

**Take Home Quiz 5**

Official name (printed):

1. Find the antiderivative  $F(x)$  of  $f(x)$  that meets the given condition.

$$f(x) = 5x^{2/3} - \frac{1}{\sqrt{x}} + 4, \quad F(1) = 7$$

2. An object moves in a straight line. The acceleration at time  $t$  seconds is  $a(t) = 12t^2 - 6$ . The initial position is  $s(0) = 8$  and the position at 1 second is  $s(1) = 12$ . Find  $s(t)$ .

3. Use the Fundamental Theorem of Calculus to find

$$\frac{d}{dx} \left( \int_0^{3x} \frac{e^{t^2}}{\cos(t) + 1} dt \right)$$

Evaluate each integral using substitution.

a)  $\int_0^4 x\sqrt{9+x^2} dx$

b)  $\int_0^2 \frac{5x}{x^2+4} dx$

c)  $\int_1^{e^3} \frac{\ln(x)}{x} dx$