Date Planned : __ / __ / __	Daily Tutorial Sheet - 5	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level - 1	Exact Duration :________

61. $\int \frac{\log(x+1)-\log x}{x(x+1)}dx$ is equal to:

(A) $-\frac{1}{2}\left[\log\left(\frac{x+1}{x}\right)\right]^2+C$ **(B)** $C-\left[\{\log(x+1)\}^2-(\log x)^2\right]$

(C) $-\log\left[\log\left(\frac{x+1}{x}\right)\right]+C$ **(D)** $-\log\left(\frac{x+1}{x}\right)+C$

62. If $\int \frac{dx}{5+4\sin x}=A\tan^{-1}\left(B\tan\frac{x}{2}+\frac{4}{3}\right)+C$, then:

(A) $A=\frac{2}{3}, B=\frac{5}{3}$ **(B)** $A=\frac{1}{3}, B=\frac{5}{3}$ **(C)** $A=\frac{2}{3}, B=\frac{2}{3}$ **(D)** $A=\frac{1}{3}, B=\frac{2}{3}$

63. If $\int \frac{xe^x}{\sqrt{1+e^x}}dx = f(x)\sqrt{1+e^x}-2\log g(x)+C$, then:

(A) $f(x)=x-2,\ g(x)=\frac{\sqrt{1+e^x}-1}{\sqrt{1+e^x}+1}$ **(B)** $f(x)=2(x-2),\ g(x)=\frac{\sqrt{1+e^x}-1}{\sqrt{1+e^x}+1}$

(C) $f(x)=x-2, g(x)=\frac{\sqrt{1+e^x}+1}{\sqrt{1+e^x}-1}$ **(D)** $f(x)=2(x-2),\ g(x)=\frac{\sqrt{1+e^x}+1}{\sqrt{1+e^x}-1}$

64. If $\int \frac{dx}{5+4\cos x}=k\tan^{-1}\left(m\tan\frac{x}{2}\right)+C$ then:

(A) $k=\frac{1}{3}, m=\frac{1}{3}$ **(B)** $k=\frac{1}{3}, m=\frac{2}{3}$ **(C)** $k=\frac{2}{3}, m=\frac{1}{3}$ **(D)** $k=\frac{2}{3}, m=\frac{2}{3}$

65. $\int \frac{1}{(x+5)\sqrt{x+4}}dx$ is:

(A) $\tan^{-1}\sqrt{x+4}+C$ **(B)** $2\tan^{-1}\sqrt{x+4}+C$

(C) $-\tan^{-1}\sqrt{x+4}+C$ **(D)** $-2\tan^{-1}\sqrt{x+4}+C$

66. $\int\left[e^x\sec x+e^x\ .\log(\sec x+\tan x)\right]dx$ is:

(A) $-e^x\log(\sec x+\tan x)+C$ **(B)** $e^x\log(\sec x-\tan x)+C$

(C) $e^x\sec x+C$ **(D)** $-e^x\log(\sec x-\tan x)+C$

67. $\int \frac{(2x^2+3)dx}{(x^2-1)(x^2+4)}=k\log\left(\frac{x+1}{x-1}\right)+k\left(\tan^{-1}\left(\frac{x}{2}\right)\right)$, then k equals:

(A) $log\ 2$ **(B)** 1/2 **(C)** 1/3 **(D)** $\frac{1}{\log 2}$

68. If $\int \frac{1}{x}\log_{ex}e\ .\log_{e^2x}e\,dx=\log\left(\frac{1+f(x)}{2+f(x)}\right)+C$ then $\lim_{x\to 0}\frac{f(1+x)}{x}$ equals:

(A) 0 **(B)** 1 **(C)** e **(D)** $1/e$

69. If $\int e^{x}\left(\tan x-\log\cos x\right)dx = f\left(x\right)\log\sec x+c$, then range of $f(x)$ is:

(A) R **(B)** $R-\{0\}$ **(C)** R^{+} **(D)** None

70. If $\int \frac{1}{\left(\sin x+4\right)\left(\sin x-1\right)}\,dx = A\frac{1}{\tan\frac{x}{2}-1}+B\tan^{-1}\left(f\left(x\right)\right)+C$, then:

(A) $A=\frac{1}{5},\ B=\frac{-2}{5\sqrt{15}},\ f\left(x\right)=\frac{4\tan x+3}{\sqrt{15}}$ **(B)** $A=-\frac{1}{5},\ B=\frac{1}{\sqrt{15}},\ f\left(x\right)=\frac{4\tan\left(\frac{x}{2}\right)+1}{\sqrt{15}}$

(C) $A=\frac{2}{5},\ B=\frac{-2}{5},\ f\left(x\right)=\frac{4\tan x+1}{5}$ **(D)** $A=\frac{2}{5},\ B=\frac{-2}{5\sqrt{15}},\ f\left(x\right)=\frac{4\tan\frac{x}{2}+1}{\sqrt{15}}$

71. $\int\left[f\left(x\right)g''\left(x\right)-f''\left(x\right)g\left(x\right)\right]dx$ is equal to:

(A) $\frac{f(x)}{g'(x)}$ **(B)** $f'\left(x\right)g\left(x\right)-f\left(x\right)g'\left(x\right)$

(C) $f\left(x\right)g'\left(x\right)-f'\left(x\right)g\left(x\right)$ **(D)** $f\left(x\right)g'\left(x\right)+f'\left(x\right)g\left(x\right)$

72. If $\int\frac{\sin^2 x}{1+\sin^2 x}dx = x-k\tan^{-1}\left(M\tan x\right)+C$, then:

(A) $M=\frac{1}{\sqrt{2}}$ **(B)** $K=\frac{1}{\sqrt{2}}$ **(C)** $M=\frac{-1}{\sqrt{2}}$ **(D)** $K=\frac{-1}{\sqrt{2}}$

***73.** If $\int\frac{1}{\left(x^2+1\right)\left(x^2+4\right)}\,dx = A\tan^{-1}x+B\tan^{-1}\frac{x}{2}+C$, then:

(A) $A=\frac{1}{3}$ **(B)** $B=\frac{2}{3}$ **(C)** $A=-\frac{1}{3}$ **(D)** $B=-\frac{1}{6}$

74. If $f\left(x\right)=\frac{1}{\cos^2 x\sqrt{1+\tan x}}$, then its anti-derivative $F(x)$ satisfying $F(0) = 4$ is:

(A) $\sqrt{1+\tan x}+4$ **(B)** $\frac{2}{3}\left(1+\tan x\right)^{3/2}$ **(C)** $2\left(\sqrt{1+\tan x}+1\right)$ **(D)** None of these

75. If $f\left(x\right)=\frac{1}{4-3\cos^2 x+5\sin^2 x}$ and its anti-derivative $F\left(x\right)=\frac{1}{3}\tan^{-1}\left(g\left(x\right)\right)+C$ then $g(x)$ =

(A) $3\tan x$ **(B)** $\sqrt{2}\tan x$ **(C)** $2\tan x$ **(D)** None of these

76. The value of $\int\frac{dx}{x^4+5x^2+4}$ is:

(A) $\frac{1}{3}\tan^{-1}x-\frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right)+C$ **(B)** $3\tan^{-1}\left(\frac{x}{3}\right)+2\tan^{-1}\left(\frac{x}{2}\right)+C$

(C) $\frac{1}{3}\tan^{-1}x+\frac{1}{6}\tan^{-1}\left(\frac{x}{2}\right)+C$ **(D)** $\frac{1}{3}\tan^{-1}x-\frac{1}{6}\tan^{-1}\left(\frac{x}{2}\right)+C$