Algebraic Methods for Finding Limits 5/21

$$\lim_{x\to c}[f(x)\pm g(x)] = \lim_{x\to c} f(x) \pm \lim_{x\to c} g(x)$$

$$\lim_{x\to c} kf(x) = k\cdot \lim_{x\to c} f(x)$$

$$\lim_{x\to c}[f(x)\cdot g(x)] = \lim_{x\to c} f(x)\cdot \lim_{x\to c} g(x)$$

$$\lim_{x\to c}\left[\frac{f(x)}{g(x)}\right] = \frac{\lim_{x\to c} f(x)}{\lim_{x\to c} g(x)}$$

Direct Substitution

Ex) $\lim_{x\to 4}(x^2-6x+3) = 4^2-6(4)+3=-5$

Ex) $\lim_{x\to 5}\frac{4x+1}{x-3} = \frac{4(5)+1}{(5)-3} = \frac{21}{2}$

Factoring

Ex) $\lim_{x\to -4}\frac{x^2-x-20}{x+4} = \frac{(x-5)\cancel{(x+4)}}{\cancel{x+4}}$

$= -4-5 = -9$

Rationalizing

Ex) $\lim_{x\to 9} \left(\frac{\sqrt{x}-3}{x-9}\right)\left(\frac{\sqrt{x}+3}{\sqrt{x}+3}\right) = \frac{\cancel{(x-9)}}{\cancel{(x-9)}(\sqrt{x}+3)} = \frac{1}{\sqrt{x}+3} = \frac{1}{6}$

p754:
1-19 odds
60-63

Piecewise Functions

Ex) $f(x) = \begin{cases} 2x+4, & x < -1 \\ -1, & -1 \le x < 0 \\ x^2, & 0 \le x < 2 \\ x-3, & x > 2 \end{cases}$

$\lim_{x\to -1} = \frac{2}{-1} =$ No Limit

$\lim_{x\to 0^-} = -1$

$\lim_{x\to 1} = 1^2 = 1$