This is the Answer Key for Module 7 Version A.

31. Determine the domain of the function below.

$$\frac{3}{24x^2 + 40x + 16}$$

The solution is All Real numbers except $x = a$ and $x = b$, where $a \in [-0.71, -0.63]$ and $b \in [-1.19, -0.78]$

A. All Real numbers.

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

B. All Real numbers except $x = a$ and $x = b$, where $a \in [-24.24, -23.84]$ and $b \in [-16.09, -15.88]$

   This corresponds to not factoring the denominator correctly.

C. All Real numbers except $x = a$, where $a \in [-0.71, -0.63]$

   This corresponds to removing only 1 value from the denominator.

D. All Real numbers except $x = a$ and $x = b$, where $a \in [-0.71, -0.63]$ and $b \in [-1.19, -0.78]$

   This is the correct option!

E. All Real numbers except $x = a$, where $a \in [-24.24, -23.84]$

   This corresponds to removing a distractor value from the denominator.

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

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

$$\frac{-9}{2*x - 5} - 5 = \frac{8}{4*x - 10}$$

The solution is 1.2

A. $x \in [-3.92, -3.31]$

B. $x_1 \in [-3.92, -3.31]$ and $x_2 \in [0, 3]$

C. $x_1 \in [0.74, 1.09]$ and $x_2 \in [0, 3]$

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

E. $x \in [0.82, 1.24]$

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

$$5*x/(-3*x + 3) - 5*x**2/(-21*x**2 + 15*x + 6) = -5/(7*x + 2)$$

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

A. $x_1 \in [-0.9, 3.7]$ and $x_2 \in [-2, 4]$

B. $x_1 \in [-1.2, 0.8]$ and $x_2 \in [-2, 4]$

C. $x \in [-1.2, 0.8]$

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

E. $x \in [-0.9, 3.7]$

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. Choose the equation of the function graphed below.

Graph of the function $f(x) = \dfrac{1}{(x-3)^2} - 3$
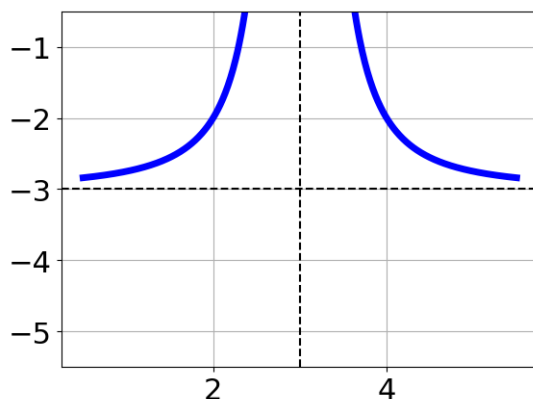


The solution is $\dfrac{1}{(x-3)^2} - 3$

A. $\dfrac{-1}{x+3} - 3$

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

B. $\dfrac{1}{x-3} - 3$

   Corresponds to thinking the graph was a shifted version of $\dfrac{1}{x}$.

C. $\dfrac{1}{(x-3)^2} - 3$

   This is the correct option.
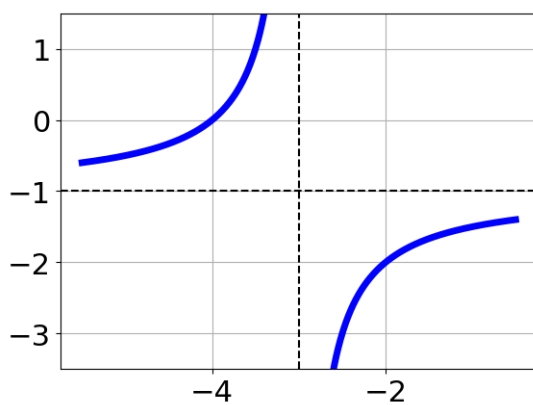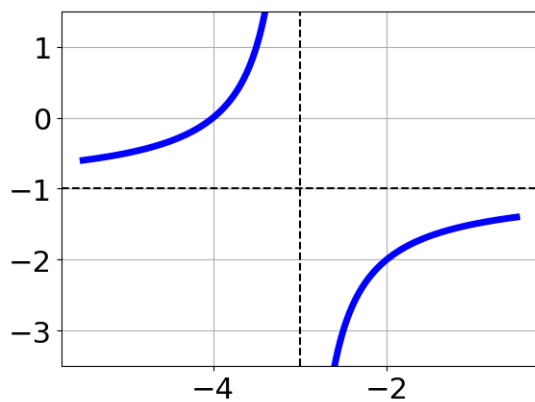
D. $\dfrac{-1}{(x+3)^2} - 3$

   Corresponds to using the general form $f(x) = \dfrac{a}{(x+h)^2} + k$ and the opposite leading coefficient.

General Comments: Remember that the general form of a basic rational equation is $f(x) = \dfrac{a}{(x-h)^n} + k$, 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.
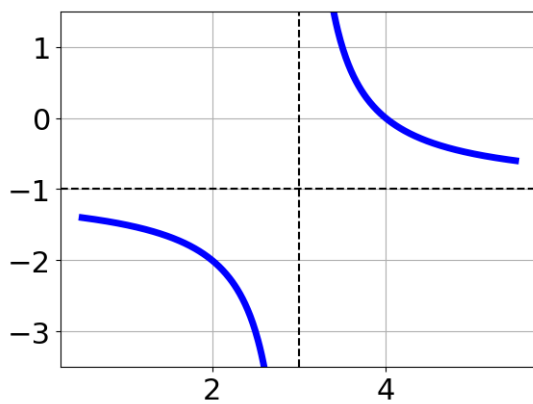
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35. Choose the graph of the equation below.
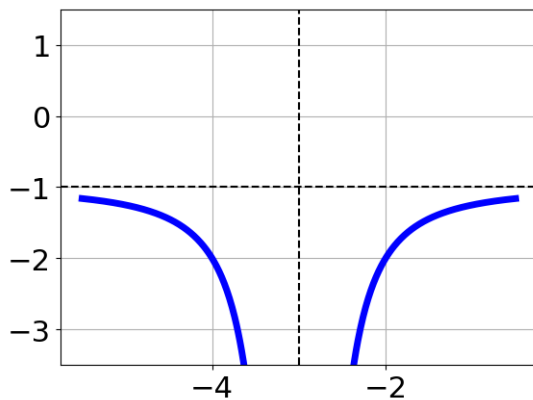
$$\dfrac{-1}{x+3} - 1$$
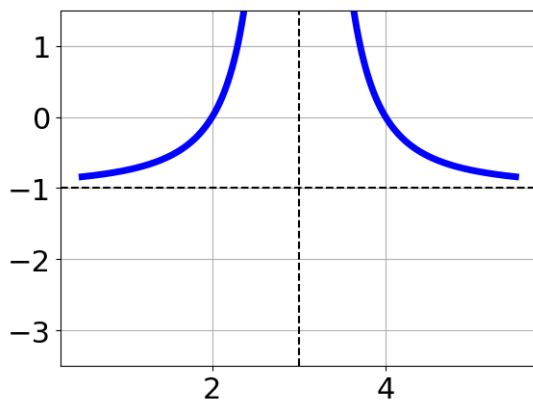
The solution is



A.



B.

C.

D.

General Comments: Remember that the general form of a basic rational equation is $f(x) = \dfrac{a}{(x-h)^n} + k$, 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.