**TEST 2 PRACTICE PROBLEMS**
**CALCULUS II (MATH 152)**
**SPRING 2013**

(1) Evaluate

(a) $\int x\sec^2(x)dx$

(b) $\int x^2\sin(3x)dx$

(c) $\int x^3e^{-x}dx$

(d) $\int \tan^{-1}(5x)dx$

(e) $\int x\ln(x)dx$

(f) $\int \sin^{-1}(x)dx$

(g) $\int \sin(\ln(x))dx$

(h) $\int e^x\sin(x)dx$

(i) $\int x\tan^{-1}(x)dx$

(j) $\int \cos^2(x)\sin^3(x)dx$

(k) $\int \cos(3x)\sin^4(3x)dx$

(l) $\int \cos^5(5x)\sin^7(5x)dx$

(m) $\int \cos^2(4x)\sin^2(4x)dx$

(n) $\int \sec^2(2x)\tan^2(2x)dx$

(o) $\int \sec^2(x)\tan(x)dx$

(p) $\int \sec^4(x)\tan^2(x)dx$

(q) $\int \sec^2(x)\tan^3(x)dx$

(r) $\int \sec(x)\tan^2(x)dx$

(s) $\int \big(\sin(x)+\cos(x)\big)^2dx$

(t) $\int \sqrt{16-x^2}dx$

(u) $\int \dfrac{x^2}{\sqrt{4-x^2}}dx$

(v) $\int \dfrac{1}{\sqrt{x^2+9}}dx$

(w) $\int \dfrac{1}{x^2\sqrt{1+9x^2}}dx$

(x) $\int \dfrac{1}{\sqrt{x^2-9}}dx$

(y) $\int \dfrac{x}{\sqrt{x^2-2x-8}}dx$

(z) $\int \dfrac{\sec(x)\tan(x)}{\sqrt{\sec^2(x)+9}}dx$

(2) (a) Perform long division on the following rational function to find the missing constants:

$$\frac{x^3-1}{x+2} = ax^2+bx+c+\frac{d}{x+2}.$$

(b) Use part (a) to evaluate $\int \dfrac{x^3-1}{x+2}dx$.

(3) Evaluate

(a) $\displaystyle\int \frac{x-1}{x^2+3x+2}dx$

(b) $\displaystyle\int \frac{5x+8}{x^2+6x+8}dx$

(c) $\displaystyle\int \frac{x+1}{x^2-4x+3}dx$

(d) $\displaystyle\int \frac{1}{x^2+1}dx$

(e) $\displaystyle\int \frac{1}{x^2-1}dx$

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

(g) $\displaystyle\int \frac{x^2}{x^2+1}dx$

(4) Write out the FORM of the partial fraction decomposition for the following (DO NOT find the numerical values for the unknown coefficients).

(a) $\dfrac{x^3+x^2+1}{x(x-1)(x+12)(x-12)} =$

(b) $\dfrac{\sqrt{2}x^2+1}{x(2x+1)(3x-1)} =$

(c) $\dfrac{x^3+x^2+1}{x(x-1)(x^2-1)^2} =$

(d) $\dfrac{x^2+10}{x^3(x^2-4)} =$

(e) $\dfrac{4x-1}{(x-4)^2(x+3)(x^2-9)} =$

Nathan Reff, Division of Mathematics, Alfred University, Alfred, NY 14802, U.S.A.
*E-mail address*: reff@alfred.edu