AP Calculus-Limits

Day 6 Limits Involving Infinity

Name_____

Date_____ Period____

1. What does $\lim_{x\to\infty} f(x) = L$ tell you about the function $f(x)$? HA at $y = L$

2. What does $\lim_{x\to a} f(x) = \infty$ tell you about the function $f(x)$? VA at $x = a$

Explain in your own words the meaning of each of the following.

3. $\lim_{x\to 2} f(x) = \infty$ VA: $x = 2$

4. $\lim_{x\to\infty} f(x) = 5$ HA: $y = 5$

5. $\lim_{x\to 1^+} f(x) = -\infty$ VA: $x = 1$

6. $\lim_{x\to-\infty} f(x) = 3$ HA: $y = 3$

Explain in your own words the meaning of each of the following.

7. $\lim_{x\to\infty} f(x) = -1$ HA: $y = -1$

8. $\lim_{x\to\infty} f(x) = 0$ HA: $y = 0$

9. $\lim_{x\to-3} f(x) = \infty$ VA: $x = -3$

10. $\lim_{x\to-1^-} f(x) = -\infty$ VA: $x = -1$

Find the asymptotes of each

11. $f(x) = \dfrac{2x+1}{x-2}$

HA: $y = 2$

VA: $x = 2$

12. $f(x) = \dfrac{1}{x^2-1}$

HA: $y = 0$

VA: $x = 1, x = -1$

13. $f(x) = \dfrac{3-x}{x+3}$

HA: $y = -1$

VA: $x = -3$

7. $f(x) = \ln(x-3)+2$

VA: $x = 3$

8. $f(x) = \dfrac{x}{x^2-9}$

HA: $y = 0$

VA: $x = 3, x = -3$

9. $f(x) = \dfrac{x+2}{x^2+3x-10}$

HA: $y = 0$

VA: $x = 2, x = -5$

10. $f(x) = \dfrac{x-1}{x^2+x-2}$

HA: $y = 0$

VA: $x = -2$

11. $f(x) = \dfrac{5-x}{x+2}$

HA: $y = -1$

VA: $x = -2$

Find the limit of each:

12. $\lim_{x\to-3^+} \dfrac{x+2}{x+3} = -\infty$

13. $\lim_{x\to 5^-} \dfrac{e^x}{(x-5)^3} = -\infty$

14. $\lim_{x\to 1} \dfrac{2-x}{(x-1)^2} = \infty$

$\lim_{x\to 1^-} \dfrac{2-x}{(x-1)^2} = \infty$

$\lim_{x\to 1^+} \dfrac{2-x}{(x-1)^2} = \infty$

15. $\lim_{x\to 5^+} \ln(x-5) = -\infty$

16. $\lim_{x\to-\frac{\pi}{2}^-} \sec x = -\infty$

(hint $\frac{-\pi}{2} \approx -1.57$ so... try $x = -1.58$) (radians)

17. $\lim_{x\to\infty} \dfrac{3x+5}{x-4} = 3$

18. $\lim_{x\to\infty} \dfrac{x^3+5x}{2x^3-x^2+4} = \dfrac{1}{2}$

19. $\lim_{x\to-\infty} \dfrac{t^2+2}{t^3+t^2-1} = 0$

Day 6 Limits Involving Infinity

Name_____

Date_____ Period_____

This is a problem to get you ready for tomorrow. TRY THE PROBLEM. Do not stress if you are confused. Start by labeling the pieces.

20. A) Sketch a graph for a function f that satisfies the following conditions:

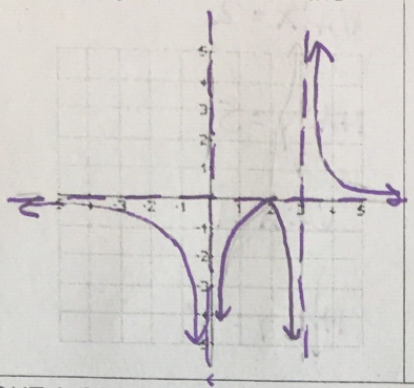
$\lim_{x\to\pm\infty} f(x) = 0$

$\lim_{x\to 0} f(x) = -\infty$

$\lim_{x\to 3^+} f(x) = \infty$

$\lim_{x\to 3^-} f(x) = -\infty$

$f(2) = 0$



* video

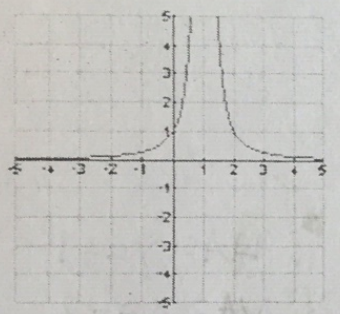
B) Find a formula for a function f that satisfies the same conditions:

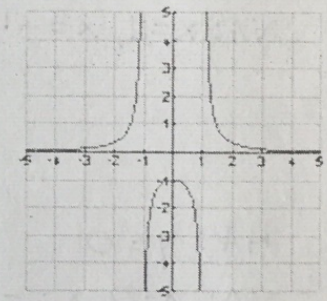
$f(x) = \dfrac{x-2}{x(x+3)}$

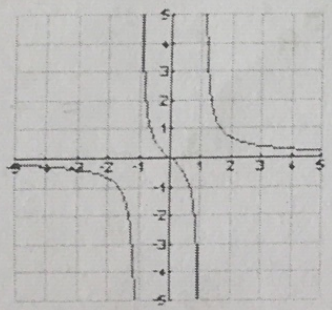
Match each function (WITHOUT A CALCULATOR)

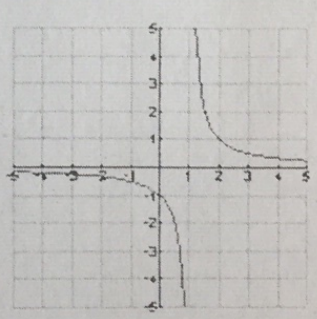
A.) $f(x) = \dfrac{1}{x-1}$	B.) $f(x) = \dfrac{x}{x-1}$	C.) $f(x) = \dfrac{1}{(x-1)^2}$
D.) $f(x) = \dfrac{1}{x^2-1}$	E.) $f(x) = \dfrac{x}{(x-1)^2}$	F.) $f(x) = \dfrac{x}{x^2-1}$

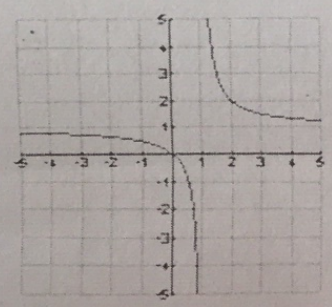
To each graph

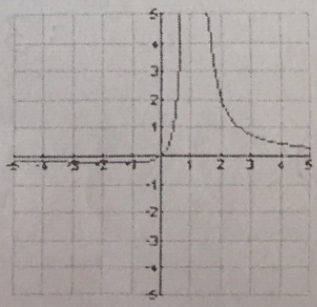
21.  C

22.  D

23.  F

24.  A

25.  B

26.  E