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. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 3x^3 - 2x^2 + 2x \text{ and } g(x) = 4x^3 - 1x^2 - 2x$$

The solution is 3.0

A. $(f \circ g)(1) \in [84, 88]$

Distractor 3: Corresponds to being slightly off from the solution.

B. $(f \circ g)(1) \in [89, 98]$

Distractor 1: Corresponds to reversing the composition.

C. $(f \circ g)(1) \in [7, 16]$

Distractor 2: Corresponds to being slightly off from the solution.

D. $(f \circ g)(1) \in [-4, 6]$

* This is the correct solution

E. It is not possible to compose the two functions.

General Comment: General Comments: f composed with g at x means $f(g(x))$. The order matters!

---

2. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^{-1}(8)$ belongs to.

$$f(x) = e^{x-3} - 3$$

The solution is $f^{-1}(8) = 5.398$

A. $f^{-1}(8) \in [-2.81, -0.67]$

This solution corresponds to distractor 2.

B. $f^{-1}(8) \in [4.56, 6.64]$

This is the solution.

C. $f^{-1}(8) \in [-1.34, -0.52]$

This solution corresponds to distractor 1.

D. $f^{-1}(8) \in [-2.81, -0.67]$

This solution corresponds to distractor 4.

E. $f^{-1}(8) \in [-1.34, -0.52]$

This solution corresponds to distractor 3.

General Comment: Natural log and exponential functions always have an inverse. Once you switch the x and y, use the conversion $e^y = x \leftrightarrow y = \ln(x)$.

---

3. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-5x+17} \text{ and } g(x) = 8x^2 + 9x + 3$$

The solution is The domain is all Real numbers less than or equal to$x = 3.4$.

A. The domain is all Real numbers greater than or equal to $x = a,$ where $a \in [-9, 3]$

B. The domain is all Real numbers except $x = a,$ where $a \in [1, 7]$

C. The domain is all Real numbers less than or equal to $x = a,$ where $a \in [0, 7]$

D. The domain is all Real numbers except $x = a$ and $x = b,$ where $a \in [-6, -1]$ and $b \in [2, 6]$

E. The domain is all Real numbers.

General Comment: General Comments: The new domain is the intersection of the previous domains.

---

4. Determine whether the function below is 1-1.

$$f(x) = 18x^2 + 105x - 375$$

The solution is no

A. Yes, the function is 1-1.

Corresponds to believing the function passes the Horizontal Line test.

B. No, because the domain of the function is not $(-\infty, \infty)$.

Corresponds to believing 1-1 means the domain is all Real numbers.

C. No, because the range of the function is not $(-\infty, \infty)$.

Corresponds to believing 1-1 means the range is all Real numbers.

D. No, because there is an x-value that goes to 2 different y-values.

Corresponds to the Vertical Line test, which checks if an expression is a function.

E. No, because there is a y-value that goes to 2 different x-values.

* This is the solution.

General Comment: General Comments: There are only two valid options: The function is 1-1 OR No because there is a y-value that goes to 2 different x-values.

---

0. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 15$ and choose the interval the $f^{-1}(15)$ belongs to.

$$f(x) = \sqrt[3]{5x+2}$$

The solution is 674.6

A. $f^{-1}(15) \in [674.16, 674.66]$

* This is the correct solution.

B. $f^{-1}(15) \in [-675.16, -674.53]$

This solution corresponds to distractor 2.

C. $f^{-1}(15) \in [-675.99, -675.21]$

This solution corresponds to distractor 3.

D. $f^{-1}(15) \in [675.36, 675.4]$

Distractor 1: This corresponds to

E. The function is not invertible for all Real numbers.

This solution corresponds to distractor 4.

General Comment: General Comments: Be sure you check that the function is 1-1 before trying to find the inverse!