

Math 220 – Business Calculus
Spring 2013 Quiz 6
Indefinite Integrals

Answer Key

1. Integrate using power rule

$$\int \sqrt{x} \left(x^2 + \frac{1}{x^4} \right) dx = \int \left(x^{\frac{5}{2}} + x^{-\frac{7}{2}} \right) dx = \frac{x^{\frac{7}{2}}}{\frac{7}{2}} + \frac{x^{-\frac{5}{2}}}{-\frac{5}{2}} + C$$

2. Integrate using substitution

$$\int \frac{3w^2 + 1}{(4w^3 + 4w - 2)} dw = \int \frac{3w^2 + 1}{u} \cdot \frac{du}{12w^2 + 4} = \int \frac{1}{4} \cdot \frac{1}{u} du = \frac{1}{4} \ln|u| + C = \frac{1}{4} \ln|4w^3 + 4w - 2| + C$$

3. Integrate using Integration by Parts

$$\int \frac{1}{x^2} \ln(x^5) dx = -\frac{1}{x} \ln(x^5) + \int \frac{5}{x^2} dx = -\frac{1}{x} \ln(x^5) - \frac{5}{x} + C$$

Handwritten notes:
 $v = \frac{x^{-1}}{-1} = -\frac{1}{x}$ $du = \frac{5x^4}{x^5} = \frac{5}{x}$

4. Integrate using any method. Use the boundary condition to eliminate +C.

$$F(x) = \int (2x)(e^{x^2+5}) dx \quad F(0) = 4$$

$$u = x^2 + 5$$

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

$$= \int 2x e^u \frac{du}{2x} = e^u + C = e^{x^2+5} + C$$

$$e^{0^2+5} + C = 4$$

$$F(x) = e^{x^2+5} + 4 - e^5 \quad C = 4 - e^5$$