

# 1.9 Rational Functions & Vertical Asymptotes

AP Precalculus

Name: \_\_\_\_\_

**Find the vertical asymptote(s) of the following rational functions, if one exists.**

1.

$$f(x) = \frac{x^2 - 25}{x^2 - 8x + 15}$$

2.

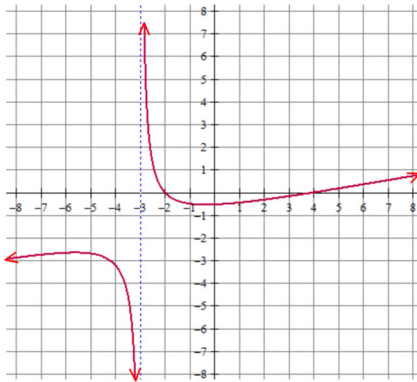
$$g(x) = \frac{(x + 1)(x - 4)}{x^2 - 8x + 16}$$

3.

$$h(t) = \frac{t^2 - 2t - 15}{t^2 + t - 20}$$

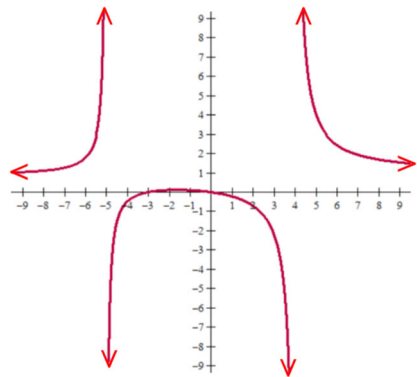
**Use the graph of  $f$  to find the vertical asymptote(s). Use limit notation.**

4.



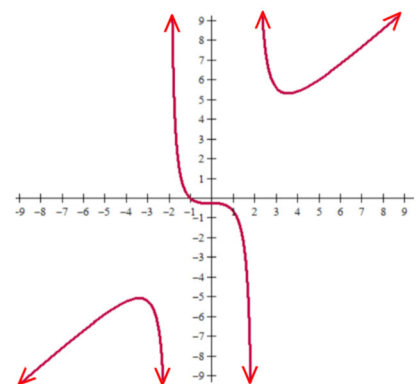
Limit Notation Vertical Asymptote(s):

5.



Limit Notation Vertical Asymptote(s):

6.



Limit Notation Vertical Asymptote(s):

**CALCULATOR ACTIVE Complete the table to answer the following.**

7.  $f(x) = \frac{(x+5)(x-2)}{x^2-16}$

$x$	3.9	3.99	3.999	4	4.001	4.01	4.1
$f(x)$							

Vertical Asymptote:

Limit Notation of Vertical Asymptote:

**CALCULATOR ACTIVE Complete the table to answer the following.**

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

$x$	-2.9	-2.99	-2.999	-3	-3.001	-3.01	-3.1
$f(x)$							

Vertical Asymptote:

Limit Notation of Vertical Asymptote:

**Answers to 1.9 CA #2**

1. $x = 3$	2. $x = 4$	3. $t = -5$ and $4$																															
4. $\lim_{x \rightarrow -3^-} f(x) = -\infty$ and $\lim_{x \rightarrow -3^+} f(x) = \infty$	5. $\lim_{x \rightarrow -5^-} f(x) = \infty$ and $\lim_{x \rightarrow -5^+} f(x) = -\infty$ $\lim_{x \rightarrow -4^-} f(x) = -\infty$ and $\lim_{x \rightarrow -4^+} f(x) = \infty$	6. $\lim_{x \rightarrow -2^-} f(x) = -\infty$ and $\lim_{x \rightarrow -2^+} f(x) = \infty$ $\lim_{x \rightarrow 2^-} f(x) = -\infty$ and $\lim_{x \rightarrow 2^+} f(x) = \infty$																															
7. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th><math>x</math></th><th><math>f(x)</math></th></tr> <tr><td>3.9</td><td>-21.41</td></tr> <tr><td>3.99</td><td>-223.9</td></tr> <tr><td>3.999</td><td>-2,249</td></tr> <tr><td>4</td><td>undefined</td></tr> <tr><td>4.001</td><td>2,251</td></tr> <tr><td>4.01</td><td>226.09</td></tr> <tr><td>4.1</td><td>23.59</td></tr> </table> <p style="text-align: center;">vertical asymptote: <math>x = 4</math>  <math>\lim_{x \rightarrow 4^-} f(x) = -\infty</math>      <math>\lim_{x \rightarrow 4^+} f(x) = \infty</math></p>	$x$	$f(x)$	3.9	-21.41	3.99	-223.9	3.999	-2,249	4	undefined	4.001	2,251	4.01	226.09	4.1	23.59	8. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th><math>x</math></th><th><math>f(x)</math></th></tr> <tr><td>-3.1</td><td>-46.1</td></tr> <tr><td>-3.01</td><td>-406</td></tr> <tr><td>-3.001</td><td>-4006</td></tr> <tr><td>-3</td><td>undefined</td></tr> <tr><td>-2.999</td><td>3994</td></tr> <tr><td>-2.99</td><td>394.01</td></tr> <tr><td>-2.9</td><td>94.1</td></tr> </table> <p style="text-align: center;">vertical asymptote: <math>x = -3</math>  <math>\lim_{x \rightarrow -3^-} f(x) = -\infty</math>      <math>\lim_{x \rightarrow -3^+} f(x) = \infty</math></p>	$x$	$f(x)$	-3.1	-46.1	-3.01	-406	-3.001	-4006	-3	undefined	-2.999	3994	-2.99	394.01	-2.9	94.1
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