Name SHUBLEKA /KEY, **No Calculators. Present neatly. Score_____.**

Find the limit.

1)

$$\lim_{h \to 0} \frac{\sqrt[4]{16+h} - 2}{h}$$

$f(x) = \sqrt[4]{x}$ @ $x = 16$; since $f(16) = 2$

$= \frac{d}{dx}\left(x^{1/4}\right)\Big|_{x=16} = \frac{1}{4} \cdot x^{-3/4}\Big|_{x=16} \doteq \frac{1}{4 \cdot 8} = \frac{1}{32}$

2)

$$\lim_{x \to 1} \frac{x^{17} - 1^{17}}{x - 1} = \frac{d}{dx}\left(x^{17}\right)\Big|_{x=1} = 17 \cdot x^{16}\Big|_{x=1} = 17$$

3)

$$\lim_{\theta \to \pi/3} \frac{\cos\theta - (0.5)^{= \cos\pi/3}}{\theta - \pi/3} = \frac{d}{d\theta}\left(\cos\theta\right)\Big|_{\theta = \pi/3} = -\sin\theta\Big|_{\theta=\pi/3} = -\frac{\sqrt{3}}{2}.$$

NOTE: $f'(a) = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$

OC $f'(a) = \lim_{x \to a} \frac{f(x) - f(a)}{x - a}$

$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$