Math_106_Home Work_no_01

1. Evaluate $\int x\sqrt{x+1}dx$.
2. Evaluate $\int x^2\sqrt[3]{8-5x^3}dx$.
3. Evaluate $\int \frac{1}{\sqrt{x}\cos^2(\sqrt{x})}dx$.
4. Calculate $\lim_{n\to\infty}\frac{1}{n^3}\sum_{k=1}^{n}(k-1)(k+2)$.
5. If $\sum_{k=5}^{15}(k^2-2\alpha k)=130$, then find the value of α.
6. Evaluate the integral $\int_0^2 |x-1|\,dx$.
7. If $F(x)=x\int_{\sqrt{\pi}}^{x}\cos(t^2)\,dt$, then find $F'(\sqrt{\pi})$.
8. If $\int_3^x g(t)dt=\frac{x}{x+1}$, then find $g(1)$.
9. Find the value of c that satisfies the conclusion of the Mean value Theorem for $f(x)=\sqrt{x+1}$ on $[0,9]$.
10. Find the value of c that satisfies the conclusion of the Mean value Theorem for $f(x)=e^x$ on $[0,2]$.
11. Approximate the integral $\int_0^2 \frac{x}{\sqrt{x+1}}dx$ using the **Simpson's rule** $n=4$.
12. If $y=(\cos x)^{x^2}e^{2x}$, then find y'.
13. If $\ln(x^2)=\ln(4x-4)$, then find the value of x.
14. Evaluate $\int 3^x 2^{3^x}dx$.
15. If $F(x)=\sinh^{-1}(\tan x)$, then find $F'(x)$.

16. Evaluate the integral $\int \frac{\cosh x}{5+4\sinh^2(x)}dx$.

17. Evaluate the integral $\int \frac{\sinh\left(\sqrt{x}\right)}{\sqrt{x}}dx$.

18. Find $\int \frac{\sqrt{x}}{\sqrt{1+4x^3}}dx$.

19. Evaluate the integral $\int \frac{e^{\cos^{-1}(x)}}{\sqrt{1-x^2}}dx$.

20. Evaluate the integral $\int \frac{1}{x\sqrt{x^7-4}}dx$.

21. Evaluate the integral $\int \frac{1}{\sqrt{4x^2-9}}dx$.

22. Evaluate the integral $\int \frac{1}{\sqrt{4-e^{-4x}}}dx$.