

MATH 211 Test 3 Fall '01 NAME:

90 points total: Show your work to receive credit.

1.(10pts) Find the point on the line $y = 3x + 5$ that is closest to the point $(1, 1)$.

2.(40pts) Evaluate the following integrals.

(i) $\int (1 - x)(3 + x^4) dx$

(ii) $\int_0^{\pi/4} \frac{1 + \cos^2 x}{\cos^2 x} dx$

(iii) $\int_{-5}^5 |x^2 - 4| dx$

(iv) $\int \sin 6x dx$

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

(vi) $\int 2x(x^2 + 5)^7 dx$

(vii) $\int \frac{(\ln x)^2}{x} dx$

(viii) $\int_0^1 \frac{\tan^{-1}}{1+x^2} dx$

3.(10pts) Evaluate $\frac{d}{dx} \int_0^{x^2} \sec t dt$.

4.(15pts) Find the area of the region bounded by the given curves:

(i) $x = 1 - y^2$ and $x = y^2 - 1$.

(ii) $y = x^2$ and $y = \frac{2}{x^2+1}$.

5.(15pts) Find the volume of the solid obtained by rotating the region bounded the given curves about the specified line.

(i) $y = \sec x$, $y = 1$, $x = -1$, $x = 1$ about the x -axis.

(ii) $y = x$, $y = x^2$ about $x = 3$.