Math 1823-002 Quiz II Name: SOLUTIONS

Q1].. Evaluate the following two limits.

$$\lim_{x\to 2}\frac{x^2+x-6}{x-2}$$

$$\lim_{x\to 2}\frac{x^2+x-6}{x-2} = \lim_{x\to 2}\frac{(x-2)(x+3)}{(x-2)} \quad \text{--- factor numerator}$$

$$= \lim_{x\to 2}\frac{\cancel{(x-2)}(x+3)}{\cancel{(x-2)}} \quad \text{--- since } x-2\neq 0 \text{ when taking Limit}$$

$$= \lim_{x\to 2}(x+3) = 2+3 = \boxed{5}$$

$$\lim_{h\to 0}\frac{\sqrt{1+h}-1}{h}$$

$$\lim_{h\to 0}\frac{\sqrt{1+h}-1}{h} = \lim_{h\to 0}\left(\frac{\sqrt{1+h}-1}{h}\right)\left(\frac{\sqrt{1+h}+1}{\sqrt{1+h}+1}\right)$$

$$= \lim_{h\to 0}\left(\frac{(\sqrt{1+h})^2-1^2}{h(\sqrt{1+h}+1)}\right) \quad \text{.....} \; P^2-Q^2=(P-Q)(P+Q)$$

$$= \lim_{h\to 0}\frac{\cancel{1}+h-\cancel{1}}{h(\sqrt{1+h}+1)} = \lim_{h\to 0}\frac{\cancel{h}}{\cancel{h}(\sqrt{1+h}+1)}$$

$$= \lim_{h\to 0}\left(\frac{1}{\sqrt{1+h}+1}\right) = \frac{1}{\sqrt{1}+1} = \boxed{\frac{1}{2}}$$