**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 6 from the right, which of the following sets of numbers should you use?

$$\frac{\frac{6}{x}-1}{x-6}$$

The solution is $\{6.1000, 6.0100, 6.0010, 6.0001\}$, which is option A.

A. $\{6.1000, 6.0100, 6.0010, 6.0001\}$

This is correct!

B. $\{5.9000, 5.9900, 5.9990, 5.9999\}$

These values would estimate the limit of 6 on the left.

C. $\{5.9000, 5.9900, 6.0100, 6.1000\}$

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

D. $\{6.0000, 5.9000, 5.9900, 5.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 6 doesn't help us estimate the limit.

E. $\{6.0000, 6.1000, 6.0100, 6.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 6 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 $\frac{\infty}{\infty}$

---

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

*As $x$ approaches $\infty$, $f(x)$ approaches* 19.245.

The solution is $f(x)$ is close to or exactly 19.245 when $x$ is large enough., which is option C.

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

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

C. $f(x)$ is close to or exactly 19.245 when $x$ is large enough.

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

E. None of the above are always true.

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

---

3. To estimate the one-sided limit of the function below as $x$ approaches 3 from the left, which of the following sets of numbers should you use?

$$\frac{\frac{3}{x}-1}{x-3}$$

The solution is $\{2.9000, 2.9900, 2.9990, 2.9999\}$, which is option A.

A. $\{2.9000, 2.9900, 2.9990, 2.9999\}$

This is correct!

B. $\{2.9000, 2.9900, 3.0100, 3.1000\}$

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

C. $\{3.0000, 2.9000, 2.9900, 2.9990\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 3 doesn't help us estimate the limit.

D. $\{3.0000, 3.1000, 3.0100, 3.0010\}$

If we get $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the value 3 doesn't help us estimate the limit.

E. $\{3.1000, 3.0100, 3.0010, 3.0001\}$

These values would estimate the limit of 3 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 $\frac{\infty}{\infty}$

---

4. Evaluate the limit below, if possible.

$$\lim_{x\to 8}\frac{\sqrt{8x-48}-4}{4x-32}$$

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

A. 0.125

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

B. $\infty$

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

C. 0.707

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

D. 0.031

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

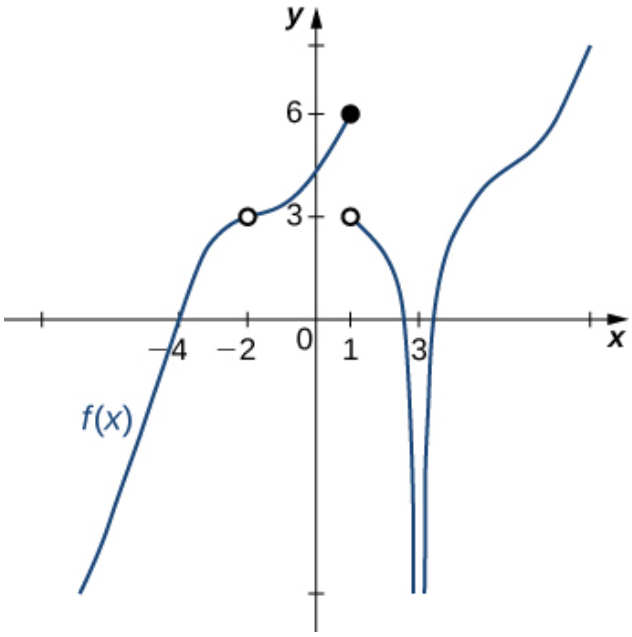
E. None of the above

* This is the correct option as the limit is 0.250.

**General Comment: General comments:** It is difficult to imagine the graph of this function, so you need to test values close to $x = 8$.

---

5. 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. $-2$

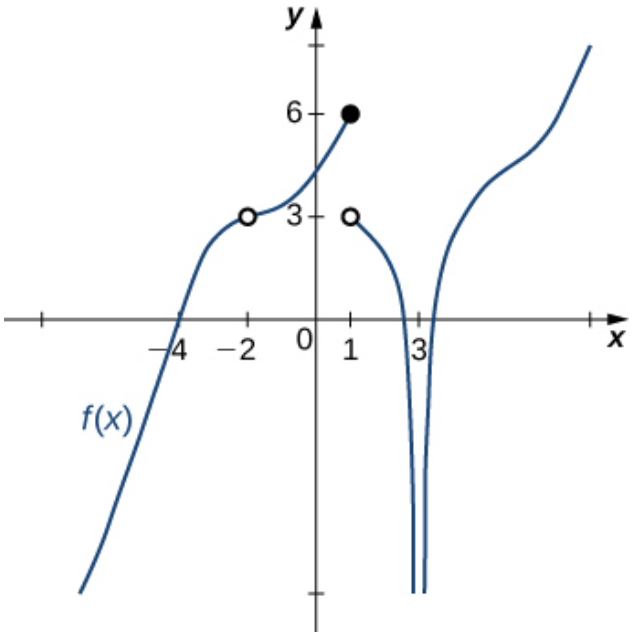
D. Multiple $a$ make the statement true.

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.

---

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 A.

A. 1

B. 3

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.

---

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

$$As\ x\ approaches\ \infty,\ f(x)\ approaches\ 14.925.$$

The solution is $f(x)$ is close to or exactly 14.925 when $x$ is large enough., which is option C.

A. $f(x)$ is close to or exactly $\infty$ when $x$ is large enough.

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

C. $f(x)$ is close to or exactly 14.925 when $x$ is large enough.

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

E. None of the above are always true.

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

---

8. Evaluate the limit below, if possible.

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

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

A. 1.225

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

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. $\infty$

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

E. None of the above

* This is the correct option as the limit is 0.300.

**General Comment: General comments:** It is difficult to imagine the graph of this function, so you need to test values close to $x = 9$.

---

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

$$\lim_{x \to 8^-} \frac{9}{(x-8)^4} + 7$$

The solution is $\infty$, which is option A.

A. $\infty$

B. $-\infty$

C. $f(8)$

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.

---

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

$$\lim_{x \to 5^+} \frac{1}{(x-5)^8} + 7$$

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

A. $f(5)$

B. $-\infty$

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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