HW 16 #5

$x^2(1-x^2)^{1/2} = f(x)$

$f'(x) = 2x\sqrt{1-x^2} + x^2 \frac{1}{2}(1-x^2)^{-1/2}(-2x)$

und $0 = 2x\sqrt{1-x^2} + \frac{-x^3}{\sqrt{1-x^2}}$

$= \frac{2x(1-x^2) - x^3}{\sqrt{1-x^2}} = \frac{2x - 2x^3 - x^3}{\sqrt{1-x^2}}$

$$\frac{2x-3x^3}{\sqrt{1-x^2}} = \frac{x(-3x^2+2)}{\sqrt{1-x^2}}$$

$x=0$

$x=\pm 1$

$-3x^2+2=0$

$2=3x^2$

$\frac{2}{3}=x^2$

$x=\pm\sqrt{\frac{2}{3}}$

HW 16 #7

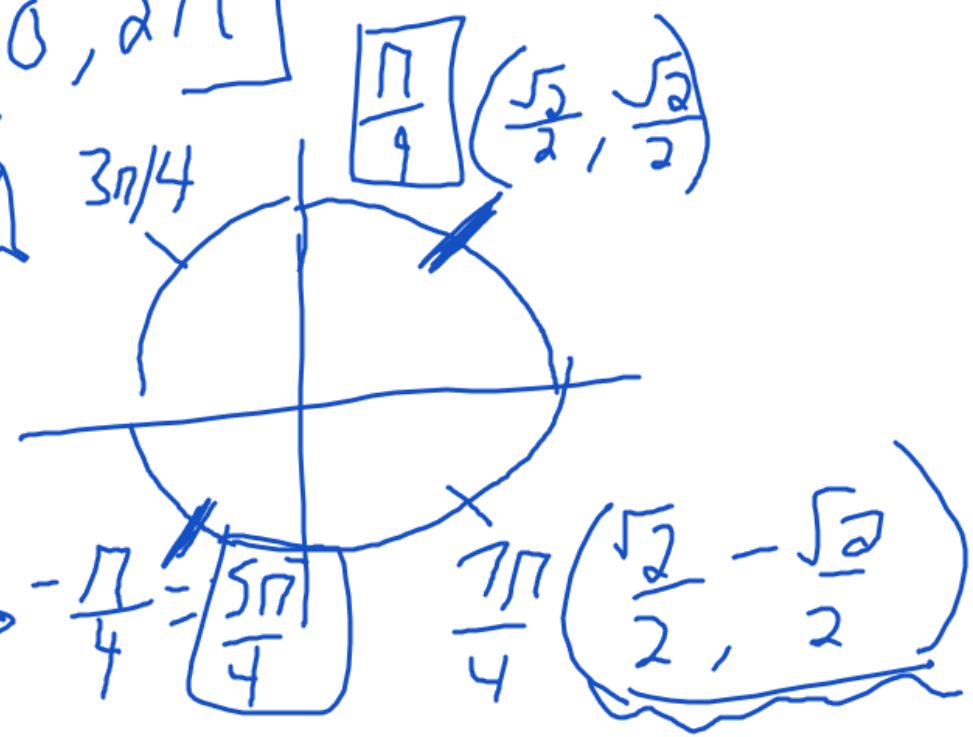
$f(x) = \sin(x)\cos(x)$ $[0, 2\pi]$

$f'(x) = \cos^2(x) - \sin^2(x)$ $[0, 2\pi]$

$\boxed{\cos^2(x) = \sin^2(x)}$

$\rightarrow \cos(x) = \sin(x)$

$\rightarrow x = \frac{\pi}{4}, \frac{5\pi}{4}$



$f(x) = \sin(x)\cos(x)$

$x = \frac{\pi}{4}, \frac{5\pi}{4}, 0, 2\pi$

$f\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{2} = \frac{2}{4} = \frac{1}{2}$

$f\left(\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{2}}{2} = \frac{1}{2}$

$\boxed{\frac{1}{2}} = f(x)$

$f(0) = \sin(0)\cos(0) = 0$

$f(2\pi) = \sin(2\pi)\cos(2\pi) = 0$

$f\left(\frac{3\pi}{4}\right) = \frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{2}}{2} = \frac{-1}{2}$

$f\left(\frac{7\pi}{4}\right) = \frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{2}}{2} = \frac{-1}{2}$

$= \boxed{\frac{-1}{2}}$

HW 15 #8

$f(x) = (x-3)^{1/2}$ $\quad a = 4$

$\sqrt{0.9}$ $\quad$ $\sqrt{1.01}$

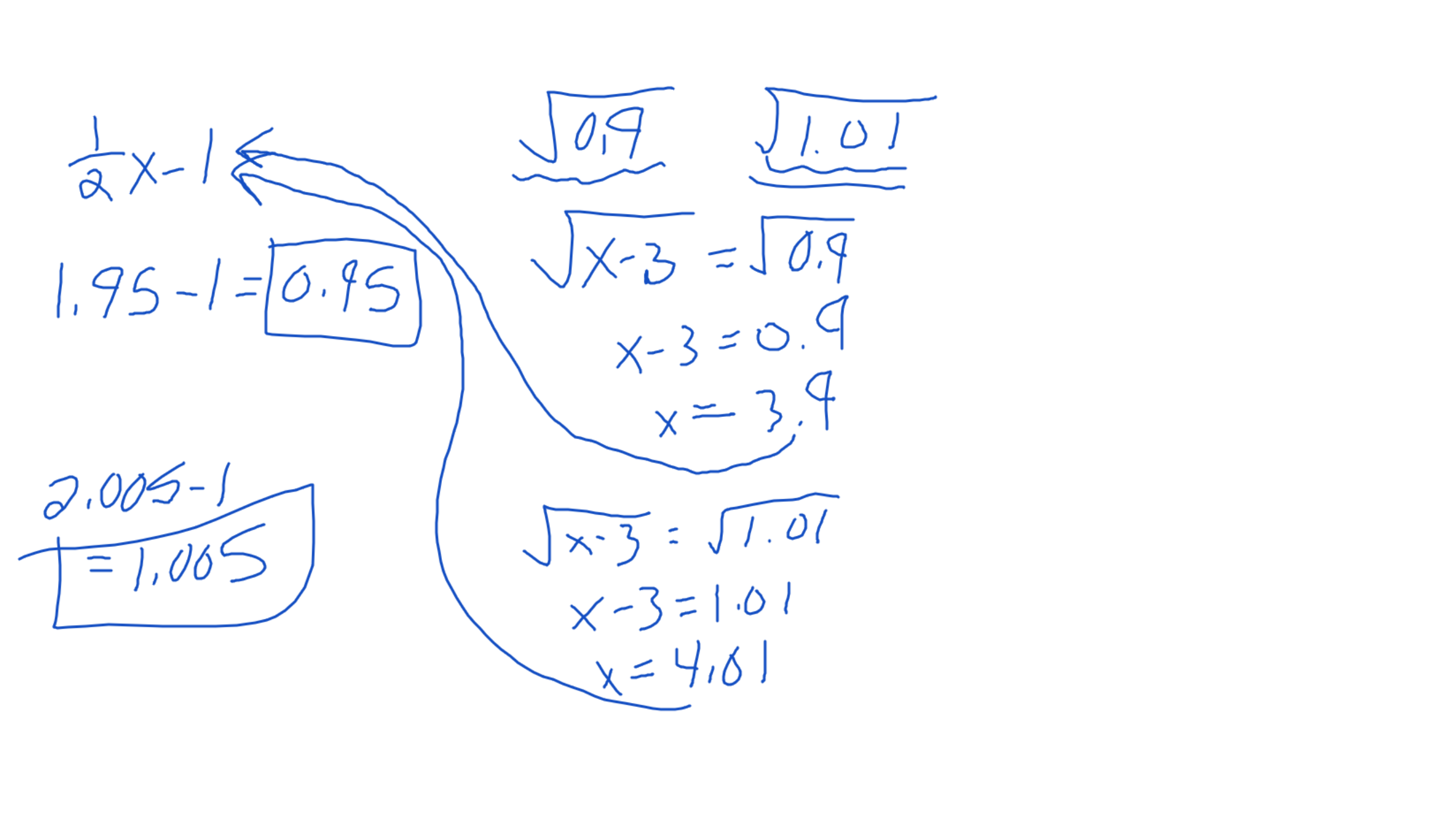
$$L(x) = f(a) + f'(a)(x-a)$$

$$= 1 + \frac{1}{2}(x-3)^{-1/2}(x-a)$$

$$= 1 + \frac{1}{2\sqrt{x-3}}(x-4) \qquad \text{(4 under } x-3\text{)}$$

$$= 1 + \frac{1}{2}(x-4)$$

$$= 1 + \frac{1}{2}x - 2 = \frac{1}{2}x - 1$$


$\frac{1}{2}x-1$
$\sqrt{0.9}$
$\sqrt{1.01}$
$1.95-1=0.95$
$\sqrt{x-3}=\sqrt{0.9}$
$x-3=0.9$
$x=3.9$
$2.005-1$
$=1.005$
$\sqrt{x-3}=\sqrt{1.01}$
$x-3=1.01$
$x=4.01$

$e^{\sin(x)} = f(x)$ $dy, \Delta y$ $x \to 0 \to 2\pi$

$a$ $b$

$\Delta y = f(b) - f(a) = f(2\pi) - f(0)$

$e^0 - e^0 = 0 = \Delta y$

$dy = f'(a)(b-a)$

$f'(x) = e^{\sin(x)} \cdot \cos(x) = 1 \cdot 1 = 1 = f'(a)$

$dy = 1(2\pi - 0) = dy = 2\pi$ —