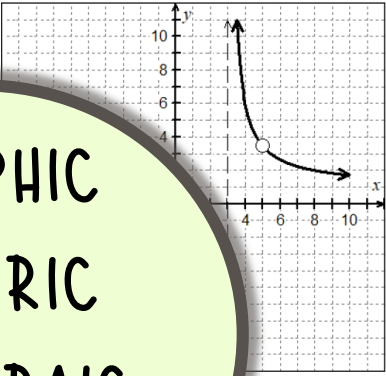


# CALCULUS



Finding Limits Graphically & Numerically Name \_\_\_\_\_  
 G.N.A.W. Date \_\_\_\_\_ Period \_\_\_\_\_

Graphically	Numerically																
<p>Use the graph of <math>f(x) = \frac{x^2 - 3x - 10}{x^2 - 8x + 15}</math> below to complete the activity.</p> 	<p>Complete the table.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="padding: 5px;"><math>x</math></th> <th style="padding: 5px;"><math>f(x)</math></th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">4.9</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">4.99</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">4.999</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">5</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">5.001</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">5.01</td><td style="padding: 5px;"></td></tr> <tr><td style="padding: 5px;">5.1</td><td style="padding: 5px;"></td></tr> </tbody> </table>	$x$	$f(x)$	4.9		4.99		4.999		5		5.001		5.01		5.1	
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GRAPHIC  
 NUMERIC  
 ALGEBRAIC  
 WORDS

Graphically	Verbally
<p>such that the extended function <math>y = g(x)</math> is continuous over</p> $g(x) = \begin{cases} \frac{x^2 - 3x - 10}{x^2 - 8x + 15} & ; x \neq 5 \\ k & ; x = 5 \end{cases}$	<ol style="list-style-type: none"> <li><math>f(5) = \underline{\hspace{2cm}}</math> <math>g(5) = \underline{\hspace{2cm}}</math></li> <li>The domain of <math>f(x)</math> is _____</li> <li><math>\lim_{x \rightarrow 3^-} f(x) = \underline{\hspace{2cm}}</math>  <math>\lim_{x \rightarrow 3^+} f(x) = \underline{\hspace{2cm}}</math></li> <li><math>\lim_{x \rightarrow 3} f(x) = \underline{\hspace{2cm}}</math></li> </ol>

# GNAW on Finding Limits

## The Rule of Four

# Finding Limits Graphically & Numerically

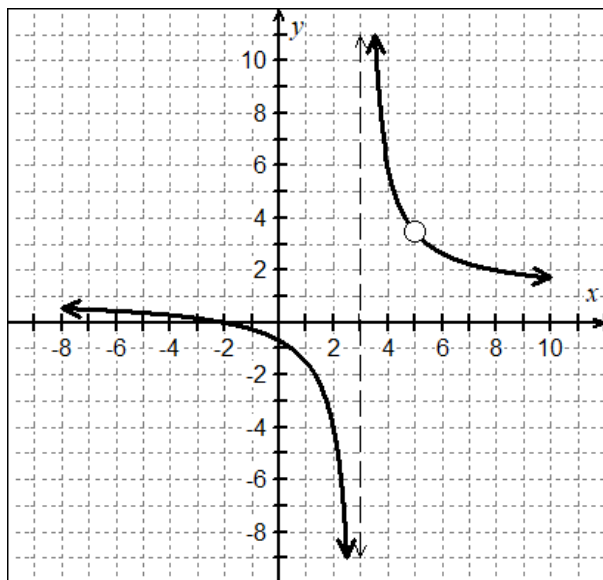
G.N.A.W.

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## Graphically

Use the graph of  $f(x) = \frac{x^2 - 3x - 10}{x^2 - 8x + 15}$  below to complete the activity.



## Numerically

Complete the table.

$x$	$f(x)$
4.9	
4.99	
4.999	
5	
5.001	
5.01	
5.1	

## Algebraically

Find the value for  $k$  such that the extended piecewise function  $y = g(x)$  is continuous over all reals.

$$g(x) = \begin{cases} \frac{x^2 - 3x - 10}{x^2 - 8x + 15} & ; x \neq 5 \\ k & ; x = 5 \end{cases}$$

## Verbally

- $f(5) = \underline{\hspace{2cm}}$   $g(5) = \underline{\hspace{2cm}}$
- The domain of  $f(x)$  is \_\_\_\_\_  
\_\_\_\_\_
- $\lim_{x \rightarrow 3^-} f(x) = \underline{\hspace{2cm}}$   
 $\lim_{x \rightarrow 3^+} f(x) = \underline{\hspace{2cm}}$
- $\lim_{x \rightarrow 3} f(x) = \underline{\hspace{2cm}}$
- As the values of  $x$  get closer and closer to 5,  $f(x)$  gets closer and closer to \_\_\_\_\_
- As  $x \rightarrow 5$ ,  $f(x) \rightarrow \underline{\hspace{2cm}}$
- $\lim_{x \rightarrow 5} f(x) = \underline{\hspace{2cm}}$
- $\lim_{x \rightarrow -\infty} f(x) = \underline{\hspace{2cm}}$  and  $\lim_{x \rightarrow \infty} f(x) = \underline{\hspace{2cm}}$

# Finding Limits Graphically & Numerically

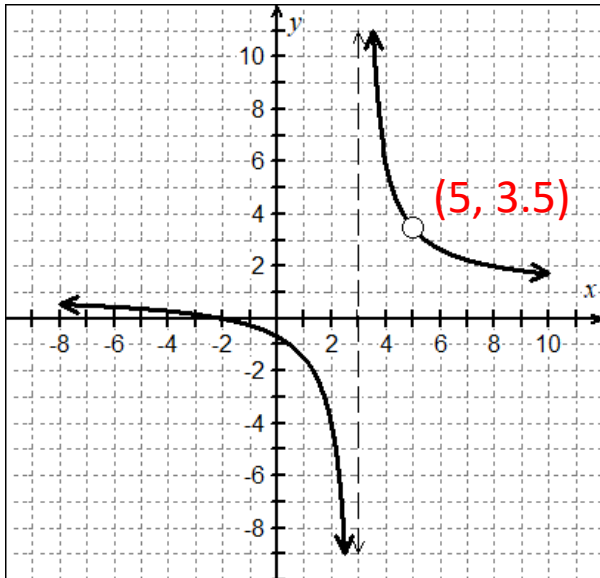
G.N.A.W.

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## Graphically

Use the graph of  $f(x) = \frac{x^2 - 3x - 10}{x^2 - 8x + 15}$  below to complete the activity.



## Numerically

Complete the table.

$x$	$f(x)$
4.9	3.6315
4.99	3.5125
4.999	3.5012
5	Undefined
5.001	3.4987
5.01	3.4875
5.1	3.3809

## Algebraically

Find the value for  $k$  such that the extended piecewise function  $y = g(x)$  is continuous over all reals.

$$g(x) = \begin{cases} \frac{x^2 - 3x - 10}{x^2 - 8x + 15} & ; x \neq 5 \\ k & ; x = 5 \end{cases}$$

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

$$f(5) = \frac{5+2}{5-3} = \frac{7}{2}$$

$$K=3.5$$

## Verbally

- $f(5) = \underline{\text{undefined}}$   $g(5) = \underline{3.5}$
- The domain of  $f(x)$  is All reals  
Except  $x \neq 3.5$
- $\lim_{x \rightarrow 3^-} f(x) = \underline{-\infty}$   
 $\lim_{x \rightarrow 3^+} f(x) = \underline{\infty}$
- $\lim_{x \rightarrow 3} f(x) = \underline{\text{Does not exist}}$
- As the values of  $x$  get closer and closer to 5,  $f(x)$  gets closer and closer to 3.5
- As  $x \rightarrow 5$ ,  $f(x) \rightarrow \underline{3.5}$
- $\lim_{x \rightarrow 5} f(x) = \underline{3.5}$
- $\lim_{x \rightarrow -\infty} f(x) = \underline{1}$  and  $\lim_{x \rightarrow \infty} f(x) = \underline{1}$