

$$1. \lim_{x \rightarrow 2} \frac{x^2 - 1}{x^2 + 2} = \frac{4 - 1}{8 + 2} = \boxed{\frac{3}{10}}$$

$$2. \lim_{x \rightarrow -2} \frac{x+2}{x^2-4} = \lim_{x \rightarrow -2} \frac{x+2}{(x-2)(x+2)} = \boxed{\frac{-1}{4}}$$

$$3. \lim_{x \rightarrow -2} \frac{x^2 - 4}{x^2 + 8} = \lim_{x \rightarrow -2} \frac{(x+2)(x-2)}{\cancel{(x+2)}(x^2 - 2x + 4)} = \lim_{x \rightarrow -2} \frac{x-2}{x^2 - 2x + 4} = \frac{-4}{12} = \boxed{-\frac{1}{3}}$$

$$\begin{array}{r} -2 \overline{) 1 \ 0 \ 0 \ 8} \\ \underline{-2 \ 4 \ -8} \\ 1 \ -2 \ 4 \ 0 \end{array}$$

$$4. \lim_{x \rightarrow -1} \left( \frac{1}{x+2} - 1 \right) \cdot \frac{1}{x+1} = \lim_{x \rightarrow -1} \frac{\frac{1}{x+2} - 1 - (x+1)}{x+1}$$

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

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

$$= \lim_{x \rightarrow -1} \frac{-(x+3)}{x+2} = \frac{-2}{1} = \boxed{-2}$$

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

$$= \lim_{x \rightarrow 0} \frac{1}{\sqrt{x+9} + 3} = \boxed{\frac{1}{6}}$$

$$6. \lim_{x \rightarrow 0} \left( \frac{1}{x+1} - 1 \right) \cdot \frac{1}{x} = \lim_{x \rightarrow 0} \frac{\frac{1}{x+1} - 1 - x}{x} = \lim_{x \rightarrow 0} \frac{1 - (x+1) - x(x+1)}{x(x+1)}$$

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

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

$$7. \lim_{x \rightarrow 1} \frac{(\sqrt{3} - \sqrt{x+2})(\sqrt{3} + \sqrt{x+2})}{(1-x)(\sqrt{3} + \sqrt{x+2})} = \lim_{x \rightarrow 1} \frac{3 - (x+2)}{(1-x)(\sqrt{3} + \sqrt{x+2})}$$

$$= \lim_{x \rightarrow 1} \frac{-x+1}{(1-x)(\sqrt{3} + \sqrt{x+2})} = \lim_{x \rightarrow 1} \frac{1}{\sqrt{3} + \sqrt{x+2}} = \frac{1}{2\sqrt{3}} = \boxed{\frac{\sqrt{3}}{6}}$$

$$8. \lim_{x \rightarrow -2} \frac{x^2 - 1}{2x} = \frac{4 - 1}{-4} = \boxed{\frac{-3}{4}}$$

$$9. \lim_{x \rightarrow c} [f(x)]^3 = 4^3 = \boxed{64}$$

$$10. \lim_{x \rightarrow c} [3f(x) - g(x)] = 3 \cdot 4 - 5 = \boxed{7}$$

$$11. \lim_{x \rightarrow c} [f(x) \cdot g(x)] = 4 \cdot 5 = \boxed{20}$$

$$12. \lim_{x \rightarrow c} \frac{f(x)}{g(x)} = \boxed{\frac{4}{5}}$$

$$13. \lim_{x \rightarrow c} \sqrt[3]{f(x)} = \sqrt[3]{27} = \boxed{3}$$

$$14. \lim_{x \rightarrow c} \frac{f(x)}{g(x)} = \frac{27}{18} = \boxed{\frac{3}{2}}$$

$$15. \lim_{x \rightarrow c} [f(x)g(x)] = 27 \cdot 12 = \boxed{324}$$

$$16. \lim_{x \rightarrow c} [f(x) - 2g(x)] = 27 - 2 \cdot 12 = \boxed{3}$$

$$\frac{27}{12} = \frac{54}{24}$$

$$\frac{27}{324}$$

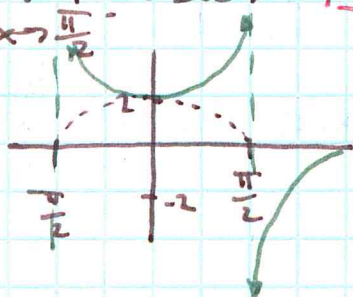
$$17. \lim_{x \rightarrow -1^+} (-|x+1| - 1) = -|0| - 1 = \boxed{-1}$$

$$18. \lim_{x \rightarrow -2^-} (x + |2x+4|) = -2 + |0| = \boxed{-2}$$

$$19. \lim_{x \rightarrow 2^+} f(x) = -2(2) + 1 = \boxed{-3}$$

$$20. \lim_{x \rightarrow \frac{\pi}{2}^-} 2 \sec x = \boxed{\infty}$$

$$21. \lim_{x \rightarrow 2^+} \frac{x-2}{(x-2)(x-1)} = \boxed{1}$$



$$22. \lim_{x \rightarrow 1^+} \frac{x-1}{(x-3)(x-1)} = \boxed{-\frac{1}{2}}$$

$$24. \lim_{x \rightarrow \frac{\pi}{3}^+} -\cot(2x) = -\frac{\cos \frac{2\pi}{3}}{\sin \frac{2\pi}{3}} \\ = -\frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \boxed{\frac{\sqrt{3}}{3}}$$

$$23. \lim_{x \rightarrow 2^+} f(x) = \frac{2}{2} + 2 = \boxed{3}$$

$$25. \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2+4}} = \boxed{1}$$

$$26. \lim_{x \rightarrow -\infty} \frac{-2x^2}{4x+1} = \boxed{\infty}$$

$$27. \lim_{x \rightarrow \infty} \left( \frac{e^x}{x^4} + 4 \right) = \boxed{\infty}$$

$$28. \lim_{x \rightarrow -\infty} 3x \sin\left(\frac{1}{x}\right) = \boxed{3}$$

use calc.

$$29. \lim_{x \rightarrow -\infty} \frac{-x+2}{x^2+2x+2} = \boxed{0}$$

$$30. \lim_{x \rightarrow \infty} \frac{-2x^2+5}{3x^2-7x+3} = \boxed{-\frac{2}{3}}$$

$$31. \lim_{x \rightarrow \infty} \frac{12}{1-x^4} = \boxed{0}$$

$$32. \lim_{x \rightarrow \infty} \frac{5x^2-x^6}{3x^2+x^4} = \boxed{-\infty}$$

