

MATH 1325

Chapter 13.1: Antiderivatives

IF $f'(x) = g'(x)$, WHAT IS THE RELATIONSHIP BETWEEN $f(x)$ AND $g(x)$?

INDEFINITE INTEGRAL

IF $F'(x) = f(x)$, THEN $\int f(x) dx = F(x) + C$

$$\frac{dy}{dx} = 4x^3$$

$$y =$$

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

$$\frac{dy}{dx} = x^7$$

POWER RULE: FOR $N \neq -1$

$$\int x^N dx = \frac{1}{N+1} x^{N+1} + C$$

FIND EACH INDEFINITE INTEGRAL.

$$\int x^5 dx$$

$$\int \frac{1}{t^2} dt$$

$$\int \sqrt{u} du$$

$$\int dx$$

PROPERTIES OF ANTI-DERIVATIVES:

$$\int k \cdot f(x) dx = k \int f(x) dx$$

CONSTANT

$$\int 4x^7 dx$$

$$\int [f(x) \pm g(x)] dx = \int f(x) dx \pm \int g(x) dx$$

SUM OR DIFFERENCE

$$\int (5x^2 - 6x - 2) dx$$

ANTI-DERIVATIVES OF EXPONENTIAL FUNCTIONS:

$$\int e^x dx = e^x + C$$

$$\int e^{kx} dx = \frac{1}{k} e^{kx} + C$$

$$\int 5e^x dx$$

$$\int e^{6x} dx$$

ANTI-DERIVATIVE OF x^{-1} :

$$\int x^{-1} dx = \int \frac{1}{x} dx = \ln|x| + C \quad x \neq 0$$

$$\int \frac{4}{x} dx$$

$$\int \left(-\frac{5}{x} + e^{-2x}\right) dx$$

THE MARGINAL REVENUE FROM SELLING x UNITS OF A PRODUCT IS GIVEN BY $MR(x) = \frac{40}{e^{.05x}} + 10$.

FIND $R(x)$.

IF THE MARGINAL COST FUNCTION IS $f(x) = \frac{9}{4\sqrt{x}}$ AND 16 UNITS COST \$200, FIND THE COST FUNCTION.