

Math 132 Quiz  
8 AM - 9 AM

1. Calculate

$$\frac{3x-12}{(x-2)(x+1)} = \frac{A}{x-2} + \frac{B}{x+1}$$

$$3x-12 = A(x+1) + B(x-2)$$

$$x=-1 \Rightarrow -15 = -3B \\ 5 = B$$

$$x=2 \Rightarrow -6 = 3A \\ -2 = A$$

$$\int \frac{3x-12}{x^2-x-2} dx.$$

$$= \int \frac{5}{x+1} - \frac{2}{x-2} dx$$

$$= 5 \ln|x+1| - 2 \ln|x-2| + C$$

2. Using a trigonometric substitution, calculate

$$\int \frac{x}{(4-x^2)^{3/2}} dx.$$

$$x = 2 \sin \theta$$

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

$$= \int \frac{2 \sin \theta}{(4 - 4 \sin^2 \theta)^{3/2}} \cdot 2 \cos \theta d\theta$$

$$= \int \frac{4 \sin \theta \cos \theta}{(4 \cos^2 \theta)^{3/2}} d\theta$$

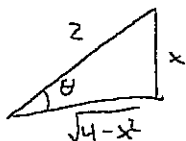
$$= \int \frac{4 \sin \theta \cos \theta}{8 \cos^3 \theta} d\theta$$

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

$$= \frac{1}{2} \int \tan \theta \sec \theta d\theta$$

$$= \frac{1}{2} \sec \theta + C$$

$$= \frac{1}{2} \cdot \frac{2}{\sqrt{4-x^2}} + C = \frac{1}{\sqrt{4-x^2}} + C$$



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