

## Answer Key

### Math 1271 Fall 2005 Final Exam

#### Multiple Choice Problems

1. A
2. C
3. B
4. C
5. D
6. E
7. E
8. E
9. C
10. B
11. A
12. E
13. D
14. A
15. D

#### Written Answer Problems

16.  $3x^2$  [see solution set for proof]
17.  $1/2$
18.  $17/3$
19.  $y = x$
20.  $126\pi^2$
21.
  - i) local (and absolute) maximum:  $(\frac{1}{2}, \frac{1}{2}e^{-1/2})$ ,  
local (and absolute) minimum:  $(-\frac{1}{2}, -\frac{1}{2}e^{-1/2})$ ;  
interval of increase:  $(-\frac{1}{2}, \frac{1}{2})$ ,  
intervals of decrease:  $(-\infty, -\frac{1}{2})$ ,  $(\frac{1}{2}, \infty)$
  - ii) points of inflection:  $(-\frac{1}{2}\sqrt{3}, -\frac{1}{2}\sqrt{3} \cdot e^{-3/2})$ ,  
 $(0, 0)$ ,  $(\frac{1}{2}\sqrt{3}, \frac{1}{2}\sqrt{3} \cdot e^{-3/2})$ ;  
intervals of upward concavity:  
 $(-\frac{1}{2}\sqrt{3}, 0)$ ,  $(\frac{1}{2}\sqrt{3}, \infty)$ ,  
intervals of downward concavity:  
 $(-\infty, -\frac{1}{2}\sqrt{3})$ ,  $(0, \frac{1}{2}\sqrt{3})$
  - iii) limit at positive and negative infinity  
(horizontal asymptote):  $y = 0$
  - iv)  $f(x) > 0$  for  $x > 0$ ,  $f(x) < 0$  for  $x < 0$
  - v) graph of function is shown below

graph for #21(v):

