MATH 1571 | Calculus I: Exam 3

NAME | 4/9/2009,

I.

1. For $f(x) = x^2 + 1$ on $[0\ , 2]$,

   divide the interval into 4 equal subintervals and approximate the integral by a sum.

2. Find the exact answer to question 1.

3. Given that $f'(x) = x^3 + 3x^2 + 1$ and that $f(1) = 3$. Find $f(x)$.

II. Integrate each of the following:

4. $\int \frac{2\ dx}{x^3}$ is:

5. $\int (4x^2 + x - 2)^2(8x + 1)\ dx$

6. $\int \frac{x^3 + 6}{x^2}\ dx$.

   Hint: divide out.

7. $\int_1^2 x^{\frac{4}{3}}\ dx$

8. $\int \frac{2x\ dx}{(x^2 + 4)^2}$

9. $\int_1^2 x^2\sqrt{x^3 - 1}\ dx$

10. $\int \sec(x)\tan(x)\ dx$

11. $\int \sin(x)\cos^4(x)\,dx$

12. $\int_0^1 \dfrac{3x}{\sqrt{(x^2+1)}}\ dx$

13. $D_x \int_0^x \sqrt{t^4+1}dt$

III.

14. Find the area bounded by the $x-axis$, $y = x^2+2$, $y-axis$ and $x = 1$.

15. The area of the region bounded by the graphs of $y = x+1,\ x = 0$, to the right of the y-axis. and $y = 2$.

16. Find the area bounded by the curves $y = x$ and $y = x^3$ and to the right of the y-axis.

17. A ball is thrown vertically into the air from a height of 16 feet above the ground and with an initial velocity of 32 ft/sec.

    (a) Find the Maximum height attained.

    (b) Find the speed upon impact.