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.

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1. To estimate the one-sided limit of the function below as x approaches 4 from the left, which of the following sets of numbers should you use?

$$\frac{\frac{4}{x} - 1}{x - 4}$$

The solution is $\{3.9000, 3.9900, 3.9990, 3.9999\}$, which is option C.

A. $\{4.1000, 4.0100, 4.0010, 4.0001\}$

These values would estimate the limit of 4 on the right.

B. $\{4.0000, 4.1000, 4.0100, 4.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 4 doesn't help us estimate the limit.

C. $\{3.9000, 3.9900, 3.9990, 3.9999\}$

This is correct!

D. $\{3.9000, 3.9900, 4.0100, 4.1000\}$

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

E. $\{4.0000, 3.9000, 3.9900, 3.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 4 doesn't help us estimate the limit.

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 $\frac{\infty}{\infty}$

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2. Based on the information below, which of the following statements is always true?

$$As$$

x$approaches$6,f(x)$approaches \infty$.

The solution is $f(x)$ is undefined when x is close to or exactly 6., which is option C.

A. x is undefined when $f(x)$ is close to or exactly ∞.

B. $f(x)$ is close to or exactly 6 when x is large enough.

C. $f(x)$ is undefined when x is close to or exactly 6.

D. $f(x)$ is close to or exactly ∞ when x is large enough.

E. None of the above are always true.

General Comment: General comments: The limit tells you what happens as the x-values approach 6. It says **absolutely nothing** about what is happening exactly at $f(x)$!

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3. Evaluate the limit below, if possible.

$$\lim_{x \to 9} \frac{\sqrt{6x-29}-5}{2x-18}$$

The solution is 0.300, which is option A.

A. 0.300

B. 0.050

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

C. 0.100

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

D. ∞

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

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 $x = 9$.

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

$$\lim_{x \to -7^+} \frac{-6}{(x+7)^7} + 1$$

The solution is $-\infty$, which is option C.

A. $f(-7)$

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.

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5. To estimate the one-sided limit of the function below as x approaches 5 from the left, which of the following sets of numbers should you use?

$$\frac{\frac{5}{x}-1}{x-5}$$

The solution is $\{4.9000, 4.9900, 4.9990, 4.9999\}$, which is option D.

A. $\{5.0000, 4.9000, 4.9900, 4.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 5 doesn't help us estimate the limit.

B. $\{5.1000, 5.0100, 5.0010, 5.0001\}$

These values would estimate the limit of 5 on the right.

C. $\{4.9000, 4.9900, 5.0100, 5.1000\}$

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

D. $\{4.9000, 4.9900, 4.9990, 4.9999\}$

This is correct!

E. $\{5.0000, 5.1000, 5.0100, 5.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 5 doesn't help us estimate the limit.

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 $\frac{\infty}{\infty}$

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

$$\lim_{x \to 8^+} \frac{5}{(x+8)^7} + 6$$

The solution is $f(8)$, which is option A.

A. $f(8)$

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.

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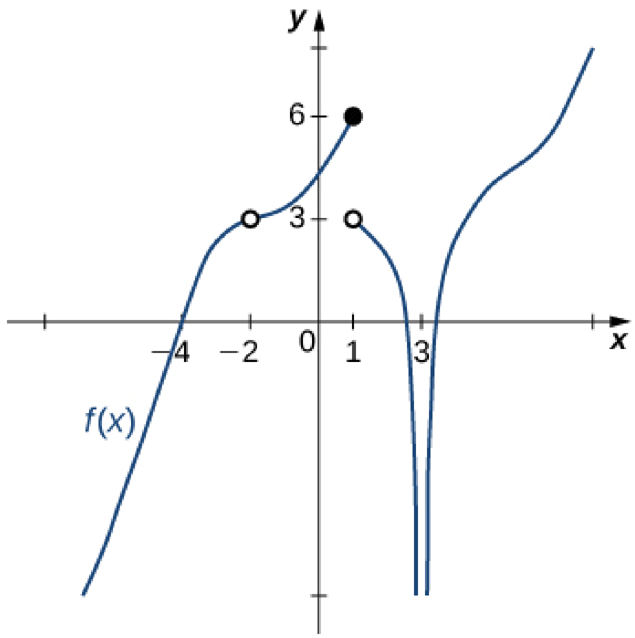
7. For the graph below, find the value(s) a that makes the statement true: $\lim_{x \to a} f(x)$ does not exist.



The solution is 1, which is option C.

A. 3

B. -2

C. 1

D. Multiple a make the statement true.

E. No a make the statement true.

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

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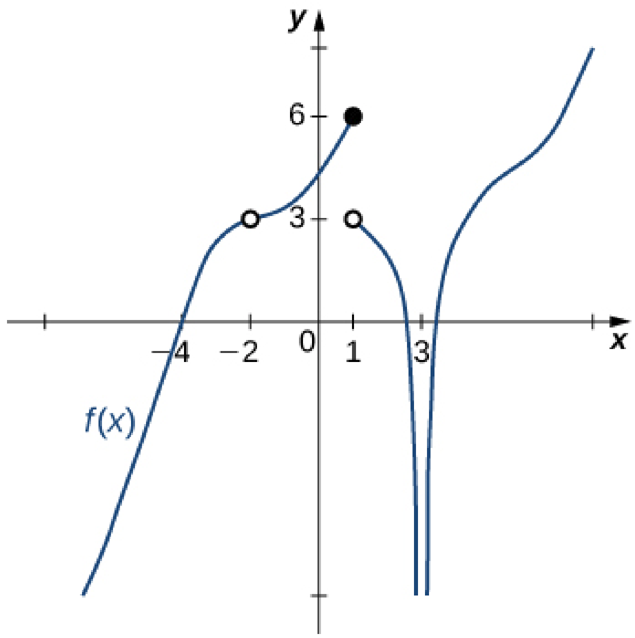
8. For the graph below, find the value(s) a that makes the statement true: $\lim_{x \to a} f(x)$ does not exist.



The solution is 1, which is option B.

A. 3

B. 1

C. -2

D. Multiple a make the statement true.

E. No a make the statement true.

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

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9. Evaluate the limit below, if possible.

$$\lim_{x \to 3} \frac{\sqrt{8x-8}-4}{2x-6}$$

The solution is 0.500, which is option B.

A. 0.125

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

B. 0.500

* This is the correct option.

C. ∞

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

D. 1.414

You likely tried to use a shortcut to find the limit of a function that only works for when the numerator/denominator are polynomials.

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 $x = 3$.

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10. Based on the information below, which of the following statements is always true?

$$As$$

x$approaches$0,f(x)$approaches$1.932.

The solution is None of the above are always true., which is option E.

A. $f(1)$ is close to or exactly 0

B. $f(1) = 0$

C. $f(0)$ is close to or exactly 1

D. $f(0) = 1$

E. None of the above are always true.

General Comment: General comments: The limit tells you what happens as the x-values approach 0. It says **absolutely nothing** about what is happening exactly at $f(x)$!
