

AP Calculus AB
Limits Review

Name Key

1. $\lim_{x \rightarrow 3} \frac{x+5}{x-4}$

see
attached
paper
for
work

2. $\lim_{x \rightarrow 2^+} \frac{x^2 - 4x - 21}{x + 7}$

3. $\lim_{x \rightarrow 9} \frac{x^2 - 5x - 36}{x^2 - 81}$

4. $\lim_{x \rightarrow 0^-} \frac{x^3 + 5x^2 - 6x}{x^2 - x}$

5. $\lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{-x + 9}$

6. $\lim_{x \rightarrow 4} \frac{x - 4}{\sqrt{x} - 2}$

7. $\lim_{x \rightarrow \infty} \frac{\sqrt{2x+6}}{x+3}$

8. $\lim_{x \rightarrow \infty} \frac{x^2 + 2}{\sqrt{x} - 7}$

9. $\lim_{x \rightarrow 5^-} \lceil [x] \rceil$

10. $\lim_{x \rightarrow 3^+} \lceil [x] \rceil + 5$

11. $\lim_{x \rightarrow 3^-} \frac{\frac{4}{9x} - \frac{12}{27x}}{x^2 - 9}$

12. $\lim_{x \rightarrow 1} \frac{\frac{1}{3-x} - \frac{1}{2}}{x-1}$

13. $\lim_{x \rightarrow 2^+} \frac{x^2 + 4x + 6}{x - 2}$

14. $\lim_{x \rightarrow -1^-} \frac{2x^2 + 5}{x^2 - 1}$

15. $\lim_{x \rightarrow \infty} \frac{5x^2 + 4x + 6}{-3x^2 - 2}$

16. $\lim_{x \rightarrow -\infty} \frac{-2x^2 + 5x - 1}{x + 3}$

17. $\lim_{\theta \rightarrow \frac{\pi}{2}} (\cot \theta)$

18. $\lim_{\theta \rightarrow 0} \left(\frac{\cos \theta}{\cot \theta} \cdot \frac{1}{\theta} \right)$

$$f(x) = \begin{cases} x+3 & x < -4 \\ 2x^2 - 3 & -4 \leq x < 2 \\ \sqrt{x-1} & x \geq 2 \end{cases}$$

$$19. \lim_{x \rightarrow -4^+} f(x) = 29$$

$$20. \lim_{x \rightarrow -4^-} f(x) = -1$$

$$21. \lim_{x \rightarrow 4} f(x) = \text{dne}$$

$$22. f(-4) = 29$$

$$23. \lim_{x \rightarrow 2^+} f(x) = 1$$

$$24. \lim_{x \rightarrow 2^-} f(x) = 5$$

$$25. \lim_{x \rightarrow 2} f(x) = \text{dne}$$

$$26. f(2) = 1$$

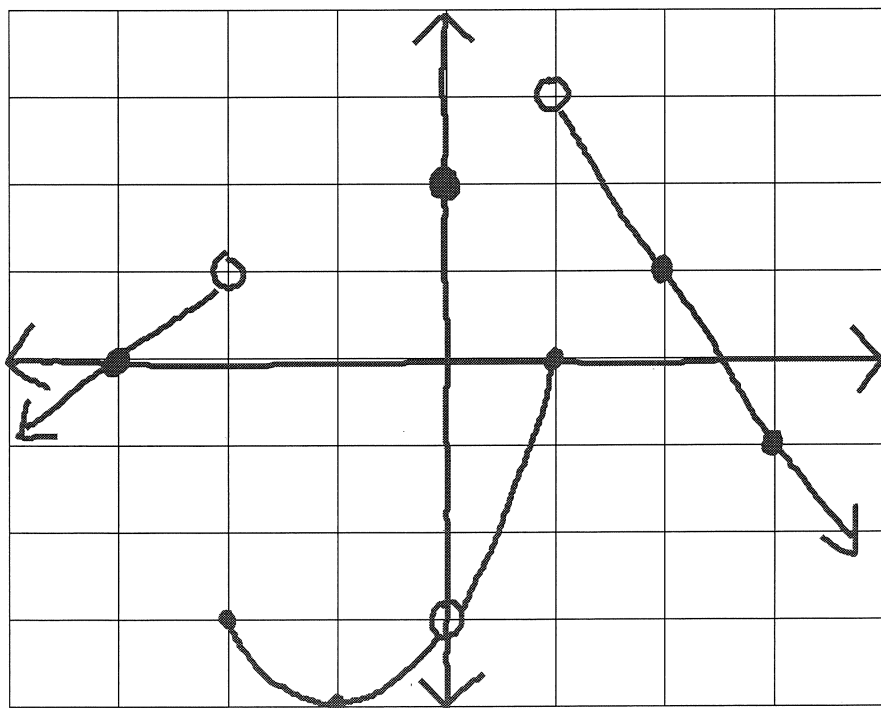
$$27. \lim_{x \rightarrow 1^+} f(x) = -1$$

$$28. \lim_{x \rightarrow -6} f(x) = -3$$

$$29. \lim_{x \rightarrow 5} f(x) = 2$$

$$30. f(10) = 3$$

Find the indicated value:



$$31. \lim_{x \rightarrow 3^+} f(x) = -1$$

$$32. \lim_{x \rightarrow 3^-} f(x) = -1$$

$$33. \lim_{x \rightarrow 3} f(x) = -1$$

$$34. f(3) = -1$$

$$35. \lim_{x \rightarrow -2^+} f(x) = -3$$

$$36. \lim_{x \rightarrow -2^-} f(x) = 1$$

$$37. \lim_{x \rightarrow -2} f(x) = \text{dne}$$

$$38. f(-2) = -3$$

$$39. \lim_{x \rightarrow 0^+} f(x) = -3$$

$$40. \lim_{x \rightarrow 0^-} f(x) = -3$$

$$41. \lim_{x \rightarrow 0} f(x) = -3$$

$$42. f(0) = 2$$

Limits Review

$$1. \lim_{x \rightarrow 3} \frac{x+5}{x-4} = \frac{8}{-1} = -8$$

$$3. \lim_{x \rightarrow 9} \frac{x^2 - 5x - 36}{x^2 - 81} = \frac{0}{0}$$

$$\lim_{x \rightarrow 9} \frac{(x-9)(x+4)}{(x-9)(x+9)} = \frac{13}{18}$$

$$5. \lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{-x + 9} = \frac{0}{0}$$

$$\lim_{x \rightarrow 9} \frac{(\sqrt{x} - 3)(\sqrt{x} + 3)}{(-x + 9)(\sqrt{x} + 3)}$$

$$\lim_{x \rightarrow 9} \frac{x-9}{-(x-9)(\sqrt{x} + 3)} = \frac{-1}{6}$$

$$7. \lim_{x \rightarrow \infty} \frac{\sqrt{2x+6}}{x+3}$$

$$\lim_{x \rightarrow \infty} \sqrt{\frac{2x+6}{(x+3)^2}}$$

$$\lim_{x \rightarrow \infty} \sqrt{\frac{2x+6}{x^2+6x+9}} = \sqrt{0} = 0$$

$$9. \lim_{x \rightarrow 5^-} \lfloor x \rfloor = 4$$

$$11. \lim_{x \rightarrow 3^-} \frac{\frac{4}{9x} - \frac{12}{27x}}{x^2 - 9} = \frac{\frac{4}{27} - \frac{12}{27}}{0}$$

$$\frac{(-)}{(-)}$$

∞

$$2. \lim_{x \rightarrow 2^+} \frac{x^2 - 4x - 21}{x+7} = \frac{-25}{9}$$

$$4. \lim_{x \rightarrow 0^-} \frac{x^3 + 5x^2 - 6x}{x^2 - x} = \frac{0}{0}$$

$$\lim_{x \rightarrow 0^-} \frac{x(x^2 + 5x - 6)}{x(x-1)} = \frac{-6}{-1} = 6$$

$$6. \lim_{x \rightarrow 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0}$$

$$\lim_{x \rightarrow 4} \frac{(x-4)(\sqrt{x}+2)}{(\sqrt{x}-2)(\sqrt{x}+2)}$$

$$\lim_{x \rightarrow 4} \frac{(x-4)(\sqrt{x}+2)}{x-4} = 4$$

$$8. \lim_{x \rightarrow \infty} \frac{x^2 + 2}{\sqrt{x-7}}$$

$$\lim_{x \rightarrow \infty} \sqrt{\frac{(x^2+2)^2}{x-7}}$$

$$\lim_{x \rightarrow \infty} \sqrt{\frac{x^4 + 4x^2 + 4}{x-7}} = \sqrt{\infty} = \infty$$

$$10. \lim_{x \rightarrow 3^+} \lfloor x \rfloor + 5 = 8$$

$$12. \lim_{x \rightarrow 1} \frac{\frac{1}{3-x} - \frac{1}{2}}{x-1} = \frac{0}{0}$$

$$\lim_{x \rightarrow 1} \frac{(\frac{1}{3-x} - \frac{1}{2}) \cdot 2(3-x)}{(x-1) \cdot 2(3-x)}$$

$$\lim_{x \rightarrow 1} \frac{2 - (3-x)}{(x-1) \cdot 2(3-x)}$$

$$x \rightarrow 1 \quad (x-1) \cdot 2(3-x)$$

continued
next page

12. (continued)

$$\lim_{x \rightarrow 1} \frac{(x-1)}{(x-1) \cdot 2(3-x)} = \frac{1}{4}$$

$$13. \lim_{x \rightarrow 2^+} \frac{x^2 + 4x + 6}{x - 2} = \frac{14}{0}$$

$$\frac{(+)}{(+)} \\ \infty$$

$$14. \lim_{x \rightarrow -1^-} \frac{2x^2 + 5}{x^2 - 1} = \frac{7}{0}$$

$$\frac{(+)}{(+)} \\ \infty$$

$$15. \lim_{x \rightarrow \infty} \frac{5x^2 + 4x + 6}{-3x^2 - 2} = \frac{-5}{3}$$

$$16. \lim_{x \rightarrow -\infty} \frac{-2x^2 + 5x - 1}{x + 3} = -\infty$$

$$17. \lim_{\theta \rightarrow \frac{\pi}{2}} \cot \theta = 0$$

$$18. \lim_{\theta \rightarrow 0} \frac{\cos \theta}{\cot \theta} = \frac{1}{0}$$
$$\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$$