

TEST 2 PRACTICE PROBLEMS
CALCULUS II (MATH 152)
FALL 2013

(1) Evaluate

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

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

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

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

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

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

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

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

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

(y) $\int \frac{x}{\sqrt{x^2 - 1}} dx$

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

(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 $\int \frac{x^3 - 1}{x + 2} dx$.

(3) Evaluate

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(f) $\frac{3x}{(x^2+9)x^2} =$

(g) $\frac{3x}{(x^2+9)^2(x^2-1)} =$