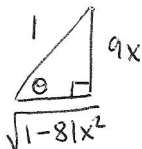


Name: Key
 September 16, 2014
 MAC 2312.5885
 Cyr

Quiz 2

You must show all work to receive full credit!!

Problem 1. (2.5 pts) Evaluate $\int \sqrt{1-81x^2} dx$.

$$\begin{aligned}
 9x &= \sin \theta \\
 9dx &= \cos \theta d\theta \\
 \sqrt{1-(9x)^2} &= \cos \theta
 \end{aligned}$$


$$\begin{aligned}
 &= \int (\cos \theta) \left(\frac{1}{9} \cos \theta d\theta \right) \\
 &= \frac{1}{9} \int \cos^2 \theta d\theta = \frac{1}{18} \int (1 + \cos 2\theta) d\theta \\
 &= \frac{1}{18} [\theta + \sin \theta \cos \theta] \\
 &= \frac{1}{18} \sin^{-1}(9x) + \frac{9x\sqrt{1-81x^2}}{18} + C \\
 &= \boxed{\frac{1}{18} \sin^{-1}(9x) + \frac{1}{2} x \sqrt{1-81x^2} + C}
 \end{aligned}$$

Problem 2. (2.5 pts) Evaluate $\int \frac{2x^2 - 11x + 19}{(2x+1)(x-2)^2} dx$.

$$\frac{2x^2 - 11x + 19}{(2x+1)(x-2)^2} = \frac{A}{2x+1} + \frac{B}{x-2} + \frac{C}{(x-2)^2} \quad A=4, C=1$$

$$2x^2 - 11x + 19 = 4(x^2 - 4x + 4) + B(2x^2 - 3x - 2) + (2x + 1)$$

$$2x^2 - 11x + 19 = (4+2B)x^2 + (-16-3B+2)x + 16-2B+1 \Rightarrow B = -1$$

$$4 \int \frac{dx}{2x+1} - \int \frac{dx}{x-2} + \int \frac{dx}{(x-2)^2} = \boxed{2 \ln|2x+1| - \ln|x-2| - \frac{1}{x-2} + C}$$

$$\begin{aligned}
 u &= 2x+1 \\
 du &= 2dx
 \end{aligned}$$

$$\begin{aligned}
 u &= x-2 \\
 du &= dx
 \end{aligned}$$