Math 141
Quiz 4
Rock-tober 2, 2015

name Heidi Claire

**Find the indefinite integral**

$$\int \frac{1}{x^2\sqrt{4-x^2}}\,dx = \int \frac{2\cos\theta\, d\theta}{(2\sin\theta)^2(2\cos\theta)}$$

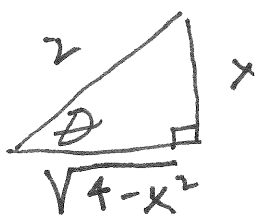
$x = 2\sin\theta$

$dx = 2\cos\theta\, d\theta$

$\sqrt{4-x^2} = 2\cos\theta$

$$= \frac{1}{4}\int \frac{1}{\sin^2\theta}\, d\theta$$

$$= \frac{1}{4}\int \csc^2\theta\, d\theta$$




$$= -\frac{1}{4}\cot\theta + C \rightarrow -\frac{1}{4}\left(\frac{\sqrt{4-x^2}}{x}\right) + C$$

---

$$\int \frac{1}{\sqrt{4+x^2}}\,dx = \int \frac{2\sec^2\theta\, d\theta}{2\sec\theta}$$

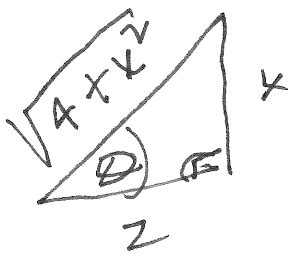
$x = 2\tan\theta$

$dx = 2\sec^2\theta\, d\theta$

$\sqrt{4+x^2} = 2\sec\theta$

$$= \int \sec\theta\, d\theta$$

$$= \ln|\sec\theta + \tan\theta| + C$$




$$= \ln\left|\frac{\sqrt{4+x^2}}{2} + \frac{x}{2}\right| + C$$