

## Math 241 Worksheet 14 (two-sided) – for practice only – no recitation on Thanksgiving

Name: \_\_\_\_\_

Section (circle one):     3     4

1. Use the Fundamental Theorem of Calculus to find the following.

(a)  $\int_1^3 x^3 \, dx$

(b)  $\int_1^2 \frac{1}{x^3} \, dx$

(c)  $\int_0^{\pi/2} (\sin(x) + 10) \, dx$

$$(d) \frac{d}{dx} \int_1^x \sqrt{t^2 + 4} \, dt$$

$$(e) \frac{dy}{dx} \text{ where } y = \int_1^{x^2} \sqrt{t^2 + 4} \, dt$$

Hint: You will need the chain rule here. You want  $\frac{d}{dx} g(x^2)$ , where  $g(u) = \int_1^u \sqrt{t \sin(t)} \, dt$ .

By the chain rule,  $\frac{d}{dx} g(x^2) = \dots$ .

$$(f) \frac{dy}{dx} \text{ where } y = \int_{2x}^{x^2} \sqrt{t^2 + 4} \, dt$$