Math 132 Fall 2017
Quiz 6 10/20/17 Name (Print): ____________________

1. Approximate $\sqrt{50}$

$f(x)=\sqrt{x}$, $f(49)=7$, $f'(x)=\frac{1}{2\sqrt{x}}$. $f'(49)=\frac{1}{14}$.

$$L_{49}(50)=f(49)+f'(49)(50-49)$$
$$=7+\frac{1}{14}\approx\sqrt{50}$$

2. Approximate the value of $f(x)=x\sqrt{50-x}$ at $x=2$ using the linearization at $x=1$.

$$f'(x)=\sqrt{50-x}+\frac{-x}{2\sqrt{50-x}}=\frac{2(50-x)-x}{2\sqrt{50-x}}=\frac{100-3x}{2\sqrt{50-x}}.$$

$f'(1)=\frac{100-3}{2\sqrt{50-1}}=\frac{97}{14}$, $f(1)=1\cdot\sqrt{50-1}=7$.

$$L_1(2)=f(1)+f'(1)(2-1)=7+\frac{97}{14}.$$

3. Let $f(x)=x+\sin x$, on $[0,3\pi]$. Find the local and absolute maxima and minima.

$f'(x)=1+\cos x \longrightarrow f'=0 \Rightarrow \cos x=-1 \Rightarrow x=\pi, 3\pi$.

$f(0)=0$, $f(\pi)=\pi$, $f(3\pi)=3\pi$.

$\therefore$ $(\pi, f(\pi))$ is not local max or min.

$(0, f(0))$ absolute min

$(3\pi, f(3\pi))$ absolute max.