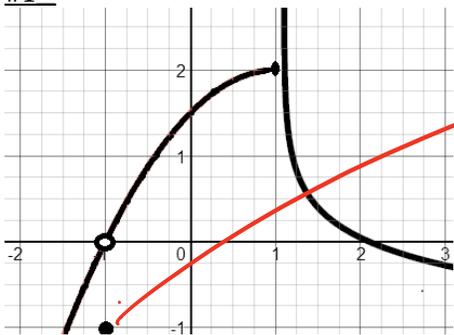
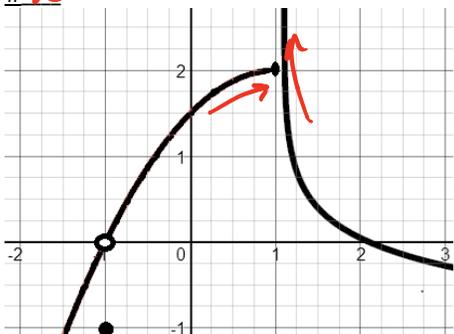


Directions: Beginning in the first cell marked #1, find the requested information. To advance in the circuit, hunt for your answer and mark that cell #2. Continue working in this manner until you complete the circuit.

<p>Ans: <math>\infty</math> #1</p>  <p>Find <math>f(-1) = -1</math></p>	<p>Ans: 0 #7</p> $\lim_{x \rightarrow 0} \frac{2x - x^2 - 2x}{x(x+2)x} = \lim_{x \rightarrow 0} \frac{2x - x^2 - 2x}{x \cdot x \cdot 2(x+2)}$ $= \lim_{x \rightarrow 0} \frac{-x^2}{2x^2(x+2)}$ $= \lim_{x \rightarrow 0} \frac{-1}{2(x+2)} = \frac{-1}{2(0+2)} = -\frac{1}{4}$				
<p>Ans: DNE (and not <math>\infty</math> or <math>-\infty</math>) #11</p> $f(x) = \frac{x^3 - 4x^2 + 3x - 12}{x^2 - 6x + 8} = \frac{x^2(x-4) + 3(x-4)}{(x-4)(x-2)}$ $= \frac{\cancel{(x-4)}(x^2+3)}{\cancel{(x-4)}(x-2)}$ <p><i>canceling factor</i></p> <p><math>f(x)</math> has a hole at <math>x = ?</math>. <math>x = 4</math></p>	<p>Ans: 0.249 #4</p> $\lim_{x \rightarrow 0} \frac{\sqrt{x+3} - \sqrt{3}}{x} \cdot \frac{(\sqrt{x+3} + \sqrt{3})}{(\sqrt{x+3} + \sqrt{3})} = \lim_{x \rightarrow 0} \frac{x+3-3}{x(\sqrt{x+3} + \sqrt{3})}$ $= \lim_{x \rightarrow 0} \frac{x}{x(\sqrt{x+3} + \sqrt{3})}$ $= \lim_{x \rightarrow 0} \frac{1}{\sqrt{x+3} + \sqrt{3}}$ $= \frac{1}{\sqrt{0+3} + \sqrt{3}} = \frac{1}{2\sqrt{3}} \approx 0.289$				
<p>Ans: 3 #10</p>  <p>Find <math>\lim_{x \rightarrow 1} f(x)</math></p> <p>DNE</p>	<p>Ans: -1 #2</p> $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x^2 + x - 2} = \frac{1-1}{1+1-2} = \frac{0}{0}$ <p><i>L'HOPITAL</i></p> $\lim_{x \rightarrow 1} \frac{3x^2}{2x^2 + 1} = \frac{3(1)^2}{2(1)^2 + 1} = \frac{3}{3} = 1$				
<p>Ans: 2 #15</p> $\lim_{x \rightarrow 1^-} \frac{x}{x^2 - 1} = \lim_{x \rightarrow 1^-} \frac{x}{(x+1)(x-1)} = -\infty$ <p>(VA @ <math>x=1, x=-1</math>)</p> <table border="1" data-bbox="90 1755 487 1915"> <tr> <td><math>x \rightarrow 1^-</math></td> <td><math>\frac{x}{(x+1)(x-1)}</math></td> </tr> <tr> <td>.9</td> <td><math>\frac{+}{(+)(-)} = - \therefore y \rightarrow -\infty</math></td> </tr> </table>	$x \rightarrow 1^-$	$\frac{x}{(x+1)(x-1)}$	.9	$\frac{+}{(+)(-)} = - \therefore y \rightarrow -\infty$	<p>Ans: -2 #13</p> $\lim_{\Delta x \rightarrow 0} \frac{(4 + \Delta x)^2 - 3(4 + \Delta x) - 4}{\Delta x}$ $\lim_{\Delta x \rightarrow 0} \frac{16 + 8\Delta x + \Delta x^2 - 12 - 3\Delta x - 4}{\Delta x}$ $\lim_{\Delta x \rightarrow 0} \frac{\Delta x^2 + 5\Delta x}{\Delta x} = \lim_{\Delta x \rightarrow 0} \frac{\Delta x(\Delta x + 5)}{\Delta x}$ $= \lim_{\Delta x \rightarrow 0} (\Delta x + 5)$ $= 0 + 5 = 5$
$x \rightarrow 1^-$	$\frac{x}{(x+1)(x-1)}$				
.9	$\frac{+}{(+)(-)} = - \therefore y \rightarrow -\infty$				

Ans:  $-\frac{1}{4}$

#8

$$f(x) = \frac{x^2 - 5x + 6}{x^2 + 2x - 15} = \frac{(x-3)(x-2)}{(x+5)(x-3)}$$

*Note canceling factor denom*

$f(x)$  has a vertical asymptote at  $x = ?$   $x = -5$

Ans: 4

#12

$$\cos(0) = 1$$

$$\text{Is } f(x) = \begin{cases} \cos x, & x < 0 \\ x^2 + 1, & x \geq 0 \end{cases} \text{ continuous at } x = 0?$$

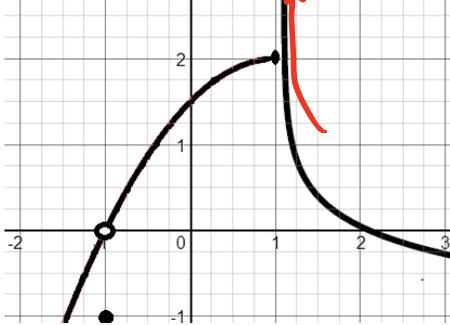
$$0^2 + 1 = 1$$

If yes, it is continuous, then go find the Ans: -2.

If no, it is not continuous, then go find the Ans: 5.

Ans:  $-\infty$

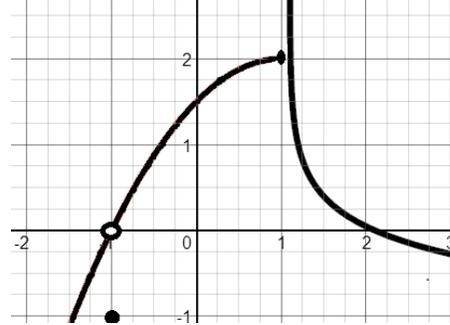
#16



Find  $\lim_{x \rightarrow 1^+} f(x) = \infty$

Ans: 5

#14



Find  $f(1)$ . = 2

Ans: 0.289

#5

*at  $x=1, y=1$*

$$\text{Is } f(x) = \begin{cases} x, & x \leq 1 \\ 2x - 3, & x > 1 \end{cases} \text{ continuous at } x = 1?$$

*at  $x=1, y=-1$*

If yes, it is continuous, then go find the Ans: 3.

If no, it is not continuous, then go find the Ans: -4.

Ans: -5

#9

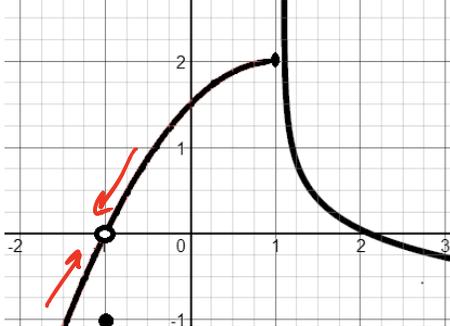
$$f(x) = \frac{x^2 - 5x + 6}{x^2 + 2x - 15} = \frac{(x-2)(x-3)}{(x+5)(x-3)}$$

*canceling factor*

$f(x)$  has a removable discontinuity at  $x = ?$   $x = 3$

Ans: -4

#6



Find  $\lim_{x \rightarrow -1} f(x) = 0$

Ans: 1

#3

$x$	1.9	1.99	1.999	2	2.001	2.01	2.1
$f(x)$	A	B	C	-	D	E	F

$$\lim_{x \rightarrow 2} \frac{x-2}{x^2-4}$$

Filling in the table above, what value would take the place of E? (Round to three places.)

$$f(x) = \frac{x-2}{x^2-4} = \frac{(x-2)}{(x-2)(x+2)} = \frac{1}{x+2}$$

$$f(2.01) = \frac{1}{2.01+2} = \frac{1}{4.01} = 0.249$$