Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Midterm 2, Phys 30, March 21, 2008

Free Response
Each problem is worth 10 pts
Useful identities:

$\sin^2(x) + \cos^2(x) = 1$

$\sec^2(x) = \tan^2(x) + 1$

1. Evaluate the integral.

$$\int_0^{\pi/2} \sin^3\theta \cos^2\theta \, d\theta$$

2. Evaluate the integral.

$$\int \frac{x-1}{x^2+2x}\, dx$$

3. Evaluate the integral.

$$\int_0^{100} \sqrt{t}\, \ln t \, dt$$

4. Evaluate the integral using the given substituion. Answer must be in terms of x.

$$\int \frac{x^3}{\sqrt{x^2+25}}\, dx \; ; x = 5\tan\theta$$

5. Find the length of arc of the curve x = 0 to x = 8/9

$y = 2x^{3/2} - 1$

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Answer Section

FREE RESPONSE

1. ANS:
   2/15

   PTS: 10
2. ANS:
   $\frac{3}{2}\ln(x+2)-\frac{1}{2}\ln x+c$

   PTS: 10
3. ANS:
   $\frac{4000}{3}\ln 2+\frac{4000}{3}\ln 5-\frac{4000}{9}$

   PTS: 10
4. ANS:
   $\frac{1}{3}(x^2-50)\sqrt{x^2+25}+C$

   PTS: 10
5. ANS:
   $\frac{52}{27}$

   PTS: 10