(5-11) Compute the limit, if possible.

5. $\lim_{x\to 3} \frac{x^2-9}{x^2+2x-3} = \lim_{x\to 3} \frac{(x-3)\cancel{(x+3)}}{\cancel{(x+3)}(x-1)} = \frac{0}{-2} = 0$

6. $\lim_{x\to 1^+} \frac{x^2-9}{x^2+2x-3} = \frac{1-9}{1+2-3} = \frac{-8}{0}$ form

$= \lim_{x\to 1^+} \frac{x-3}{x-1}$ Form $\frac{-\#}{pos(0)} = -\infty$

$\lim_{x\to 1^-} \frac{x-3}{x-1}$ $\frac{-\#}{0(neg)} = \infty$

7. $\lim_{t\to 2} \frac{t^2-4}{t-2} = \lim_{t\to 2} \frac{\cancel{(t-2)}(t+2)}{\cancel{t-2}} = 4$

8. $\lim_{x\to 8^-} \frac{|x-8|}{x-8}$ ~~DNE~~ ~~$\lim_{x\to 8}$~~

$= \lim_{x\to 8^-} \frac{-\cancel{(x-8)}}{\cancel{x-8}} = -1$

9. $\lim_{x\to 1^+} (\sqrt{x-2}+7) =$ DNE

Not in domain

10. $\lim_{x\to 0} \frac{1-\sqrt{1-x^2}}{x}$ Hint: multiply the top and bottom of the fraction by $1+\sqrt{1-x^2}$.

$= \lim_{x\to 0} \frac{1-(1-x^2)}{x\cancel{x}(1+\sqrt{1-x^2})} = \lim_{x\to 0} \frac{x^2}{x(1+\sqrt{1-x^2})} = \lim_{x\to 0} \frac{x}{1+\sqrt{1-x^2}} = \frac{0}{2} = \boxed{0}$

11. $\lim_{h\to 0} \frac{2(x+h)-2x}{h} = \lim_{h\to 0} \frac{\cancel{2x}+2h-\cancel{2x}}{h} = \lim_{h\to 0} 2 = \boxed{2}$

12. Prove that $\lim_{x\to 0} x^4 \cos\left(\frac{2}{x}\right) = 0$.

$-1 \le \cos(\frac{2}{x}) \le 1$

$-x^4 \le x^4 \cos\frac{2}{x} \le x^4$

$0 = \lim_{x\to 0} -x^4 \le \lim_{x\to 0} x^4 \cos(\frac{2}{x}) \le \lim_{x\to 0} x^4 = 0$

by Squeez thm $\lim_{x\to 0} x^4 \cos(\frac{2}{x}) = 0$

13. If $1 \le f(x) \le x^2+2x+2$ for all x, find $\lim_{x\to -1} f(x)$.

$+1 = \lim_{x\to -1} +1 \le \lim_{x\to -1} f(x) \le \lim_{x\to -1} x^2+2x+2 = 1-2+2 = 1$

By the squeeze Thm $\lim_{x\to -1} f(x) = 1$.