This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

---

1. Evaluate the limit below, if possible.

$$\lim_{x \to 6} \frac{\sqrt{9x-5}-7}{5x-30}$$

The solution is 0.129

A. 0.014

You likely learned L'Hospital's Rule in a previous course, but misapplied it here.

B. ∞

You likely believed that since the denominator is equal to 0, the limit is infinity.

C. 0.129

D. 0.071

You likely memorized how to solve the similar homework problem and used the same formula here.

E. None of the above

If you got a limit that does not match any of the above, please contact the coordinator.

General Comment: General comments: It is difficult to imagine the graph of this function, so you need to test values close to $x = 6$.

---

2. Based on the information below, which of the following statements is always true? $f(x)$ approaches 4.73 as x approaches 3. The solution is $f(x)$ is close to or exactly 4.73 when x is close to 3

A. $f(x) = 3$ when x is close to 4.73

B. $f(x)$ is close to or exactly 3 when x is close to 4.73

C. $f(x)$ is close to or exactly 4.73 when x is close to 3

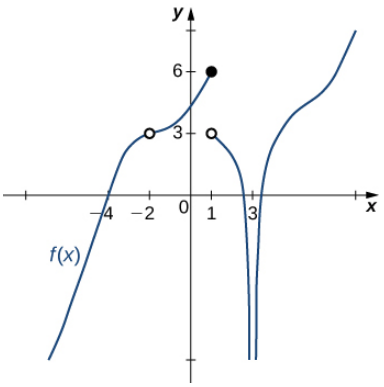
D. $f(x) = 4.73$ when x is close to 3

E. None of the above are always true.

General Comment: General comments: The limit tells you what happens as the x-values approach 3. It says **absolutely nothing** about what is happening exactly at $f(x)$!

---

3. For the graph below, find the value(s) a that makes the limit true: $\lim_{x \to a} f(x)$ does not exist.



The solution is 1

A. -2

B. 1

C. 3

D. Multiple a make the limit true.

E. No a make the limit true.

General Comment: General Comments: Remember that the limit does not exist if the left-hand and right-hand limits do not match.

---

4. Evaluate the one-sided limit of the function $f(x)$ below, if possible.

$$\lim_{x \to 1^-} \frac{2}{(x+1)^6} + 8$$

The solution is $f(1)$

A. $f(1)$

B. ∞

C. $-\infty$

D. The limit does not exist

E. None of the above

General Comment: General comments: You should be able to graph the rational function displayed. If not, go back to Module 7 to learn about the general shape of rational functions.

---

0. To estimate the one-sided limit of the function below as x approaches 1 from the left, which of the following sets of numbers should you use?

$$\frac{\frac{1}{x} - 1}{x - 1}$$

The solution is $\{0.9000, 0.9900, 0.9990, 0.9999\}$

A. $\{0.9000, 0.9900, 0.9990, 0.9999\}$

This is correct!

B. $\{1.0000, 0.9000, 0.9900, 0.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 1 doesn't help us estimate the limit.

C. $\{1.0000, 1.1000, 1.0100, 1.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 1 doesn't help us estimate the limit.

D. $\{0.9000, 0.9900, 1.0100, 1.1000\}$

These values would estimate the limit at the point and not a one-sided limit.

E. $\{1.1000, 1.0100, 1.0010, 1.0001\}$

These values would estimate the limit of 1 on the right.

General Comment: General Comments: To evaluate a one-sided limit, we want to put numbers close to the limit. We can't use the limit value itself if it results in $\frac{0}{0}$ or $\frac{\infty}{\infty}$