

Name: Key

11:00-11:55 (325)

3:30-4:20 (333)

Math211-2, Fall 2007

Quiz #6: 10-30-07

No Calculators. There are three problems.

1. (3 Points) Find the indefinite integral $\int \frac{2x}{\sqrt{2x+1}} dx$.

$$u = 2x+1 \Leftrightarrow u-1 = 2x$$

$$du = 2dx$$

$$\frac{du}{2} = dx$$

$$\int \frac{2x}{\sqrt{2x+1}} dx = \int \frac{u-1}{\sqrt{u}} \frac{du}{2} = \int \frac{u}{\sqrt{u}} - \frac{1}{\sqrt{u}} \frac{du}{2}$$

$$= \frac{1}{2} \int \sqrt{u} - u^{-1/2} du = \frac{1}{2} \int u^{1/2} - u^{-1/2} du$$

$$= \frac{1}{2} \frac{u^{3/2}}{3/2} - \frac{u^{1/2}}{1/2} + C$$

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

2. (4 Points total)

a. (1 Point) What is the integration by parts formula? $\int u dv = uv - \int v du$.b. (3 Points) Find the integral $\int t \ln t dt$. = I

Take $u = \ln t$ $dv = t dt$

$$du = \frac{1}{t} dt$$

$$v = \frac{1}{2} t^2$$

$$I = \frac{1}{2} t^2 \ln t - \int \frac{1}{2} t^2 \frac{1}{t} dt = \frac{1}{2} t^2 \ln t - \frac{1}{2} \int t dt$$

$$= \frac{1}{2} t^2 \ln t - \frac{1}{2} \frac{t^2}{2} + C$$

$$= \boxed{\frac{t^2 \ln t}{2} - \frac{1}{4} t^2 + C}$$