

Name _____

Math 125 Quiz 2 — 30 Minutes 11:50-12:20, Tuesday, Oct. 10, 2017

(3 questions, 40 points, no notes or calculator permitted)

1. (15 points) Using the equality $3 + 5x^2 = 5(1 + x^2) - 2$, find the indefinite integral (anti-derivative) of

$$\int \left(\frac{3 + 5x^2}{1 + x^2} + \cos(5x) + (\sqrt{x} + 3x)^2 \right) dx$$

2. (13 points) Find

$$\frac{d}{dt} \int_{t^2-t}^{t^3-2t^2} f(x) dx$$

at $t = 3$, where your answer should be expressed in the form $af(b) - cf(d)$ where a, b, c, d are numbers.

3. (12 points) American football lasts for one hour of playing time. Suppose that $f(t)$ is a measure of the efficiency of a player at time t sec into the game. This efficiency $f(t)$ is the number of seconds he can play for each calorie of energy burned, at the instant when he has played for exactly t sec. Let

$$A = \int_0^{3600} \frac{dt}{f(t)}.$$

- (a) (5 points) What are the units of A ?
(b) (7 points) What is the practical meaning of A ?

Answers

- $\int \left(5 - \frac{2}{1+x^2} + \cos(5x) + x + 6x^{3/2} + 9x^2 \right) dx =$
 $= 5x - 2\text{Arctan}(x) + \frac{1}{5} \sin(5x) + \frac{1}{2}x^2 + \frac{12}{5}x^{5/2} + 3x^3 + C.$
- $15f(9) - 5f(6).$
- (a) calories, (b) the total number of calories the player burns during the game