

Limits Practice from PSU Calculus 1 Class

Use the function $f(x) = \frac{|x|(x-3)}{9-x^2}$ to answer questions 1-3 that follow.

#1. Evaluate $\lim_{x \rightarrow 3} f(x)$.

#2. Determine all vertical asymptotes (if any) of $f(x)$.

#3. Find all the removable discontinuities (if any) of $f(x)$.

#4. Determine $\lim_{\theta \rightarrow 0} \frac{\csc 3\theta}{\cot \theta}$.

#5. Determine the constants c and k that make the following function continuous.

$$f(x) = \begin{cases} x + 2c & , x < -2 \\ 3cx + k & , -2 \leq x \leq 1 \\ 3x - 2k & , x > 1 \end{cases}$$

#6. What is the value of $\lim_{x \rightarrow -1} \frac{x^2 - 3x - 4}{x^2 - 1}$?

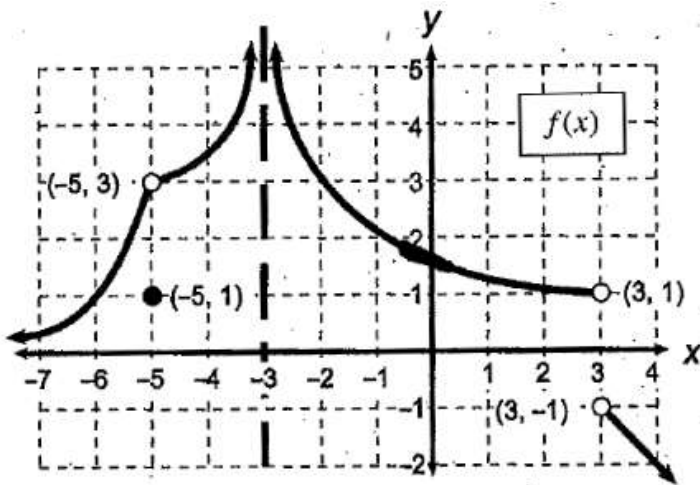
#7. Evaluate the limit, if it exists: $\lim_{x \rightarrow 9} \frac{\sqrt{x-5} - 2}{x-9}$.

#8. Evaluate the limit, if it exists: $\lim_{x \rightarrow 2} \frac{\frac{1}{x} - \frac{1}{2}}{x-2}$.

#9. Find the limit (if it exists): $\lim_{x \rightarrow \infty} \frac{x^4 - 4x^3 - 7x^2 - 31x + 6}{x^3 - x^2 - 33x + 18}$

#10. Find the limit (if it exists) : $\lim_{x \rightarrow \infty} \frac{3x^5 + 7x^3 - 5x^2 + 1}{2x^5 + 2x^2 - 8}$

Use the graph of $f(x)$ below to answer questions 11 – 20 that follow.



#11. $f(-5) =$

#12. $f(3) =$

#13. $\lim_{x \rightarrow -3} f(x) =$

#14. $\lim_{x \rightarrow 3^-} f(x) =$

#15. $\lim_{x \rightarrow 3^+} f(x) =$

#16. $\lim_{x \rightarrow 3} f(x) =$

#17. $\lim_{x \rightarrow -\infty} f(x) =$

#18. $\lim_{x \rightarrow \infty} f(x) =$

#19. Is $f(x)$ continuous at $x = 3$? Justify your answer using Calculus.

#20. Is $f(x)$ continuous at $x = -2$? Justify your answer using Calculus.

#21.

Find ALL vertical asymptotes for the function $f(x) = \frac{1}{2 \sin^2 x - \sin x - 1}$

in the interval $0 \leq x \leq 2\pi$. EXPRESS YOUR ANSWERS IN RADIANS!