

Math 125 D Winter 2012  
Mid-Term Exam Number One  
January 26, 2012  
Answers

There were two versions of the exam.

### Version A

In version A, the integrand in problem 1(a) had  $x^2$  in the denominator.

1. (a)  $\frac{1}{3}x^3 - \frac{1}{2}\cos x^2 + C$  (b)  $\frac{1}{6}x^6 + x^4 + \frac{3}{2}x^2 + C$  (c)  $\frac{1}{70}(2x^7 + 5)^{5/2} - \frac{10}{84}(2x^7 + 5)^{3/2} + C$

2. (a) 142.75 (b)  $\frac{3}{2}(\ln 10 - \ln 16)$  (c)  $\frac{5}{2}\ln 2 + \frac{\pi}{2}$

3.  $g'(x) = e^x \ln(1 + e^{2x}) + 2x \ln(1 + x^4)$

4.  $\frac{256}{3}$

5. The rock hit the surface with a velocity of -14.91798 m/s.

6. (a) Several answers are possible. One is

$$\int_0^{a^2} \left( \frac{y - a^2}{2a} + a - \sqrt{y} \right) dy$$

(b)  $a = 1200^{1/3} = 10.626585\dots$

### Version B

In version B, the integrand in problem 1(a) had  $x^3$  in the denominator.

1. (a)  $x + \frac{1}{3}\sin x^3 + C$  (b)  $\frac{1}{6}x^6 - x^4 - \frac{5}{2}x^2 + C$  (c)  $\frac{1}{320}(4t^8 + 3)^{5/2} - \frac{1}{64}(4t^8 + 3)^{3/2} + C$

2. (a) 3596.25 (b)  $\frac{5}{3}(\ln 7 - \ln 16)$  (c)  $2\ln 2 + \frac{3}{2}\pi$

3.  $g'(x) = e^x \ln(1 + e^{2x}) + 2x \ln(1 + x^4)$

4. 36

5. The rock hit the surface with a velocity of -16.35105 m/s.

6. (a) Several answers are possible. One is

$$\int_0^{a^2} \left( \frac{y - a^2}{2a} + a - \sqrt{y} \right) dy$$

(b)  $a = 3852^{1/3} = 15.67576\dots$