3-1}{x^3+1} =$

b. $\lim_{x \rightarrow \infty} \frac{2x^3-1}{x^2+1} =$

e. $\lim_{x \rightarrow -\infty} 1 - x^4 =$

c. $\lim_{x \rightarrow -\infty} \frac{2x^3-1}{x^3+1} =$

f. $\lim_{x \rightarrow \infty} 1 - x^4 =$

(16) Graph the function $g(x) = \begin{cases} -x, & \text{if } x < -2 \\ 3, & \text{if } -2 \leq x \leq 2 \\ x, & \text{if } x > 2 \end{cases}$ below. Then, identify and classify all discontinuities.

(17) Find the value of a that makes $g(x)$ a continuous function $g(x) = \begin{cases} -x + a, & \text{if } x < 0 \\ 1, & \text{if } x = 0 \\ x + a, & \text{if } x > 0 \end{cases}$

(18) Find values of a and b that makes $f(x)$ a continuous function: $f(x) = \begin{cases} 3x^2 - 1, & \text{if } x \geq 2 \\ ax + b, & \text{if } x < 2 \end{cases}$

(19) Draw the graph of a single function that has all of these properties:

- $f(x)$ is continuous on the interval $(-\infty, 0) \cup (0, \infty)$
- $\lim_{x \rightarrow 0} f(x) = 0$
- $f(0) = 2$
- $\lim_{x \rightarrow \infty} f(x) = 0$
- $\lim_{x \rightarrow -\infty} f(x) = 0$