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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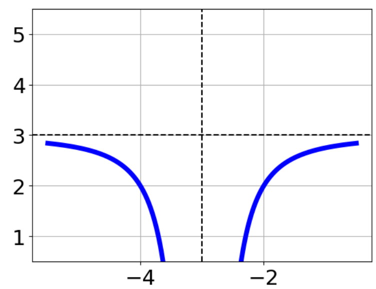
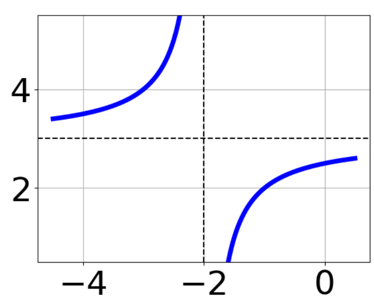
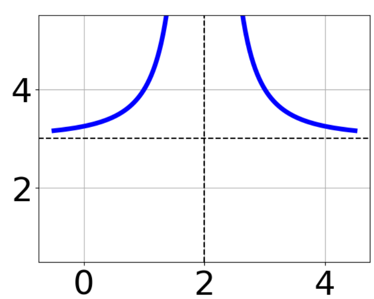
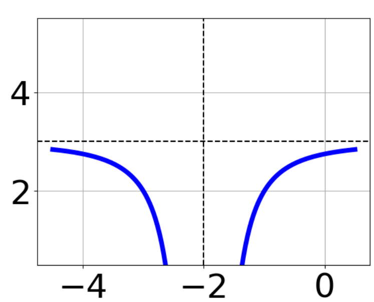
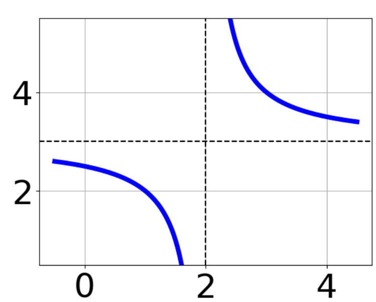
31. Choose the graph of the equation below.

$$f(x) = \frac{1}{x-2} + 3$$

The solution is



 A.	 B.
 C.	 D.
E. None of the figures above.	

A. This is the correct option.

B. Corresponds to using the general form $f(x) = \frac{a}{x+h} + k$ and the opposite leading coefficient.

C. Corresponds to thinking the graph was a shifted version of $\frac{1}{x^2}$.

D. Corresponds to thinking the graph was a shifted version of $\frac{1}{x^2}$, using the general form $f(x) = \frac{a}{x+h}+k$, and the opposite leading coefficient.

General Comments: Remember that the general form of a basic rational equation is $f(x) = \frac{a}{(x-h)^n} + k$, where a is the leading coefficient (and in this case, we assume is either 1 or -1), n is the degree (in this case, either 1 or 2), and (h, k) is the intersection of the asymptotes.

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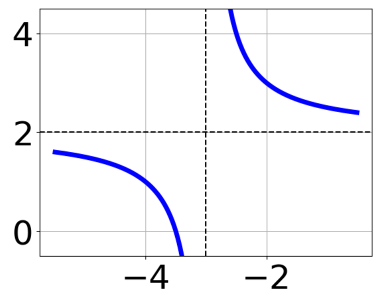
32. Choose the equation of the function graphed below.



The solution is None of the above as it should be $f(x) = \frac{1}{x+3} + 2$

A. $f(x) = \frac{-1}{x+3} + 5$

Corresponds to using the general form $f(x) = \frac{a}{x-h} + k$, the opposite leading coefficient AND not noticing the y-value was wrong.

B. $f(x) = \frac{1}{(x-3)^2} + 5$

Corresponds to thinking the graph was a shifted version of $\frac{1}{x^2}$ not noticing the y-value was wrong.

C. $f(x) = \frac{1}{x-3} + 5$

The x- and y-value of the equation does not match the graph.

D. $f(x) = \frac{-1}{(x+3)^2} + 5$

Corresponds to thinking the graph was a shifted version of $\frac{1}{x^2}$, using the general form $f(x) = \frac{a}{x-h}+k$, the opposite leading coefficient, AND not noticing the y-value was wrong.

E. None of the above

None of the equation options were the correct equation.

General Comments: Remember that the general form of a basic rational equation is $f(x) = \frac{a}{(x-h)^n} + k$, where a is the leading coefficient (and in this case, we assume is either 1 or -1), n is the degree (in this case, either 1 or 2), and (h, k) is the intersection of the asymptotes.

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33. Solve the rational equation below. Then, choose the interval(s) that the solution(s) belongs to.

$$\frac{3x}{7x-2} + \frac{-6x^2}{-35x^2-4x+4} = \frac{-7}{-5x-2}$$

The solution is There are two solutions: $x = 0.406$ and $x = 1.641$

A. $x \in [-0.58, -0.14]$

B. All solutions lead to invalid or complex values in the equation.

C. $x \in [0.61, 2.44]$

D. $x_1 \in [0.07, 0.98]$ and $x_2 \in [0.72, 3.88]$

    * $x = 0.406$ and $x = 1.641$, which is the correct option.

E. $x_1 \in [0.07, 0.98]$ and $x_2 \in [-0.19, 0.45]$

General Comments: Distractors are different based on the number of solutions. Remember that after solving, we need to make sure our solution does not make the original equation divide by zero!

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34. Solve the rational equation below. Then, choose the interval(s) that the solution(s) belongs to.

$$\frac{-56}{-56x - 72} + 1 = \frac{-56}{-56x - 72}$$

The solution is all solutions are invalid or lead to complex values in the equation.

A. $x \in [-1.29, 0.71]$

    $x = -1.286$, which corresponds to not checking if this value leads to dividing by 0 in the original equation and thus is not a valid solution.

B. $x \in [-1, 2]$

    $x = 1.286$, which corresponds to not distributing the factor $-56x-72$ correctly when trying to eliminate the fraction.

C. $x_1 \in [-3, -1]$ and $x_2 \in [-1, 2]$

    $x = -1.286$ and $x = 1.286$, which corresponds to getting the correct solution and believing there should be a second solution to the equation.

D. $x_1 \in [-3, -1]$ and $x_2 \in [-2, 0]$

    $x = -1.286$ and $x = -1.286$, which corresponds to getting the correct solution and believing there should be a second solution to the equation.

E. All solutions lead to invalid or complex values in the equation.

    *$x = -1.286$ leads to dividing by 0 in the original equation and thus is not a valid solution, which is the correct option.

General Comments: Distractors are different based on the number of solutions. Remember that after solving, we need to make sure our solution does not make the original equation divide by zero!

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35. Determine the domain of the function below.

$$f(x) = \frac{3}{25x^2 + 5x - 12}$$

The solution is All Real numbers except $x = -0.800$ and $x = 0.600$.

A. All Real numbers except $x = a$, where $a \in [-1.6, -0.4]$

    All Real numbers except $x = -0.800$, which corresponds to removing only 1 value from the denominator.

B. All Real numbers except $x = a$ and $x = b$, where $a \in [-1.6, -0.4]$ and $b \in [-0.2, 1.9]$

All Real numbers except $x = -0.800$ and $x = 0.600$, which is the correct option.

C. All Real numbers.

This corresponds to thinking the denominator has complex roots or that rational functions have a domain of all Real numbers.

D. All Real numbers except $x = a$, where $a \in [-21.3, -19.5]$

All Real numbers except $x = -20.000$, which corresponds to removing a distractor value from the denominator.

E. All Real numbers except $x = a$ and $x = b$, where $a \in [-21.3, -19.5]$ and $b \in [14.1, 16.8]$

All Real numbers except $x = -20.000$ and $x = 15.000$, which corresponds to not factoring the denominator correctly.

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