I.

1. For $f(x) = \sin(x)$ on $[0\ , \pi]$,

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

2. Find the exact answer to question 1.

3. Given that $f'(x) = x^2 + x + 1$ and that $f(0) = 3$. Find $f(x)$.

II. Integrate each of the following:

4. $\int \frac{2\ dx}{(x)^5}$ is:

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

6. $\int \frac{x^4 + 6}{x^2}\ dx$.
   Hint: divide out.

7. $\int_1^6 \sqrt{x}\ dx$

8. $\int \frac{dx}{(x+4)^3}$

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

10. $\int_0^{\frac{1}{4}} \sec^2(\pi x)\,dx$

11. $\int \sin^3(x)\cos(x)\,dx$

12. $\int_0^1 \frac{3x}{\sqrt{(6x^2+1)}}\,dx$

13. $D_x \int_0^x \sqrt{t^3+1}dt$

III.

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

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

16. Find the area bounded by the curves $y=x$ and $y=x^2-2$ 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. Find the speed upon impact.