Homework 7

March 11, 2020

1. Differentiate the following functions:
   (a) (1 point) $f(x) = \arctan(x+1)$
   (b) (1 point) $f(x) = \arcsin(\sqrt{x})$
   (c) (1 point) $f(x) = \operatorname{arccsc}(e^x)$
2. Calculate the following integrals:
   (a) (1 point) $\displaystyle\int_0^1 \frac{dx}{1+x^2}$
   (b) (1 point) $\displaystyle\int \frac{dx}{\sqrt{3-4x^2}}$
   (c) (1 point) $\displaystyle\int \frac{e^{-x}}{\sqrt{1-e^{-2x}}}\,dx$
   (d) (1 point) $\displaystyle\int \frac{dx}{x\left[1+(\ln(x))^2\right]}$
3. Calculate the following integrals:
   (a) (1 point) $\displaystyle\int xe^{-x}\,dx$
   (b) (1 point) $\displaystyle\int x^2 2^x\,dx$
   (c) (1 point) $\displaystyle\int \ln(x)\,dx$
   (d) (1 point) $\displaystyle\int x\ln(x^2)\,dx$
   (e) (1 point) $\displaystyle\int x\sqrt{x+1}\,dx$
   (f) (1 point) $\displaystyle\int \frac{x^2}{\sqrt{1-x^2}}dx$
   (g) (1 point) $\displaystyle\int \sqrt{x}\ln(x)$

(h) (2 points) $\int e^{2x} \sin(3x)\, dx$

(i) (2 points) $\int x^4 \sin(x)\, dx$

(j) (2 points) $\int \cos\sqrt{x}\, dx$ *Hint: Use* $u = \sqrt{x}$ *and* $dv = \dfrac{\cos\sqrt{x}}{\sqrt{x}}$