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. Evaluate the limit below, if possible.

$$\lim_{x \to 7} \frac{\sqrt{6x - 26} - 4}{8x - 56}$$

The solution is 0.094, which is option D.

A. 0.125

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

B. ∞

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

C. 0.016

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

D. 0.094

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 $x = 7$.

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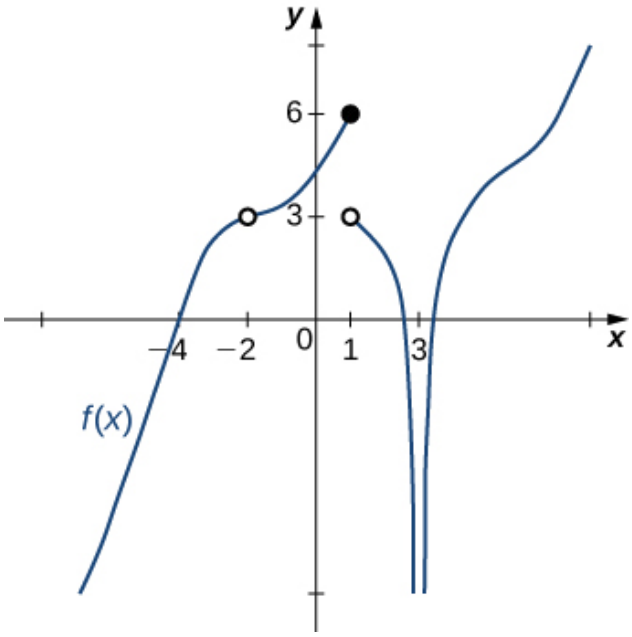
2. For the graph below, evaluate the limit: $\lim_{x \to -4} f(x)$.



The solution is 0, which is option C.

A. -6

B. $-\infty$

C. 0

D. The limit does not exist

E. None of the above

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

---

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

f(x)$approaches$10.453asx$approaches$$\infty$.

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

A. $f(x)$ is undefined when $f(x)$ is large enough.

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

C. $f(x)$ is undefined when x is large enough.

D. $f(x)$ is close to or exactly 10.453 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 ∞. It says **absolutely nothing** about what is happening exactly at $f(x)$!

---

4. To estimate the one-sided limit of the function below as x approaches 7 from the right, which of the following sets of numbers should you use?

$$\frac{\frac{7}{x}-1}{x-7}$$

The solution is $\{7.1000, 7.0100, 7.0010, 7.0001\}$, which is option A.

A. $\{7.1000, 7.0100, 7.0010, 7.0001\}$

This is correct!

B. $\{7.0000, 6.9000, 6.9900, 6.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 7 doesn't help us estimate the limit.

C. $\{6.9000, 6.9900, 7.0100, 7.1000\}$

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

D. $\{6.9000, 6.9900, 6.9990, 6.9999\}$

These values would estimate the limit of 7 on the left.

E. $\{7.0000, 7.1000, 7.0100, 7.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 7 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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5. Evaluate the limit below, if possible.

$$\lim_{x\to 9} \frac{\sqrt{5x-9}-6}{9x-81}$$

The solution is 0.046, which is option B.

A. 0.083

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

B. 0.046

* This is the correct option.

C. ∞

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

D. 0.248

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 $x = 9$.

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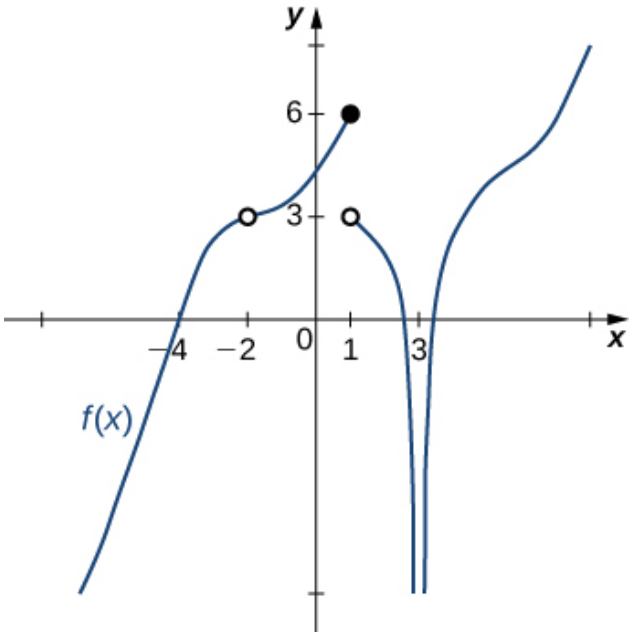
6. For the graph below, find the value(s) a that makes the statement true: $\lim_{x \to a} f(x)$ does not exist.



The solution is 1, which is option C.

A. -2

B. 3

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.

---

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

$$\lim_{x \to 2^-} \frac{-8}{(x-2)^3} + 5$$

The solution is ∞, which is option B.

A. $f(2)$

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.

---

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

$$\lim_{x \to 1^-} \frac{-9}{(x+1)^9} + 5$$

The solution is $f(1)$, which is option C.

A. ∞

B. $-\infty$

C. $f(1)$

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.

---

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

$$As$$

x*approaches*7,f(x)*approaches*5.182.

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

A. $f(5)$ is close to or exactly 7

B. $f(5) = 7$

C. $f(7)$ is close to or exactly 5

D. $f(7) = 5$

E. None of the above are always true.

General Comment: General comments: The limit tells you what happens as the x-values approach 7. It says **absolutely nothing** about what is happening exactly at $f(x)$!

---

10. To estimate the one-sided limit of the function below as x approaches 9 from the left, which of the following sets of numbers should you use?

$$\frac{\frac{9}{x} - 1}{x - 9}$$

The solution is $\{8.9000, 8.9900, 8.9990, 8.9999\}$, which is option B.

A. $\{9.1000, 9.0100, 9.0010, 9.0001\}$

These values would estimate the limit of 9 on the right.

B. $\{8.9000, 8.9900, 8.9990, 8.9999\}$

This is correct!

C. $\{8.9000, 8.9900, 9.0100, 9.1000\}$

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

D. $\{9.0000, 9.1000, 9.0100, 9.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 9 doesn't help us estimate the limit.

E. $\{9.0000, 8.9000, 8.9900, 8.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 9 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 $\frac{\infty}{\infty}$