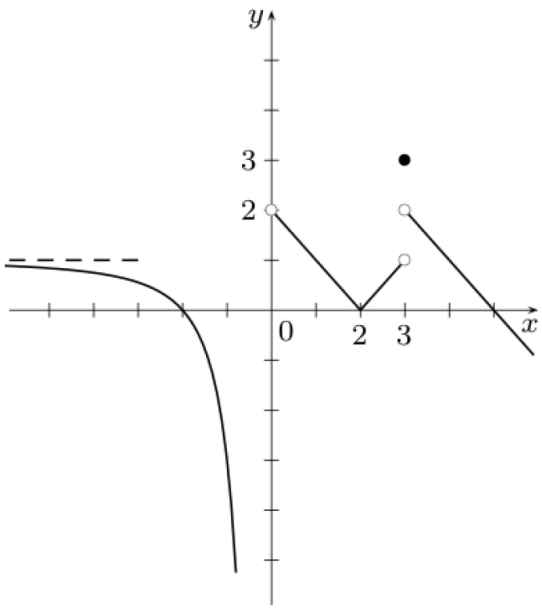
Dr. Sophie Marques

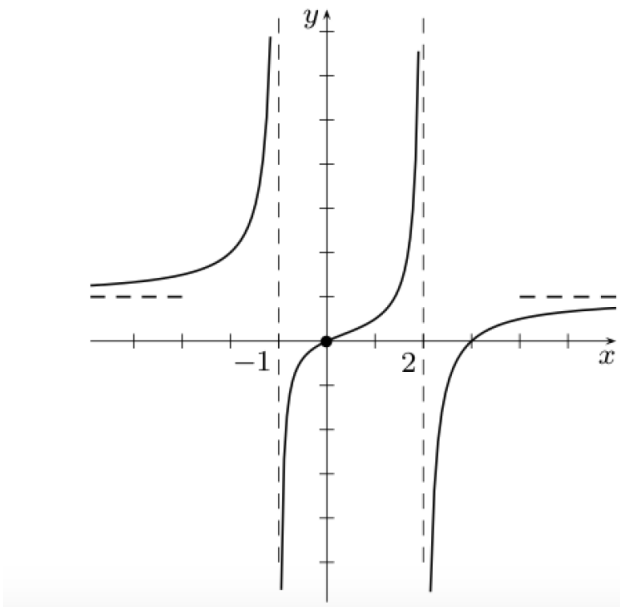
MAM1020S **Tutorial 5** **August 2017**

1. Use the graph of the function f to answer each question. Some times, there is the answer might not exist just specify when this is the case.



(a) $f(0) =$
(b) $f(2) =$
(c) $f(3) =$
(d) $lim_{x\to 0^-} f(x) =$
(e) $lim_{x\to 0^+} f(x) =$
(f) $lim_{x\to 0} f(x) =$
(g) $lim_{x\to 3^+} f(x) =$
(h) $lim_{x\to 3^-} f(x) =$
(i) $lim_{x\to 3} f(x) =$
(j) $lim_{x\to -\infty} f(x) =$

2. Use the graph of the function f to answer each question. Some times, there is the answer might not exist just specify when this is the case.



(a) $f(0) =$
(b) $f(2) =$
(c) $f(3) =$
(d) $lim_{x\to -1^+} f(x) =$
(e) $lim_{x\to -1^-} f(x) =$
(f) $lim_{x\to -1} f(x) =$
(g) $lim_{x\to 0} f(x) =$
(h) $lim_{x\to 2^+} f(x) =$
(i) $lim_{x\to 2^-} f(x) =$
(j) $lim_{x\to 2} f(x) =$
(k) $lim_{x\to -\infty} f(x) =$
(l) $lim_{x\to \infty} f(x) =$

3. Evaluate each limit using algebraic techniques. Some times, there is the answer might not exist just specify when this is the case.

1. $lim_{x\to 0}\frac{x^2-25}{x^2-4x-5}$
2. $lim_{x\to 5}\frac{x^2-25}{x^2-4x-5}$
3. $lim_{x\to 1}\frac{7x^2-4x-3}{3x^2-4x+1}$
4. $lim_{x\to 2}\frac{x^4+5x^3+6x^2}{x^2(x+1)-4(x+1)}$
5. $lim_{x\to -3}|x+1|+\frac{3}{x}$
6. $lim_{x\to 3}\frac{\sqrt{x+1}-2}{x^2-9}$
7. $lim_{x\to 3}\frac{\sqrt{x^2+7}-3}{x+3}$
8. $lim_{x\to 2}\frac{x^2+2x-8}{\sqrt{x^2+5}-(x+1)}$
9. $lim_{y\to 5}\left(\frac{2y^2+2y+4}{6y-3}\right)^{\frac{1}{3}}$
10. $lim_{x\to 0}\sqrt{2cos(x)-5}$
11. $lim_{x\to 0}\frac{\frac{1}{3+x}-\frac{1}{3-x}}{x}$
11. $lim_{x\to -6}\frac{\frac{2x+8}{x^2-12}-\frac{1}{x}}{x+6}$
12. $lim_{x\to\infty}\sqrt{x^2-2}-\sqrt{x^2+1}$
13. $lim_{x\to -\infty}\sqrt{x-2}-\sqrt{x}$
14. $lim_{x\to 7}\sqrt{2x-14}$
15. $lim_{x\to 1^-}\sqrt[6]{3-3x}$
16. $lim_{x\to\infty}\frac{x^4-10}{4x^3+x}$
17. $lim_{x\to -\infty}\sqrt[3]{\frac{x-3}{5-x}}$
18. $lim_{x\to\infty}\frac{3x^3+x^2-2}{x^2+x-2x^3+1}$
19. $lim_{x\to\infty}\frac{x+5}{2x^2+1}$
20. $lim_{x\to -\infty}cos(\frac{x^5+1}{x^6+x^5+100})$
21. $lim_{x\to 2}\frac{2x}{x^2-4}$
22. $lim_{x\to 1}\frac{3x}{x^2+2x+1}$
23. $lim_{x\to 1}\frac{x^2-25}{x^2-4x-5}$
24. $lim_{x\to 3}\frac{\sqrt{x^2-5}+2}{x-3}$
25. $lim_{x\to 0}\frac{2^x+sin(x)}{x^4}$
26. $lim_{x\to 1^-}\frac{1}{x-1}+e^{x^2}$
27. $lim_{x\to\infty}2x^2-3x$
28. $lim_{x\to 0}\frac{\sqrt{x+2}-\sqrt{2-x}}{x}$
29. $lim_{x\to 0^+}\frac{e^x}{1+ln(x)}$
30. $lim_{x\to\infty}\sqrt{x^2+1}-2x$
31. $lim_{x\to 1}\frac{\sqrt[3]{x}-1}{\sqrt{x}-1}$

4. Find the following limits involving absolute values

   (a) $lim_{x\to 1}\frac{x^2-1}{|x-1|}$ (b) $lim_{x\to -2}\frac{1}{|x+2|}+x^2$ (c) $lim_{x\to 3^-}\frac{x^2|x-3|}{x-3}$

5. Find the value of the parameter k to make the following limit exist and be finite. What is then the value of the limit?

$$lim_{x\to 5}\frac{x^2+kx-20}{x-5}$$

6. Answer the following questions for the piecewise defined function f described bellow.

$$f: \begin{array}{lcl} (-\infty,1)\cup(1,\infty) & \to & \mathbb{R} \\ x & \mapsto & \begin{cases} sin(\pi x) & for\ x<1 \\ 2^{x^2} & for\ x>1 \end{cases} \end{array}$$

   (a) $f(1)=$
   (b) $lim_{x\to 0}f(x)=$
   (c) $lim_{x\to 1}f(x)=$

7. Answer the following questions for the piecewise defined function f described bellow.

$$f: \begin{array}{lcl} (-\infty,-2)\cup(-1,0)\cup(0,1)\cup(1,\infty) & \to & \mathbb{R} \\ t & \mapsto & \begin{cases} t^2 & for\ t<-2 \\ \frac{t+6}{t^2-t} & for\ -1<t<2 \\ 3t-2 & for\ t\geq 2. \end{cases} \end{array}$$

   (a) $f(-3/2)=$
   (b) $f(2)=$
   (c) $f(3/2)=$
   (d) $lim_{t\to -2}f(t)=$
   (e) $lim_{t\to 1^+}f(t)=$
   (f) $lim_{t\to 2}f(t)=$
   (g) $lim_{t\to 0}f(t)=$