6-2 day 1 Indefinite Integrals and Differenal Equaons

Learning Objecves:

I can find an indefinite integral

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Ex1. Integrate each indefinite integral using integral formulas.

1.) $\int x^5 dx$ $\frac{1}{6}x^6 + C$

2.) $\int \frac{1}{\sqrt[3]{x}} dx = \int x^{-1/3} dx$ $\frac{3}{2}x^{2/3} + C$

3.) $\int e^{-4x} dx$ $-\frac{1}{4}e^{-4x} + C$

4.) $\int \sin(3x) dx$ $-\frac{1}{3}\cos(3x) + C$

5.) $\int \sec^2\left(\frac{x}{3}\right) dx$

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What if you cannot evaluate the integral? $\int e^x \sin^3(2x) dx$

We can write the anderivave as

$$F(x) = \int_0^x e^t \sin^3(2t) dt$$

and look at the graph.

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Ex2. Integrate

1.) $\int (x^2 + 3x + 5) dx$ $\frac{1}{3}x^3 + \frac{3}{2}x^2 + 5x + C$

2.) $\int \left(e^{2x} + \frac{1}{3x}\right) dx$ $\frac{1}{2}e^{2x} + \frac{1}{3}\ln(3x) + C$ $\frac{3}{3x}$

3.) $\int (\cos x + \sin x) dx$ $\sin x - \cos x + C$

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Ex3. Which integral formulas is correct (if either)?

A.) $\int \frac{1}{16 + x^2} dx = \ln(16 + x^2) + C$ No

$\frac{1}{16+x^2} \cdot 2x$

B. $\int \frac{1}{16 + x^2} dx = \frac{1}{4}\tan^{-1}\left(\frac{x}{4}\right) + C$

$\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{1 + \left(\frac{x}{4}\right)^2}$ $\tan^{-1}(x) = \frac{1}{1+x^2}$

$= \frac{1}{16\left(1 + \frac{x^2}{16}\right)}$

$= \frac{1}{16 + x^2}$

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Homework

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