

AB Calculus Review Sheet for Chpt. 2

Name _____

For 1-2 state the a) vertical asymptotes and b) horizontal asymptotes

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

2. $y = \frac{x+1}{x^2-4x+3}$

3. Let $f(x) = \begin{cases} x^2 - 4x + 5, & x < 2 \\ 4 - x, & x \geq 2 \end{cases}$

Find each limit.

(a) $\lim_{x \rightarrow \frac{1}{2}} f(x) =$

(b) $\lim_{x \rightarrow 2} f(x)$ (c) $f(2)$

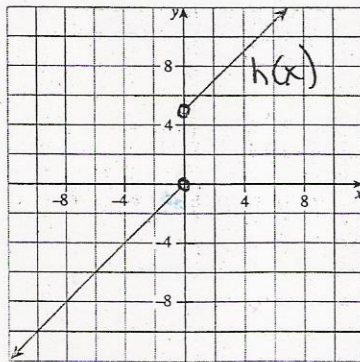
4. What value should be assigned to k to make f a continuous function?

$$f(x) = \begin{cases} \frac{x^2 + 2x - 15}{x - 3}, & x \neq 3 \\ k, & x = 3 \end{cases}$$

5. $f(x) = \begin{cases} x+1, & x \neq 2 \\ 4, & x = 2 \end{cases}$ Is $f(x)$ continuous? Justify.

6. a) Write the equation for the piecewise function $h(x)$.

b) Explain why $\lim_{x \rightarrow 0} h(x) = DNE$



Find the following limits, if they exist!

⑦ $\lim_{x \rightarrow 2} \frac{x^2 - x + 6}{x - 2}$

⑧ $\lim_{x \rightarrow \infty} \frac{(x-3)^2}{2x - 5x^3}$

⑨ $\lim_{x \rightarrow \frac{\pi}{3}} \sec x$

⑩ $\lim_{x \rightarrow -2} (x^2 + 3x - 7)$

⑪ Find $\lim_{x \rightarrow 0} f(x)$ where $f(x) = \begin{cases} x + 5 & \text{if } x > 0 \\ x & \text{if } x < 0 \end{cases}$

⑫ $\lim_{t \rightarrow -3} \frac{t^2 - 9}{2t^2 + 7t + 3}$

⑬ $\lim_{h \rightarrow 0} \frac{f(h) - f(0)}{3h^2}$ if $h(x) = 4h^2 + 2$

Using the tables, find

⑭

X	Y _i	
.7	-.3	
.8	-.2	
.9	-.1	
1	ERROR	
1.1	.1	
1.2	.2	
1.3	.3	
X = .7		

$\lim_{x \rightarrow 1}$

⑮

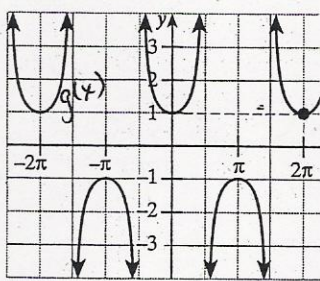
x	f(x)
1.97	1.293633333
1.98	1.306800000
1.99	1.320033333
2.01	1.346700000
2.02	1.360133333
2.03	1.373633333

$\lim_{x \rightarrow 2} f(x)$

⑩ For what values of x is f NOT continuous?

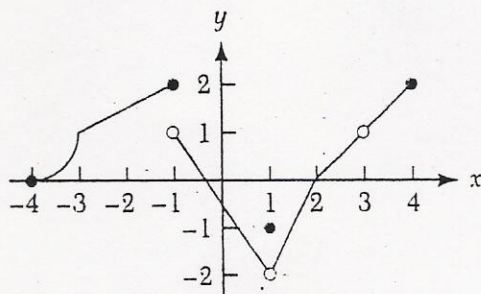
$$f(x) = \begin{cases} 2t+3 & t < -1 \\ t^2, & -1 \leq t < 2 \\ 3t-2, & t \geq 2 \end{cases}$$

⑪ Find a) $\lim_{x \rightarrow \infty} g(x)$ b) $\lim_{x \rightarrow \pi} g(x)$



⑫ Use g below to answer a - h.

Graph of g



a) $\lim_{x \rightarrow -4^+} g(x)$

c) $g(-1)$

e) $\lim_{x \rightarrow -1} g(x)$

g) $\lim_{x \rightarrow 2^+} g(x)$

b) $\lim_{x \rightarrow 0} g(x)$

d) $\lim_{x \rightarrow 1} g(x)$

f) $\lim_{x \rightarrow 3} g(x)$

h) $\lim_{x \rightarrow 4^+} g(x)$

AB Calculus Review Sheet for Chpt. 2

Name Key

For 1 & 2 state the a) vertical asymptotes and b) horizontal asymptotes

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

2. $y = \frac{x-1}{x^2-4x+3}$
 $(x-1)(x-3)$

1) a) $x = -2$ b) $y = -3$

2) a) $x = 3$ b) $y = 0$

3. Let $f(x) = \begin{cases} x^2 - 4x + 5, & x < 2 \\ 4 - x, & x \geq 2 \end{cases}$

Find each limit.

(a) $\lim_{x \rightarrow \frac{1}{2}} f(x) = 3\frac{1}{4}$ (b) $\lim_{x \rightarrow 2} f(x) = \text{DNE}$ (c) $f(2) = 2$

(b) $\lim_{x \rightarrow 2^-} f(x) = \lim_{x \rightarrow 2^+} f(x)$

(a) $\frac{1}{4} - 4(\frac{1}{2}) + 5 = \frac{1}{4} - 2 + 5 = 3\frac{1}{4}$
 $x^2 - 4x + 5 = 4 - x$
 $4 - 8 + 5 = 4 - 2$

4) What value should be assigned to k to make f a continuous function?

$$f(x) = \begin{cases} \frac{x^2 + 2x - 15}{x - 3}, & x \neq 3 \\ k, & x = 3 \end{cases}$$

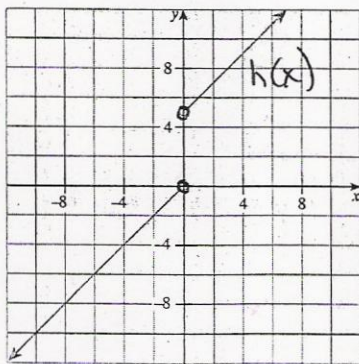
$\frac{(x-3)(x+5)}{x-3} = 8 = k$

5. $f(x) = \begin{cases} x+1, & x \neq 2 \\ 4, & x = 2 \end{cases}$ Is $f(x)$ continuous? *no b/c*
 justify. $f(2) = 4$ and $\neq \lim_{x \rightarrow 2} f(x) = 3$

$f(2) = 4 \stackrel{?}{=} \lim_{x \rightarrow 2^-} f(x) \stackrel{?}{=} \lim_{x \rightarrow 2^+} f(x)$
 $4 \stackrel{?}{=} 3 \stackrel{?}{=} 3$ so

(b) Write the equation for the piecewise function $h(x)$.

b) Explain why $\lim_{x \rightarrow 0} h(x) = \text{DNE}$



a) $h(x) = \begin{cases} -x & x < 0 \\ x+5 & x > 0 \end{cases}$

b) $\lim_{x \rightarrow 0^-} h(x) \neq \lim_{x \rightarrow 0^+} h(x)$

Find the following limits, if they exist!

7 $\lim_{x \rightarrow 2} \frac{x^2 - x + 6}{x - 2} = \text{DNE}$
 $(x-3)(x+2)$

8 $\lim_{x \rightarrow \infty} \frac{(x-3)^2}{2x - 5x^3} = -\frac{1}{5}$

9 $\lim_{x \rightarrow \frac{\pi}{3}} \sec x = 2$

10 $\lim_{x \rightarrow -2} (x^2 + 3x - 7) = -9$
 $4 - 6 - 7$

11 Find $\lim_{x \rightarrow 0} f(x)$ where $f(x) = \begin{cases} x + 5 & \text{if } x > 0 \\ x & \text{if } x < 0 \end{cases}$ DNE
 $\lim_{x \rightarrow 0^-} = \lim_{x \rightarrow 0^+}$
 $0 \neq 5$

12 $\lim_{t \rightarrow -3} \frac{t^2 - 9}{2t^2 + 7t + 3} = \frac{6}{5}$
 $\frac{(t-3)(t+3)}{(2t+1)(t+3)} = \frac{-6}{-5} = \frac{6}{5}$

13 $\lim_{h \rightarrow 0} \frac{f(h) - f(0)}{3h^2}$ if $h(x) = 4h^2 + 2$ $\frac{4h^2 + 2 - 2}{3h^2} = \frac{4}{3}$

Using the tables, find

14

X	Y1	
.7	-.3	
.8	-.2	
.9	-.1	
1	ERROR	
1.1	.1	
1.2	.2	
1.3	.3	

X = .7

$\lim_{x \rightarrow 1} = 0$

15

x	f(x)
1.97	1.293633333
1.98	1.306800000
1.99	1.320033333
2.01	1.346700000
2.02	1.360133333
2.03	1.373633333

$\lim_{x \rightarrow 2} f(x) = 1.33$

16) For what values of x is f NOT continuous?

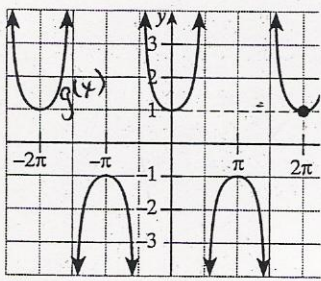
$$f(x) = \begin{cases} 2t+3 & t < -1 \\ t^2, & -1 \leq t < 2 \\ 3t-2, & t \geq 2 \end{cases}$$

$f(2)$ is not defined

so $x=2$ is not continuous

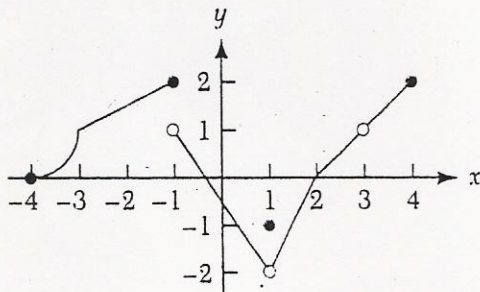
$f(-1) = 1$, so $f(-1)$ does exist?
 $\lim_{x \rightarrow -1^-} f(x) = \lim_{x \rightarrow -1^-} (2(-1)+3) = 1$
 $\lim_{x \rightarrow -1^+} f(x) = \lim_{x \rightarrow -1^+} (-1)^2 = 1$

17) Find a) $\lim_{x \rightarrow \infty} g(x)$ b) $\lim_{x \rightarrow \pi} g(x)$
 a) DNE b) -1



18) Use g below to answer a - h.

Graph of g



- a) $\lim_{x \rightarrow -4^+} g(x)$ DNE
- b) $\lim_{x \rightarrow 0} g(x)$ $-\frac{1}{2}$
- c) $g(-1)$ 2
- d) $\lim_{x \rightarrow 1} g(x)$ -2
- e) $\lim_{x \rightarrow -1} g(x)$ DNE
- f) $\lim_{x \rightarrow 3} g(x)$ 1
- g) $\lim_{x \rightarrow \frac{1}{2}^+} g(x)$ 1
- h) $\lim_{x \rightarrow 4^+} g(x)$ DNE