

## Exam 2 Review

1) Compute the following integrals:

a)  $\int x^2 \sin(x^3+2) dx$

b)  $\int \sqrt{3x-1} dx$

c)  $\int_1^{13} \frac{x}{\sqrt{5x-1}} dx$

d)  $\int \frac{1}{x \ln x} dx$

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

f)  $\int \sec^3 x \tan x dx$

g)  $\int_0^{\pi/2} \cos x e^{\sin x} dx$

h)  $\int e^{\sqrt{x}} dx$

i)  $\int x(x-7)^{100} dx$

k)  $\int x \tan(x^2-1) dx$

2) Given  $\int_{-1}^2 f(x) dx = 20$ , find  $\int_0^1 f(2-3x) dx$ .

3) Find the derivative of  $f(x) = \frac{x\sqrt{x^3-1}}{(x^2+1)(x-5)^2}$

4) Find the inverse of  $f(x) = \frac{7x-3}{5x+2}$ .

5) Let  $f(x) = \sqrt{x^3 + x^2 + x + 1}$ . Find  $(f^{-1})'(2)$

6) Approximate  $\ln(3)$  by computing  $R_6$ .

7) Compute a)  $\frac{d}{dx} e^{\cos x}$  b)  $\frac{d}{dx} \left( \frac{1}{1-e^x} \right)$

c)  $\ln(\tan x)$

8) Find the equation of the tangent line to  $y = \ln x$  at  $x=1$ .

9) In a murder investigation, the temperature of the corpse was  $32.5^\circ\text{C}$  at 1:30 PM and  $30.3^\circ\text{C}$  an hour later. Normal body temperature is  $37^\circ\text{C}$  and the temperature of the surroundings was  $20^\circ\text{C}$ . When did the murder take place?

10) A sample of tritium-3 decayed to 94.5% of its original amount after a year.

a) What is the half-life of tritium-3?

b) How long would it take the sample to decay to 20% of its original amount?