Math 2150 - Homework # 0

Derivatives and integrals

1. Differentiate the following functions with respect to x.

   (a) $\cos(5x)$

   (b) $\sin^2(x)$

   (c) $4xe^{x^2+2}$

   (d) $(x^2+x)^3\tan(2x)$

   (e) $\dfrac{x^3-2x^2}{\sin(x)}$

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2. Compute the following indefinite integrals.

   (a) $\displaystyle\int \cos(10x)\,dx$

   (b) $\displaystyle\int xe^{2x}\,dx$

   (c) $\displaystyle\int x^2\sin(2x)\,dx$

   (d) $\displaystyle\int \sin^2(x)\,dx$

   (e) $\displaystyle\int \frac{\ln(x)}{x}\,dx$

   (f) $\displaystyle\int \frac{1}{x(\ln(x))^2}\,dx$

   (g) $\displaystyle\int \sin(x)\cos(x)\,dx$

   (h) $\displaystyle\int \frac{e^x}{1+e^x}\,dx$

(i) $\displaystyle\int \frac{1}{1+e^x}\,dx$ [Hint: $1 = 1 + e^x - e^x$]

(j) $\displaystyle\int e^{2x}\sin(e^x)\,dx$
