

MATH 6 - QUIZ 3
17 FEBRUARY 2012

Name: SOLUTIONS.

NO CALCULATORS

1. Compute the following definite integral.

$$\int_0^2 x^2 \sqrt{x^3+1} dx$$

Set $u = x^3+1$. Then $du = 3x^2 dx$ and $\frac{1}{3} du = x^2 dx$.

If $x=0$, $u=1$ and if $x=2$, $u=9$.

Substitute:

$$\begin{aligned} \int_1^9 \frac{1}{3} \sqrt{u} du &= \frac{1}{3} \frac{u^{3/2}}{3/2} \bigg|_1^9 = \frac{2}{9} (9^{3/2} - 1^{3/2}) = \frac{2}{9} \cdot (27-1) \\ &= \frac{2}{9} (26) = \boxed{\frac{52}{9}} \end{aligned}$$

2. Compute the following indefinite integral.

$$\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$$

Set $u = \sqrt{x}$. Then $du = \frac{1}{2} x^{-1/2} dx = \frac{1}{2\sqrt{x}} dx$.

and $2 du = \frac{1}{\sqrt{x}} dx$.

Substitute:

$$2 \int e^u du = 2e^u + C = \boxed{2e^{\sqrt{x}} + C}$$