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**MULTIPLE CHOICE QUESTIONS**

(From Past Papers 2006-2011)

(Lahore + Gujranwala Board)

- (1)  $\int e^x \left( \tan^{-1} x + \frac{1}{1+x^2} \right) dx =$  (GRW 2006)  
(a)  $e^x \tan^{-1} x + c$  (b)  $e^x \tan^{-1} x + c$   
(c)  $e^x \frac{1}{1+x^2} + c$  (d) none
- (2) To evaluate  $\int \frac{1}{a^2 + x^2} dx$  we put (GRW 2006)  
(a)  $x = a \cos \theta$  (b)  $x = a \sin \theta$   
(c)  $x = a \tan \theta$  (d)  $x = \tan \theta$
- (3)  $\int e^{nx} dx =$  (LHR 2006)  
(a)  $e^{nx+1} + c$  (b)  $\ln e^{nx}$   
(c)  $\frac{e^{nx}}{n} + c$  (d)  $e^{nx} + c$
- (4)  $\int \frac{dx}{\sqrt{a^2 - x^2}} =$  (LHR 2006)  
(a)  $\sin^{-1} \left( \frac{x}{a} \right) + c$  (b)  $\sin^{-1} \left( \frac{a}{x} \right) + c$   
(c)  $\cos^{-1} \left( \frac{x}{a} \right) + c$  (d) both a and b
- (5)  $\int \cos 2x dx =$  (LHR 2006)  
(a)  $-2 \sin 2x + c$  (b)  $2 \sin 2x + c$   
(c)  $-\frac{1}{2} \sin 2x + c$  (d)  $\frac{1}{2} \sin 2x + c$
- (6)  $\int (e^x + 1) dx =$  (GRW 2007)  
(a)  $e^x$  (b)  $e^x + x + c$   
(c)  $e^x + x^2 + c$  (d)  $e^x + x^3 + c$
- (7)  $\int_0^2 2x dx$  (GRW 2007)  
(a) a (b) 7  
(c) 4 (d) 0
- (8)  $\int \ln x dx =$  (GRW 2007)  
(a)  $x \ln x - x + c$  (b)  $x - x \ln x$   
(c)  $x \log_a x + x + c$  (d)  $\frac{1}{x} \ln x + c$





### Unit 3

### Integration

- (9)  $\int_{-1}^3 x^3 dx =$   
(a) 20  
(c) 28  
(b) 80  
(d) 18  
(GRW 2007)
- (10)  $\int x^{-1} dx =$   
(a) 0  
(c)  $\frac{x^{-2}}{0}$   
(b)  $-x - 2$   
(d)  $\ln x + c$   
(LHR 2007)
- (11) Differential of  $y$  is denoted by  
(a)  $dy'$   
(c)  $dy$   
(b)  $\frac{dy}{dx}$   
(d)  $dx$   
(LHR 2007)
- (12)  $\int \sin x dx =$   
(a)  $\sin x$   
(c)  $-\cos x + c$   
(b)  $\cos x + c$   
(d)  $-\sin x + c$   
(LHR 2007)
- (13)  $\int \sec 5x \tan 5x dx =$   
(a)  $5 \sec 5x + c$   
(c)  $\frac{\sec 5x}{5} + c$   
(b)  $\frac{1}{5} \sec x + c$   
(d)  $\frac{\tan 5x}{5} + c$   
(LHR 2008)
- (14)  $\int \cos x \left( \frac{\ln \sin x}{\sin x} \right) dx =$   
(a)  $\ln(\sin x)^2 + c$   
(c)  $(\ln \sin x)^2 + c$   
(b)  $\frac{1}{2} \ln(\sin x)^2 + c$   
(d)  $\frac{1}{2} (\ln \sin x)^2 + c$   
(LHR 2008)
- (15)  $\int x e^x dx =$   
(a)  $x e^x + e^x + c$   
(c)  $x e^x - e^x + c$   
(b)  $e^x + x + c$   
(d)  $x e^x + c$   
(LHR 2008)
- (16)  $\int_0^{\frac{1}{\sqrt{3}}} \frac{dx}{1+x^2} =$   
(a)  $\frac{\pi}{2}$   
(c)  $\frac{\pi}{4}$   
(b)  $\frac{\pi}{6}$   
(d)  $\frac{\pi}{3}$   
(LHR 2008)





- (17) The solution of  $\frac{dy}{dx} = -y$  is (LHR 2008)  
(a)  $y = e^x$  (b)  $y = ce^{-x}$   
(c)  $y = e^{-x}$  (d)  $y = ce^x$
- (18)  $\int x^n dx =$  (LHR 2008)  
(a)  $\frac{x^{n+1}}{n+1} + c$  (b)  $\frac{x^{n-1}}{n-1} + c$   
(c)  $x^n + c$  (d)  $x^{n-1} + c$
- (19)  $\int \sec x dx =$  (LHR 2008)  
(a)  $\ln(\sec x + \tan x) + c$  (b)  $\ln(\sec x - \tan x) + c$   
(c)  $\ln(\operatorname{cosec} x + \cot x) + c$  (d)  $\ln(\sin x + \cos x) + c$
- (20)  $\int_0^{\frac{\pi}{6}} \sin x dx =$  (LHR 2008)  
(a)  $1 + \frac{\sqrt{3}}{2}$  (b)  $1 - \frac{\sqrt{3}}{2}$   
(c)  $\frac{1}{2}$  (d)  $-2$
- (21) The solution of differential equation  $\frac{dy}{dx} = \cos x$  is (LHR 2008)  
(a)  $y = \cos x + c$  (b)  $y = \tan x + c$   
(c)  $y = \sin x + c$  (d)  $y = \cot x + c$
- (22) If  $y = f(x)$  then differential of  $y$  i.e  $dy$  is equal to (GRW 2008)  
(a)  $\frac{dy}{dx}$  (b)  $f(x) dx$   
(c)  $f'(x) dx$  (d)  $f'(x)$
- (23)  $\int a^{x^2} x dx =$  (GRW 2008)  
(a)  $\frac{a^{x^2}}{2}$  (b)  $\frac{a^{x^2}}{\ln a} + c$   
(c)  $\frac{a^{x^2}}{2 \ln a} + c$  (d)  $a^{x^2} \ln a + c$
- (24)  $\int_{-\pi}^{\pi} \sin x dx =$  (GRW 2008)  
(a) 2 (b) 4  
(c) 0 (d) 1





- (25) The general solution of  $\frac{dy}{dx} = e^x(y^2 + 1)$  is (GRW 2008)
- (a)  $y = \tan^{-1}(e^x + c)$   
(b)  $y = \tan e^x + c$   
(c)  $y = \tan(e^x + c)$   
(d)  $y = e^x + c$
- (26)  $\int \frac{1+x}{x} dx =$  (GRW 2008)
- (a)  $\ln x + c$   
(b)  $\ln(1+x) + c$   
(c)  $1 + \ln x + c$   
(d)  $x + \ln x + c$
- (27) If  $\int_2^5 f(x) dx = 8$  and  $\int_2^1 f(x) dx = 3$  then  $\int_1^5 f(x) dx = ?$  (GRW 2008)
- (a) 11  
(b) 5  
(c) -5  
(d) 24
- (28) The order of differential equation  $\frac{x^2 d^2 y}{dx^2} - \frac{xdy}{dx} + y = 0$  is (GRW 2008)
- (a) 1  
(b) 2  
(c) 4  
(d) 3
- (29)  $\int f(x) dx = \frac{e^{ax}}{a^2 + b^2} [a \sin bx - b \cos bx] + c$  then  $f(x) =$  (GRW 2008)
- (a)  $e^{ax}(\sin bx - \cos bx)$   
(b)  $e^{ax} \sin bx \cos bx$   
(c)  $e^{ax} \cos bx$   
(d)  $e^{ax} \sin bx$
- (30) If  $y = e^{2x}$  then  $y''$  is: (GRW 2009)
- (a)  $e^{2x}$   
(b)  $4e^{2x}$   
(c)  $e^{2x}$   
(d)  $2e^{2x}$
- (31)  $\int x e^x dx$  is equal to: (GRW 2009)
- (a)  $xe^x + e^x + c$   
(b)  $e^x + x + c$   
(c)  $xe^x - e^x + c$   
(d)  $xe^x + e$
- (32)  $-\int \frac{e^{\cot^{-1} x}}{1+x^2} dx$  is equal to: (GRW 2009)
- (a)  $e^{\sec x} + c$   
(b)  $e^{\tan x} + e$   
(c)  $e^{\cot^{-1} x} + c$   
(d)  $e^{\tan^{-1} x} + c$
- (33)  $3 \int_{\frac{\pi}{2}}^{\pi} \sin x dx$  is equal to: (GRW 2009)
- (a) 4  
(b) 3  
(c) 2  
(d) 1





(34)  $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$  is equal to:

(GRW 2009)

(a)  $\frac{\pi}{6}$

(b)  $\frac{\pi}{4}$

(c)  $\frac{\pi}{3}$

(d)  $\pi$

(35) Solution of  $\frac{dy}{dx} = \frac{y^2+1}{e^{-x}}$  is:

(GRW 2009)

(a)  $y = \tan(e^x+c)$

(b)  $y = -\tan(e^x+c)$

(c)  $y = \cot(e^x+c)$

(d)  $y = -\cot(e^x+c)$

(36)  $\int \frac{\sec^2 x}{\tan x} dx + \int \frac{\operatorname{cosec}^2 x}{\cot x} dx$

(LHR 2009)

(a)  $\ln|\tan x| + c$

(b)  $\ln|\cot x| + c$

(c)  $2\ln|\cot x| + c$

(d)  $2\ln|\tan x| + c$

(37)  $\int e^{ax+b} dx =$

(LHR 2009)

(a)  $\frac{e^{ax+b}}{b} + c$

(b)  $\frac{e^{ax+b}}{a} + c$

(c)  $e^{ax+b} + c$

(d)  $\frac{e^{ax+b}}{a+b} + c$

(38)  $\int_{-\infty}^{\infty} \frac{dx}{1+x^2} =$

(LHR 2009)

(a)  $\frac{\pi}{6}$

(b)  $\frac{\pi}{4}$

(c)  $\frac{\pi}{3}$

(d)  $\pi$

(39) If  $\int_1^2 (3x^2 + 2x - k) dx = 12$  then  $k =$

(LHR 2009)

(a) -1

(b) 0

(c) 1

(d) -2

(40) Solution of  $\frac{dy}{dx} = \frac{1}{\sqrt{x^2-1}}$  is

(LHR 2009)

(a)  $y = \sinh^{-1} x + c$

(b)  $y = \cosh^{-1} x + c$

(c)  $y = \tanh^{-1} x + c$

(d)  $y = \cos^{-1} x + c$





### Unit 3

### Integration

(41)  $\int \left( \frac{1}{x} - \frac{\sin 2x}{\cos^2 x} \right) dx =$

(a)  $\ln(x \sin x) + c$

(c)  $\ln(e^x \cos^2 x) + c$

(b)  $\ln(x \sin^2 x) + c$

(d)  $\ln(x \cos^2 x) + c$

(LHR 2009)

(42)  $\int \frac{dx}{\sqrt{a^2 + x^2}} =$

(a)  $\tanh^{-1} \frac{x}{a} + c$

(c)  $\sin^{-1} \frac{x}{a} + c$

(b)  $\cosh^{-1} \frac{x}{a} + c$

(d)  $\ln(x + \sqrt{x^2 + a^2}) + c$

(LHR 2009)

(43)  $\int_0^{\frac{1}{\sqrt{2}}} \frac{dx}{\sqrt{1-x^2}} =$

(a)  $\frac{\pi}{6}$

(c)  $\frac{\pi}{3}$

(b)  $\frac{\pi}{4}$

(d)  $\pi$

(LHR 2009)

(44)  $\int_0^1 (4x + k) dx = 4$ , then  $k =$

(a) -1

(c) 1

(b) 0

(d) 2

(LHR 2009)

(45) Solution of  $ydx + xdy = 0$  is

(a)  $xy = c$

(c)  $\ln \frac{x}{y} = c$

(b)  $\ln xy = c$

(d) none

(LHR 2010)

(46) Integral of  $(\sqrt{x} + 1) =$

(a)  $\frac{2}{3}x^{\frac{3}{2}} + c$

(c)  $\frac{3}{2}x^{\frac{2}{3}} + c$

(b)  $\frac{2}{3}x^{\frac{3}{2}} + x + c$

(d)  $\frac{3}{2}x^{\frac{2}{3}} + x + c$

(LHR 2010)

(47) Value of  $\int e^x \left( \frac{1}{x} + \ln x \right) dx$

(a)  $e^x \ln x + c$

(c)  $\ln x + c$

(b)  $e^x + \ln x + c$

(d)  $e^x + c$





(48)  $\int_1^2 3x^2 dx =$

- (a) 1  
(b) 5

- (b) 3  
(d) 7

(LHR 2010)

(49) Area of a region enclosed between the curve  $y = g(x)$  and the x-axis from  $x = a$  to  $b$  is

(a)  $\int_a^b g(x) dx$

(b)  $\int_a^b g'(x) dx$

(c)  $\int_a^b [g(x) + g'(x)] dx$

(d)  $\int_a^b [g(x) + g'(x)] dx$

(LHR 2010)

(50) If  $\int f(x) dx = \frac{e^{ax}}{a^2 + b^2} [a \sin bx - b \cos bx] + c$  then  $f(x)$  is

- (a)  $e^{ax} (\sin bx - \cos bx)$   
(c)  $e^{ax} \cos bx$

- (b)  $e^{ax} \sin bx \cos bx$   
(d)  $e^{ax} \sin bx$

(LHR 2010)

(51)  $3 \int_{\frac{\pi}{2}}^{\pi} \sin x dx =$

- (a) 1  
(c) 2

- (b) 3  
(d) 4

(LHR 2010)

(52) The area between the x-axis and the curve  $y = \sin 2x$  from  $x = 0$  to  $x = \frac{\pi}{3}$  is

(a)  $\frac{3}{4}$

(b)  $\frac{1}{4}$

(c) 0

(d) 1

(LHR 2010)

(53) The solution of differential equation  $y dx = x dy$  is

(a)  $x + y = c$

(b)  $x - y = c$

(c)  $\frac{x}{y} = c$

(d)  $xy = c$

(LHR 2010)

(54)  $\int \frac{1}{ax+b} dx$  equals

(a)  $\frac{\ln(ax+b)}{a} + c$

(b)  $-a(ax+b)^2 + c$

(c)  $-a(ax+b) + c$

(d)  $\frac{a}{(ax+b)^2} + c$

(GRW 2010)

(55) Answer of  $\int x e^x dx$  is

(a)  $x - e^x$

(b)  $e^x (x - 1) + c$

(c)  $x(e^x - 1)$

(d)  $e^x (1 - x) + c$

(GRW 2010)





- (56) Value of  $\int_{-\pi}^{\pi} \sin x \, dx$  is  
(a) 0  
(c)  $\pi$   
(b) 1  
(d)  $2\pi$   
(GRW 2010)
- (57) If integrand involves  $\sqrt{x^2 - a^2}$ , we substitute  
(a)  $x = a \sin \theta$   
(c)  $x = a \tan \theta$   
(b)  $x = a \sec \theta$   
(d)  $x = a \cos \theta$   
(GRW 2010)
- (58) If  $V = x^3$ , then differential of V is  
(a)  $3x^2 \, dx$   
(c)  $x^3 \, dx$   
(b)  $3x^2$   
(d)  $3x^2 \, dx$   
(GRW 2010)
- (59) To integrate  $\sqrt{x^2 - a^2}$ , suitable substitution is  
(a)  $x = a \sin \theta$   
(c)  $x = a \sec \theta$   
(b)  $x = a \tan \theta$   
(d)  $x = a \cos \theta$   
(LHR 2011)
- (60)  $\int a^x \, dx =$   
(a)  $\frac{a^x}{a} \ln a + c$   
(c)  $\frac{1}{a^x} \ln a + c$   
(b)  $\frac{1}{\ln a} a^x + c$   
(d)  $\frac{a^x}{a \ln a} + c$   
(LHR 2011)
- (61) If  $\int_{-2}^1 f(x) \, dx = 5$ ,  $\int_1^3 f(x) \, dx = 3$ , then  $\int_{-2}^3 f(x) \, dx =$   
(a) 8  
(c) 3  
(b) 5  
(d) 1  
(LHR 2011)
- (62) The area between x-axis and the curve  $y = x^2 + 1$  from  $x = 1$  to  $x = 2$  is equal to  
(a)  $\frac{10}{2}$   
(c)  $\frac{10}{4}$   
(b)  $\frac{10}{3}$   
(d)  $\frac{10}{7}$   
(LHR 2011)
- (63)  $\int e^x (\cos x + \sin x) \, dx =$   
(a)  $e^x \cos x + c$   
(c)  $-e^x \sin x + c$   
(b)  $-e^x \cos x + c$   
(d)  $e^x \sin x + c$   
(LHR 2011)
- (64) The differential equation  $\frac{dy}{dx} - x = xy^2$  is of  
(a) Order 2 degree 1  
(c) Order 1 degree 1  
(b) Order 1 degree 2  
(d) Order 2 degree  
(LHR 2011)





(65)  $\int_1^2 3x^2 dx =$

(LHR 2011)

- (a) 7  
(c) 3

- (b) 5  
(d) 1

(66)  $\int e^{ax} [af(x) + f'(x)] dx =$

(LHR 2011)

(a)  $ae^{ax}(x) + c$

(b)  $e^{ax}f(x) + c$

(c)  $e^{ax}f'(x) + c$

(d)  $\frac{e^{ax}f(x)}{a} + c$

(67) The solution of differential equation  $\frac{dy}{dx} = \sinh x$  is

(LHR 2011)

(a)  $y = -\cosh x + c$

(b)  $y = \cosh x + c$

(c)  $y = \operatorname{cosech} x + c$

(d)  $y = \tanh x + c$

(68)  $\int \frac{dx}{a^2 + x^2} =$

(LHR 2011)

(a)  $\frac{1}{a} \tan^{-1} \left( \frac{x}{a} \right) + c$

(b)  $\frac{1}{a} \tan^{-1} \left( \frac{a}{x} \right) + c$

(c)  $\frac{1}{a} \ln \left| \frac{a+x}{a-x} \right| + c$

(d)  $\frac{1}{a} \ln \left| \frac{a-x}{a+x} \right| + c$

(69)  $\int \cot x dx =$

(LHR 2011)

(a)  $\ln |\cos x| + c$

(b)  $-\ln |\cos x| + c$

(c)  $\ln |\sin x| + c$

(d)  $-\ln |\sin x| + c$

(70)  $\int x^n dx =$

(LHR 2011)

(a)  $\frac{x^{n+1}}{2n+1}$

(b)  $\frac{x^{n+1}}{n+1} + c$

(c)  $\frac{x^{n-1}}{n-1}$

(d)  $x^n + c$

(71) Value of  $\int e^x (\sin x + \cos x) dx$  is

(GRW 2011)

(a)  $e^x \sin x + c$

(b)  $e^x \cos x + c$

(c)  $e^x + \sin x + c$

(d)  $e^x + \cos x + c$

(72) Area of the region bounded by the curve  $f(x) = x^2$  and the x-axis from  $x=0$  to  $x=2$  is

(GRW 2011)

(a)  $\frac{8}{3}$

(b)  $\frac{2}{3}$

(c)  $\frac{4}{3}$

(d) 4





(73)  $\int_1^2 5x^4 dx$  is equal to

(a) 11

(c) 31

(b) 21

(d) 41

(GRW 2011)

(74) Integral of  $x\sqrt{x}+1$  is

(a)  $\frac{2}{3}x^{\frac{3}{2}}+c$

(c)  $\frac{2}{5}x^{\frac{5}{2}}+x+c$

(b)  $\frac{2}{5}x^{\frac{5}{2}}+c$

(d)  $x^{\frac{5}{2}}+x+c$

(GRW 2011)

(75) Solution of differential equation  $\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$  is

(a)  $y = \tan^{-1} x + c$

(c)  $y = \cos^{-1} x + c$

(b)  $y = \cos^{-1} x + c$

(d)  $y = \sin^{-1} x + c$

(GRW 2011)

(76)  $\int x^m dx$  where  $m \neq -1$  is equal to

(a)  $mx^{m+1}+c$

(c)  $\frac{x^{m+1}}{m}+c$

(b)  $(m+1)x^{m+1}+c$

(d)  $\frac{x^{m+1}}{m+1}+c$

(GRW 2011)

**MULTIPLE CHOICE QUESTIONS**

(From Past Papers 2008-2011)

(Faisalabad + Sargodha + Rawalpindi Board)

(1) Inverse of  $\int \dots dx$  is

(a)  $\frac{d}{dx}$

(c)  $\frac{d}{dy}$

(b)  $\frac{dy}{dx}$

(d)  $\frac{dx}{dy}$

(FSD 2008)

(2) The suitable substitution for  $\int \sqrt{2ax-x^2} dx$  is

(a)  $x-a=a\cos\theta$

(c)  $x+a=a\sin\theta$

(b)  $x-a=a\sin\theta$

(d)  $a+x=a\tan\theta$

(FSD 2008)

(3)  $\int U \cdot dv$  equals to

(a)  $Vdu - \int VU$

(c)  $UV - \int Vdu$

(b)  $UV + \int Vdv$

(d)  $UV + \int V - dv$

(FSD 2008)





(4)  $\int_0^{-2} \sin x dx$

(FSD 2008)

(a) -2

(b) 0

(c) 2

(d) 1

(5) The general solution of  $\frac{dy}{dx} = \frac{-y}{x}$  is

(FSD 2008)

(a)  $\frac{x}{y} = c$

(b)  $\frac{y}{x} = c$

(c)  $xy = c$

(d)  $x^2 y^2 = c$

(6)  $\int \frac{x+2}{x+1} dx$

(FSD 2008)

(a)  $\ln(x+1)$

(b)  $\ln(x+1) + x$

(c)  $x + \ln(x+1)$

(d) none of these

(7)  $\int \sin^3 x \cos x dx$

(FSD 2008)

(a)  $\frac{\sin^3 x}{3}$

(b)  $\frac{1}{4} \sin^4 x$

(c)  $-\frac{1}{4} \sin^4 x$

(d)  $\sin^4 \frac{x}{4}$

(8)  $\int x e^x dx$

(FSD 2008)

(a)  $x e^x + x$

(b)  $x e^x - e^x$

(c)  $e^x - x$

(d) none of these

(9)  $\int_0^3 \frac{dx}{x^2 + 9}$

(FSD 2008)

(a)  $\frac{x}{4}$

(b)  $\frac{x}{12}$

(c)  $\frac{x}{2}$

(d) None of these

(10) Solution of differential equation  $\frac{dy}{dx} = -y$  is

(FSD 2008)

(a)  $y = c e^{-x}$

(b)  $y = c e^x$

(c)  $xy = c$

(d) none of these





- (11)  $\int \frac{dx}{x \ln x}$  equals:  
(a)  $\ln x + c$   
(c)  $\ln(\ln x) + c$   
(b)  $x + c$   
(d)  $\ln(\ln(\ln x)) + c$   
(FSD 2009)
- (12)  $\int \sec x dx$  equals:  
(a)  $\ln(\sec x + \tan x) + c$   
(c)  $\ln(\sec x - \tan x) + c$   
(b)  $\ln(\operatorname{cosec} x - \cot x) + c$   
(d)  $-\ln(\operatorname{cosec} x - \cot x) + c$   
(FSD 2009)
- (13)  $\int \frac{\cos x dx}{\sin x \cdot \ln \sin x}$  equals:  
(a)  $\ln(\ln(\cos x)) + c$   
(b)  $\ln(\ln(\sin x)) + c$   
(c)  $\ln \sin x + c$   
(d)  $\ln \cos x + c$   
(FSD 2009)
- (14) The solution of differential equation  $\frac{dy}{dx} = \sec^2 x$  is:  
(a)  $y = \cos x + c$   
(c)  $y = \sin x + c$   
(b)  $y = \tan x + c$   
(d)  $y = \cot x + c$   
(FSD 2009)
- (15)  $\int_0^2 2x dx$  equals:  
(a) 9  
(c) 4  
(b) 7  
(d) 0  
(FSD 2009)
- (16) The expression  $\int \frac{1}{\sqrt{x}(\sqrt{x}+1)} dx (x > 0)$  equals to  
(a)  $\frac{1}{2} \ln(\sqrt{x}+1)$   
(b)  $2 \ln \sqrt{x} + c$   
(c)  $\frac{(\sqrt{x}+1)^2}{2} + c$   
(d)  $2 \ln(\sqrt{x}+1) + c$   
(FSD 2009)
- (17) The suitable substitution for evaluating  $\int \frac{dx}{x\sqrt{x^2-a^2}} (-a < x < a)$  is  
(a)  $x+1 = a \sec \theta$   
(c)  $x = a \sec \theta$   
(b)  $x = a \sin \theta$   
(d)  $x = a \cos \theta$   
(FSD 2009)
- (18) The value of definite integral  $\int_1^2 \frac{1}{x+1} dx$  equals to  
(a)  $\ln \frac{3}{2}$   
(c)  $\ln\left(\frac{3}{2}\right) + c$   
(b)  $\ln \frac{2}{3}$   
(d)  $\left(\frac{3}{2}\right)$   
(FSD 2009)





(FSD 2009)

(19) The value  $\int_{\pi-x}^{\pi} \sin x \, dx$  equals to

- (a) 1  
(b) -1  
(c) does not exist  
(d)  $\frac{1}{2} \cos x$

(20) The order of differential equation  $x \frac{d^2 y}{dx^2} + \frac{dy}{dx} - 21x = 0$  is

- (a) one  
(b) three  
(c) four  
(d) two

(FSD 2009)

(21)  $\int_0^2 (x^2 + 1) \, dx$  equals

- (a) 3/10  
(b) 2  
(c) 10/3  
(d)  $\frac{14}{3}$

(FSD 2010)

(22)  $\int \sec x \, dx$  equals

- (a)  $\ln (\sec x + \tan x) + c$   
(b)  $\ln (\sec x - \tan x) + c$   
(c)  $\ln (\operatorname{cosec} x + \cot x) + c$   
(d)  $\ln (\operatorname{cosec} x - \tan x) + c$

(FSD 2010)

(23)  $\int (e^x + 1) \, dx$  equals

- (a)  $ex + c$   
(b)  $e^x + x + c$   
(c)  $e^x + x^2 + c$   
(d)  $e^x + x^3 + c$

(FSD 2010)

(24)  $\int x^{-1} \, dx$  equals

- (a) c  
(b)  $-x^{-2} + c$   
(c)  $\frac{1}{x^2} + c$   
(d)  $\ln x + c$

(FSD 2010)

(25)  $\int_0^{\pi/2} \cos^2 x \, dx$

- (a)  $\frac{\pi}{2}$   
(b)  $\frac{\pi}{4}$   
(c)  $\frac{\pi}{3}$   
(d)  $\frac{\pi}{6}$

(FSD 2010)

(26) The solution of the differential equation  $x \frac{dy}{dx} = y + 1$  is

(FSD 2010)

- (a)  $y = cx + c$   
(b)  $y = cx + 1$   
(c)  $y = cx - 1$   
(d)  $y = c + x$

(27)  $\int \frac{-2x}{\sqrt{4-x^2}} \, dx$  equals

(FSD 2010)

- (a)  $\sqrt{x^2 + 4} + c$   
(b)  $2\sqrt{x^2 - 4}$   
(c)  $2\sqrt{4 - x^2} + c$   
(d)  $8 - 2x^2$





(FSD 2010)

(28)  $\int \frac{dx}{x^2 - a^2}$  equals

(a)  $\frac{1}{2a} \ln \frac{x-a}{x+a} + c$

(c)  $\frac{1}{2a} \ln \frac{x+a}{x-a} + c$

(b)  $\frac{1}{2a} \ln \frac{a+x}{a-x} + c$

(d)  $\frac{1}{a} \tan^{-1} \frac{x}{a} + c$

(FSD 2010)

(29)  $\int \frac{dx}{\sqrt{1-x^2}}$  equals

(a)  $\tan^{-1} x + c$

(c)  $-\cos^{-1} x + c$

(b)  $\cot^{-1} x + c$

(d)  $-\sin^{-1} x + c$

(FSD 2010)

(30)  $\int \frac{dx}{ax+b}$  equals

(a)  $\ln(ax+b) + c$

(c)  $a \ln(ax+b) + c$

(b)  $\frac{1}{a} \ln(ax+b) + c$

(d)  $\log a(ax+b) + c$

(FSD 2010)

(31)  $\int_0^{\pi/2} \sin^2 x dx$  equals

(a)  $\frac{\pi}{2}$

(c)  $\frac{\pi}{3}$

(b)  $\frac{\pi}{4}$

(d)  $\frac{\pi}{6}$

(FSD 2010)

(32) The solution of the differential equation  $\frac{dy}{dx} - \frac{1}{1+x^2}$  is

(b)  $y = \sin^{-1} x + c$

(d)  $y = \cot x + c$

(SGD 2009)

(33)  $\int \sec^2 x dx$  is

(a)  $\sin x + c$

(c)  $\tan x + c$

(b)  $\cos x + c$

(d)  $\cot x + c$

(SGD 2009)

(34)  $\int \sin 3x dx$  is

(a)  $3 \cos 3x + c$

(c)  $\frac{1}{3} \cos 3x + c$

(b)  $\frac{1}{3} \sin 3x$

(d)  $-\frac{1}{3} \cos 3x + c$

(SGD 2009)

(35)  $\int \frac{dx}{x}$  =

(a)  $2x + c$

(c)  $\frac{a}{x^2} + c$

(b)  $a \ln|x| + c$

(d)  $ax^2 + c$





(SGD 2009)

(36)  $\int_a^b [f(x) + g(x)] dx =$

(a)  $\int_a^b f(x) dx - \int_a^b g(x) dx$

(c)  $\int_a^b f(x) dx + \int_b^a f(x) dx$

(b)  $\int_a^b f(x) dx + \int_a^b f(x) dx$

(d)  $\int_b^a f(x) dx + \int_a^b g(x) dx$

(37) The solution of the differential  $\frac{dy}{dx} = \sin x$  is

(a)  $y = -\cos x + c$

(c)  $y = -\sin x + c$

(b)  $y = \cos x + c$

(d)  $y = \operatorname{cosec} x + c$

(SGD 2009)

(38) The inverse equation of  $\int \frac{1}{y} dy$  is equal to

(a)  $\frac{d}{dy}$

(c)  $\frac{dy}{dx}$

(b)  $\frac{d}{dx}$

(d)  $\frac{dx}{dy}$

(SGD 2010)

(39) The suitable substitutions to evaluate  $\int \frac{1}{\sqrt{2ax+x^2}} dx$  is

(a)  $x+a = a \tan \theta$

(c)  $x+a = a \cos \theta$

(b)  $x+a = a \sin \theta$

(d)  $x+a = a \sec \theta$

(SGD 2010)

(40) The integral  $\int e^{-x} (\cos x - \sin x) dx$  is equal to

(a)  $-e^{-x} \sin x + c$

(c)  $e^{-x} \sin x + c$

(b)  $e^{-x} \cos x + c$

(d)  $e^{-x} \sin x + c$

(SGD 2010)

(41) The value of integral  $\int_1^0 (x + |x|) dx$  equal to

(a) zero

(c) 2

(b) 1

(d) 3

(SGD 2010)

(42) The area under the curve  $y = f(x)$  from  $x = a$  to  $x = b$

(a)  $\int f(x) dx$

(c)  $\int_a^b f(x) dx + c$

(b)  $\int_a^b f(x) dx$

(d)  $\int_b^a f(x) dx$

(SGD 2010)

(43) The general solution of  $\frac{dy}{dx} = e^x (y^2 + 1)$  equal to

(a)  $y = \tan e^x$

(c)  $y = e^x + c$

(b)  $y = \tan^{-1} e^x + c$

(d)  $y = \operatorname{Tan} (e^x + c)$

(SGD 2010)





### Unit 3

### Integration

- (44)  $\int (ax + b)^n dx =$  where  $n \neq -1$  (SGD 2011)
- (a)  $\frac{(ax + b)^{n+1}}{n+1} + c$
- (b)  $\frac{(ax + b)^{n-1}}{a(n+1)} + c$
- (c)  $\frac{(ax + b)^{n+1}}{a} + c$
- (d)  $\frac{(ax + b)^{n+1}}{n} + c$
- (45)  $\int \frac{e^x}{e^x + 3} dx =$  (SGD 2011)
- (a)  $\ln e^x + c$
- (b)  $ex \ln(e^x + 3) + c$
- (c)  $(e^x + 3) \ln x + c$
- (d)  $\ln(e^x + 3) + c$
- (46)  $\int x e^x dx =$  (SGD 2011)
- (a)  $xe^x + e^x + c$
- (b)  $xe^x - e^x + c$
- (c)  $xe^x + x + c$
- (d)  $xe^x - x + c$
- (47)  $\int_1^2 (x^2 + 1) dx =$  (SGD 2011)
- (a)  $\frac{8}{3}$
- (b)  $\frac{10}{3}$
- (c)  $\frac{11}{3}$
- (d)  $\frac{13}{3}$
- (48) Area between  $x$  - axis and the curve  $y = \sin x$  from  $x = 0$  to  $x = \frac{\pi}{2}$  is (SGD 2011)
- (a) 1 square units
- (b) 2 square units
- (c) 3 square units
- (d) 4 square units
- (49) Differential equation of  $xy = c$  is (SGD 2011)
- (a)  $y^2 dx + x dy = 0$
- (b)  $y dx + y^2 dx = 0$
- (c)  $y dx + x dy = 0$
- (d)  $x dx + y dy = 0$
- (50)  $\int 2 \sin 2x dx$  equals. (SGD 2011)
- (a)  $-\sin 2x + C$
- (b)  $\sin 2x + C$
- (c)  $-\cos 2x + C$
- (d)  $\cos 2x + C$
- (51)  $\frac{d}{dx} \int g(x) dx =$  (SGD 2011)
- (a)  $g(x)$
- (b)  $\frac{1}{g(x)}$
- (c)  $g'(x)$
- (d)  $g''(x)$
- (52) A suitable substitution for  $\int \sqrt{a^2 - x^2} dx$  is  $x =$  (SGD 2011)
- (a)  $a \sin \theta$
- (b)  $a \sec \theta$
- (c)  $a \tan \theta$
- (d)  $a \cot \theta$





(SGD 2011)

(53)  $\int_a^b f(x) dx$  if  $a < c < b$  equals

(a)  $\int_a^c f(x) dx$

(b)  $\int_a^c f(x) dx - \int_c^b f(x) dx$

(c)  $\int_a^c f(x) dx + \int_c^b f(x) dx$

(d)  $\int_a^c f(x) dx + \int_b^c f(x) dx$

(54) The area bounded by  $y = \sin 2x$  and  $x$ -axis from  $x = 0$  to  $x = \frac{\pi}{3}$  equals

(SGD 2011)

(a)  $\frac{1}{4}$

(b)  $\frac{4}{3}$

(c) 2

(d)  $\frac{3}{4}$

(55)  $\int_{-2}^1 f(x) dx = 5$  and  $\int_1^3 f(x) dx = 3$  then  $\int_{-2}^3 f(x) dx$  equals

(SGD 2011)

(a) 7

(b) 9

(c) 8

(d) 6

(56)  $\int 3^{2x} dx$

(RWP 2008)

(a)  $\frac{3^{2x}}{\ln 3} c$

(b)  $\frac{3^{2x}}{\lambda \ln 3} c$

(c)  $\frac{3^{2x}}{\lambda} + c$

(d)  $\frac{3^x}{\lambda \ln 3} + c$

(57) In expression involving  $\sqrt{a^2 - x^2}$  we substitute  $x$  by,

(RWP 2008)

(a)  $a \sin \theta$

(b)  $a \tan \theta$

(c)  $a \sin \theta$

(d)  $a \cos \theta$

(58)  $\int e^{ax} (af(x)) + f'(x) dx$  equals,

(RWP 2008)

(a)  $e^{ax} f'(x) + c$

(b)  $e^{ax} f(x) + c$

(c)  $e^x f'(x) + c$

(d)  $e^{ax} f''(x) + c$

(59)  $\int_0^1 \frac{dx}{1+x^2}$  equals,

(RWP 2008)

(a)  $-\frac{\pi}{4}$

(b)  $\frac{\pi}{3}$

(c)  $-\frac{\pi}{3}$

(d)  $\frac{\pi}{4}$





(60) The solution of  $x \frac{dy}{dx} = 1 + y$  is,

(a)  $y = cx$

(c)  $y = cx - 1$

(b)  $y = cx + 1$

(d)  $y = x + 1$

(RWP 2008)

(61)  $\int \frac{\sec^2 x}{\tan x} dx$  equals:

(a)  $\ln \tan x + c$

(c)  $\cot x + c$

(b)  $\ln \cot x + c$

(d)  $\tan x + c$

(RWP 2009)

(62)  $\int \frac{dx}{\sqrt{a^2 - x^2}}$  equals:

(a)  $\cos^{-1}\left(\frac{x}{a}\right) + c$

(c)  $\sin^{-1}\left(\frac{x}{a}\right) + c$

(b)  $\sin^{-1}\left(\frac{a}{x}\right) + c$

(d)  $\sin^{-1} x + c$

(RWP 2009)

(63)  $\int_{-1}^1 x^3 dx$  equals:

(a) 20

(c) 28

(b) 80

(d) none of these

(RWP 2009)

(64)  $\int_1^2 \sin x dx$

(a) -2

(c) 0

(b) -1

(d) 2

(RWP 2009)

(65) The solution of differential equation  $\frac{dy}{dx} = \frac{1}{1+x^2}$

(a)  $y = \tan^{-1} x + c$

(c)  $y = \sec^{-1} x + c$

(b)  $y = \sin^{-1} x + c$

(d)  $y = \cos^{-1} x + c$

(RWP 2009)

(66)  $\int \frac{1+x}{x} dx$  equals

(a)  $\ln|x| + c$

(c)  $1 + \ln|x| + c$

(b)  $\ln|1+x| + c$

(d)  $x + \ln|x| + c$

(RWP 2010)

(67)  $\int \sec 5x \tan 5x dx$  is equal to

(a)  $\sec 5x + c$

(c)  $\frac{\sec 5x}{25} + c$

(b)  $\frac{\sec 5x}{5} + c$

(d)  $\frac{\tan 5x}{5} + c$

(RWP 2010)





(RWP 2010)

(68)  $\int \frac{f'(x)}{f(x)} dx$  equals

(a)  $\ln|f(x)| + c$

(c)  $\ln|f'(x)| + c$

(b)  $\frac{|f(x)|^{-1+1}}{-1+1} + c$

(d)  $-\ln|f'(x)| + c$

(RWP 2010)

(69)  $\int_a^b f(x) dx$  gives

(a) Area under the curve

(c) Area of the parallelogram

(b) Length of the curve

(d) Volume of the rectangle

(RWP 2010)

(70) The definite integral  $\int_1^2 \frac{1}{x} dx$  equals

(a)  $2\ln 2$

(c)  $2\ln 2 - 1$

(b)  $\ln 2 - \ln 1$

(d)  $2\ln 2 + 1$

(71) The solution of differential equation is  $x \frac{dy}{dx} = 1 + y$

(RWP 2010)

(a)  $y = cx - 1$

(c)  $y = -x + c$

(b)  $y = x + c$

(d)  $y = cx + 1$

(72)  $\int \frac{dx}{\sqrt{a^2 - x^2}} = ?$

(a)  $\frac{1}{a} \sin^{-1} \frac{x}{a} + c$

(c)  $\sin^{-1} \frac{x}{a} + c$

(b)  $\frac{1}{a} \sin^{-1} \frac{a}{x} + c$

(d)  $\sin^{-1} \frac{a}{x} + c$

(RWP 2011)

(73) Solution of differential equation  $xdy + ydx = 0$  is:

(a)  $\frac{y}{x} = c$

(c)  $xy = c$

(b)  $cx = y^2$

(d)  $x = cy$

(RWP 2011)

(74)  $\int f(x)g'(x) = ?$

(a)  $f(x)g'(x) - \int f(x)g'(x)dx$

(c)  $f(x)g(x) - \int f'(x)g(x)dx$

(b)  $f(x)g(x) - \int f'(x)g'(x)dx$

(d)  $f(x)g'(x) - \int f'(x)g(x)dx$

(RWP 2011)

(75)  $\int \frac{(\ln x)^2}{2} dx = ?$

(a)  $\ln|\ln x| + c$

(c)  $\ln|x| + c$

(b)  $\frac{(\ln x)^2}{2} + c$

(d)  $\frac{\ln|\ln x|}{2} + c$

(RWP 2011)





### Unit 3

### Integration

(76)  $\int e^{ax} [af(x) + f'(x)] dx = ?$

(a)  $ae^{ax} f(x) + c$

(c)  $e^{ax} f'(x) + c$

(b)  $ae^{ax} f'(x) + c$

(d)  $e^{ax} f(x) + c$

(RWP 2011)

(77)  $\int x^e dx = ?$

(a)  $\frac{xe^{+1}}{e+1} + c$

(c)  $x^e + c$

(b)  $e^x + c$

(d)  $\frac{ex^{+1}}{x+1} + c$

(RWP 2011)

### MULTIPLE CHOICE QUESTIONS

(From Past Papers 2008-2011)

(D.G Khan + Bahawalpur/R.Y Khan + Multan Board)

(1)  $\int \frac{dx}{ax+b} =$

(a)  $a \ln |ax+b| + c$

(c)  $-\frac{1}{a} \ln |ax+b| + c$

(b)  $\frac{1}{a} \ln |ax+b| + c$

(d) none of these

(MTN 2008)

(2)  $\int a^x dx = \dots\dots\dots$

(a)  $a^x + c$

(c)  $a^2 \ln a + c$

(b)  $\frac{a^x}{\ln a}$

(d) none of these

(MTN 2008)

(3)  $\int \cot x dx = \dots\dots\dots$

(a)  $\ln |\operatorname{cosec} x| + c$

(c)  $\ln |\cos x| + c$

(b)  $\ln |\sin x| + c$

(d) none of these

(MTN 2008)

(4)  $\int_0^1 \frac{dx}{1+x^2} = \dots\dots\dots$

(a)  $\frac{\pi}{6}$

(c)  $\frac{\pi}{4}$

(b)  $\frac{\pi}{3}$

(d)  $\frac{\pi}{2}$

(MTN 2008)

(5)  $\int \operatorname{cosec}^2 x dx$  is

(a)  $-\cot x + c$

(c)  $\tan x + c$

(b)  $\cot x + c$

(d)  $\sin x + c$

(MTN 2008)

(6) In  $\int \sqrt{a^2 + x^2} dx$ , the substitution will be

(a)  $x = a \sin \theta$

(c)  $x = a \tan \theta$

(b)  $x = a \cos \theta$

(d)  $x = a \sec \theta$





- (7)  $\int x \ln x dx$  is (MTN 2008)
- (a)  $\frac{x^2}{2} \ln x - \frac{x^2}{4} + c$  (b)  $\frac{x^2}{2} \ln x + \frac{x^2}{2} + c$
- (c)  $\frac{x}{2} \ln x + c$  (d)  $x \ln x + c$
- (8)  $\int_1^2 e^x dx$  (MTN 2008)
- (a)  $1 - e$  (b)  $1 - e^2$
- (c)  $e^2 - e$  (d)  $e$
- (9) Solution of  $\frac{dy}{dx} = -y$  is (MTN 2008)
- (a)  $y = ce^{-x}$  (b)  $y = ce^x$
- (c)  $y = -ce^x$  (d)  $y = ce^{2x}$
- (10) If  $\int_3^1 f(x) dx = \ln |\operatorname{cosec} x - \cot x| + c$ , then  $f(x) =$  (MTN 2008)
- (a)  $\csc x$  (b)  $\cot x$
- (c)  $\sec x$  (d)  $\tan x$
- (11) If  $\int_{-2}^1 f(x) dx = 5$ ,  $\int_{-1}^3 f(x) dx = 3$ ,  $\int_{-2}^1 g(x) dx = 4$ , then  $\int_{-2}^1 [2f(x) + 3g(x)] dx =$  (MTN 2008)
- (a) 12 (b) 9
- (c) 22 (d) 21
- (12)  $\int e^x (\sin x \sqrt{x}) dx =$  (MTN 2008)
- (a)  $e^x \sin x$  (b)  $-e^x \sin x$
- (c)  $e^x \cos x$  (d)  $-e^x \cos x$
- (13) The order of differential equation  $x \frac{d^2 y}{dx^2} + \frac{dy}{dx} - 2x = 0$  (MTN 2008)
- (a) 3 (b) 1
- (c) 2 (d) zero
- (14)  $\int (2x+3)^{1/2} dx =$  (MTN 2008)
- (a)  $\frac{1}{2} (2x+3)^{1/2} + c$  (b)  $(2x+3)^{1/2} + c$
- (c)  $\frac{2}{3} (2x+3)^{1/2} + c$  (d)  $\frac{1}{3} (2x+3)^{3/2} + c$
- (15)  $\int \operatorname{Cosec} x dx$  is equal to: (MTN 2008)
- (a)  $\ln x + x + c$  (b)  $x - \ln x + c$
- (c)  $\ln |\operatorname{Cosec} x - \cot x| + c$  (d)  $\ln |\operatorname{Cosec} x \cot x| + c$





### Unit 3

### Integration

- (16)  $\int \ln x dx$  is equal to  
(a)  $\ln x + x + c$   
(c)  $x \ln x + c$   
(b)  $x - \ln x + c$   
(d) None of these  
(MTN 2008)
- (17)  $\int_{\pi}^{-\pi} \sin x dx$  is equal to  
(a) 2  
(c) 0  
(b) 1  
(d) -2  
(MTN 2008)
- (18) The order of differential equation  $x \frac{d^2 y}{dx^2} + \frac{dy}{dx} - 2x = 0$  is equal to  
(a) 1  
(c) 3  
(b) 2  
(d) zero  
(MTN 2008)
- (19)  $\int \ln x dx$  equals  
(a)  $x \ln x - x + c$   
(c)  $x \ln x + x + c$   
(b)  $x - x \ln x + c$   
(d)  $\frac{1}{x} \ln x + c$   
(MTN 2009)
- (20)  $\int_0^1 \frac{dx}{1+x^2}$  equals  
(a)  $\frac{\pi}{6}$   
(c)  $\frac{\pi}{3}$   
(b)  $\frac{\pi}{4}$   
(d)  $\frac{\pi}{2}$   
(MTN 2009)
- (21)  $\int_0^1 2x dx$  equals  
(a) 9  
(c) 4  
(b) 7  
(d) none of these  
(MTN 2009)
- (22)  $\int \frac{dx}{\sqrt{a^2 - x^2}}$   
(a)  $\cos^{-1} \left( \frac{x}{c} \right)$   
(c)  $\sin^{-1} \left( \frac{x}{a} \right) + c$   
(b)  $\sin^{-1} \left( \frac{9}{x} \right) + c$   
(d)  $\sin^{-1} (ax) + c$   
(MTN 2009)
- (23) The solutions of differential equation  $\frac{xdy}{dx} = 1 + y$  is  
(a)  $y = cx - 1$   
(c)  $\frac{x}{y} = c$   
(b)  $y - 1 = cx$   
(d)  $\frac{y}{x} = c$   
(MTN 2009)





(MTN 2009)

(24)  $\int \cot x \, dx$  equals

(a)  $\ln|\operatorname{cosec} x| + c$

(c)  $\ln|\cos x| + c$

(b)  $\ln|\sin x| + c$

(d)  $\ln|\tan x| + c$

(25)  $\int \sqrt{a^2 - x^2} \, dx$  equals

(a)  $\frac{x}{2} \sqrt{a^2 - x^2} + \sin^{-1} \frac{x}{a} + c$

(c)  $\frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \ln|x + \sqrt{a^2 - x^2}| + c$

(b)  $x \sqrt{a^2 - x^2} + a \sin^{-1} \frac{x}{a} + c$

(d)  $\frac{x \sqrt{a^2 - x^2}}{2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + c$

(MTN 2009)

(26)  $\int_0^{\pi} \cos x \, dx$  equals

(a) 2

(c) 0

(b) -1

(d) -2

(MTN 2009)

(27)  $\int_0^2 f(x) \, dx$  equals

(a)  $\int_2^0 f(x) \, dx$

(c)  $-\int_{-2}^0 f(x) \, dx$

(b)  $-\int_0^2 f(x) \, dx$

(d)  $\int_0^1 f(x) \, dx + \int_1^2 f(x) \, dx$

(MTN 2009)

(28) The order of the differential equation  $x^2 \frac{d^2 y}{dx^2} + 4 \frac{dy}{dx} - 5y = 0$ 

(a) 1

(c) 3

(b) 2

(d) 4

(MTN 2009)

(29) Solution of differential equation  $\frac{dy}{dx} = \frac{1}{1+x^2}$  is

(a)  $y = \sec^{-1} x - c$

(c)  $y = \sin^{-1} x + c$

(b)  $y = \tan^{-1} x - c$

(d)  $y = \operatorname{cosec}^{-1} x + c$

(MTN 2010)

(30)  $\int x^{100} \, dx$  is

(a)  $100 x^{10}$

(c)  $x^{100} + c$

(b)  $100 x^{101} + c$

(d)  $\frac{x^{101}}{101} + c$

(MTN 2010)

(31) Integral of  $x \left( \frac{1}{x} + x \right)$  is

(a)  $\frac{2}{3} x^2 + x + c$

(c)  $\frac{2}{3} x^{\frac{3}{2}} + \frac{x^3}{3} + c$

(b)  $\frac{2}{3} x^{\frac{3}{2}} + x^2 + c$

(d)  $x + \frac{x^3}{3} + c$

(MTN 2010)





- (32) Value of  $\int e^x \left( \sin^{-1} x + \frac{1}{\sqrt{1-x^2}} \right) dx$  is (MTN 2010)
- (a)  $-e^3 \sin^{-1} x + c$   
(b)  $e^x \sin^{-1} x + c$   
(c)  $e^x \cos^{-1} x + c$   
(d)  $e^x + \sin^{-1} x$
- (33)  $\int 6x^5 dx$  is equal to: (MTN 2010)
- (a)  $x^5 + c$   
(b)  $x^6 + c$   
(c)  $\frac{x^6}{x^6} + c$   
(d)  $\frac{6x^5}{5} + c$
- (34) Area of region enclosed between the curve  $f(x) = x^2 + 1$  and  $x$ -axis from  $x=0$  to  $x=2$  is (MTN 2010)
- (a)  $\frac{14}{3}$   
(b) 14  
(c)  $\frac{16}{3}$   
(d) 16
- (35) The integral  $\int \frac{1}{ax+b} dx$  ( $ax+b > 0$ ) equals: (MTN 2010)
- (a)  $\frac{1}{a} \ln|ax+b| + c$   
(b)  $\frac{1}{2} \ln(ax+b)^2 + c$   
(c)  $\frac{1}{a} \ln|a+bx| + c$   
(d)  $\ln(ax+b) + c$
- (36) The suitable substitution to evaluate  $\int \frac{dx}{x\sqrt{x^2-a^2}}$  is: (MTN 2010)
- (a)  $x = a \sin \theta$   
(b)  $x = a \cos \theta$   
(c)  $x = a \sec \theta$   
(d)  $x = a \tan \theta$
- (37) If  $u=f(x)$  and  $v=g(x)$  then  $\int u \cdot dv$  equals: (MTN 2010)
- (a)  $uv - \int v \cdot du$   
(b)  $uv - \int v \cdot du$   
(c)  $uv - \int u \cdot dv$   
(d)  $uv - \int u \cdot du$
- (38) The value of  $\int_{-\pi}^{\pi} \sin x \, dx$  equals to: (MTN 2010)
- (a) 1  
(b) 2  
(c) Zero  
(d)  $\pi$
- (39) If  $\int_{-2}^1 f(x) dx = 5$  and  $\int_{-2}^1 g(x) dx = 4$  then  $\int_{-2}^1 [3f(x) - 2g(x)] dx$  equals to: (MTN 2010)
- (a) 1  
(b) 20  
(c) 23  
(d) 7





(40) The general solution of differential equation in variable separable form contains: (MTN 2010)

- (a) One variable (b) Two variables  
(c) Three variables (d) No variable

(41)  $\int \sin\left(\frac{3x}{2} - x\right) dx$  is equal to: (MTN 2011)

- (a)  $\sin x + c$  (b)  $-\sin x + c$   
(c)  $\cos x + c$  (d)  $-\cos x + c$

(42)  $\int \frac{1}{1+x^2} dx$  equals: (MTN 2011)

- (a)  $\tan^{-1} x + c$  (b)  $-\tan^{-1} x + c$   
(c)  $-\tan^{-1} x + c$  (d)  $\tan^{-1} x + c$

(43)  $\int e^x [af(x) + f'(x)] dx$  equals: (MTN 2011)

- (a)  $e^x af(x) + c$  (b)  $e^x af'(x) + c$   
(c)  $e^x f(x) + c$  (d)  $e^x f'(x) + c$

(44)  $\int \sqrt{1 - \cos 2x} dx$  is equal to: (MTN 2011)

- (a)  $\sqrt{2}$  (b)  $-\sqrt{2}$   
(c)  $\frac{1}{\sqrt{2}}$  (d)  $-\frac{1}{\sqrt{2}}$

(45)  $\int \frac{\sec^2 x}{\sqrt{\tan x}} dx$  equals (MTN 2011)

- (a)  $\sqrt{\tan x} + c$  (b)  $-\sqrt{\tan x} + c$   
(c)  $\frac{\sqrt{\tan x}}{2} + c$  (d)  $2\sqrt{\tan x} + c$

(46)  $\int e^x \left( \frac{1}{x} + \ln x \right) dx$  is equal to: (MTN 2011)

- (a)  $e^x \ln x + c$  (b)  $e^{1/x} \ln x + c$   
(c)  $-e^x \ln x + c$  (d)  $e^{1/x} \ln x + c$

(47)  $\int \frac{1}{x^2 + 16} dx$  equals: (MTN 2011)

- (a)  $\tan \frac{x}{4} + c$  (b)  $\frac{1}{4} \tan^{-1} x + c$   
(c)  $\frac{1}{4} \tan^{-1} \frac{x}{4} + c$  (d)  $\tan^{-1} \frac{x}{4} + c$

(48)  $\int e^x (\sin x + \cos x) dx$  is equal to (MTN 2011)

- (a)  $e^x \sin x + c$  (b)  $e^x \cos x + c$   
(c)  $-e^x \sin x + c$  (d)  $-e^x \cos x + c$





(49)  $\int \frac{1}{x} dx$  equals:

(a)  $\frac{1}{x^2} + c$

(c)  $\frac{1}{x} + c$

(b)  $-\frac{1}{x^2} + c$

(d)  $\ln x + c$

(MTN 2011)

(50)  $\int e^x dx$  is equal to:

(a)  $xe^x + c$

(c)  $e^x + c$

(b)  $-x3^x + c$

(d)  $-e^x + c$

(MTN 2011)

(51)  $\int \frac{1}{\sqrt{1-x^2}} dx$  equals:

(a)  $\sin^{-1} x + c$

(c)  $-\sin^{-1} x + c$

(b)  $\cos^{-1} x + c$

(d)  $-\cos^{-1} x + c$

(MTN 2011)

(52)  $\int_0^{\frac{\pi}{4}} \frac{\sec^2 x}{1 + \tan x} dx$  is equal to:

(a) 1

(c) 3

(b) 2

(d)  $\ln 2$

(MTN 2011)

(53)  $\int (x^2 + 3x) dx$  equals

(a)  $\frac{x^3}{3} + \frac{3x^2}{2} + c$

(c)  $x^2 + 3x + c$

(b)  $2x + 3 + c$

(d)  $x^3 + 3x + c$

(D.G.K 2008)

(54)  $\int \frac{\sec^2 x dx}{\tan x}$  equals

(a)  $\ln(\tan x) + c$

(c)  $\cot x + c$

(b)  $\ln(\cot x) + c$

(d)  $\tan x + c$

(D.G.K 2008)

(55)  $\int e^x (\cos x - \sin x) dx$

(a)  $e^x \sin x + c$

(c)  $e^{\tan x}$

(b)  $e^x \cos x + c$

(d)  $e^x \cot x + c$

(D.G.K 2008)

(56)  $\int_0^{\frac{\pi}{2}} \sin x dx$

(a) 5

(c) 2

(b) 4

(d) 1

(D.G.K 2008)

(57) A equation involving derivatives or differentiation is called

(a) quadratic equation

(c) algebraic equation

(b) differential equation

(d) linear equation

(D.G.K 2008)





(58)  $\int x^n dx$

(D.G.K 2009)

(a)  $\frac{x^{n+1}}{n} + c$

(b)  $\frac{x^{n+1}}{n-1} + c$

(c)  $\frac{x^{n+1}}{n+1} + c$

(d)  $\frac{x^{n+1}}{n} + c$

(59)  $\int \sec x dx$  equals

(D.G.K 2009)

(a)  $\ln(\sec x + \tan x) + c$

(b)  $\sec x \tan x + c$

(c)  $\ln(\sec x - \tan x) + c$

(d)  $\sec^2 x$

(60)  $\int_0^{\frac{\pi}{6}} \cos x dx$

(D.G.K 2009)

(a)  $\frac{\sqrt{3}}{2}$

(b)  $\frac{1}{2}$

(c)  $\frac{-\sqrt{3}}{2}$

(d) 2

(61)  $\int_0^{\frac{1}{\sqrt{3}}} \frac{dx}{1+x^2}$

(D.G.K 2009)

(a)  $\frac{\pi}{2}$

(b)  $\frac{\pi}{6}$

(c)  $\frac{\pi}{4}$

(d)  $\frac{\pi}{3}$

(62)  $x \frac{dy}{dx} = 1 + y$  solution is

(D.G.K 2009)

(a)  $y = ex$

(b)  $y = ex - 1$

(c)  $y = ex - 1$

(d)  $y = x + 1$

(63) The integration is the reverse process of

(D.G.K 2010)

(a) tabulation

(b) Substitution

(c) Differentiation

(d) Classification

(64) If  $n \neq -1$ , then  $\int [f(x)]^n f(x) dx$  equals to

(D.G.K 2010)

(a)  $\frac{[f(x)]^{n+1}}{n+1} + c$

(b)  $\frac{[f(x)]^{n+1}}{n+1} + c$

(c)  $\frac{[f(x)]^{n+1}}{n} + c$

(d)  $\frac{[f(x)]^n}{n+1} + c$





(65)  $\int a^x dx$  equal to ( $a > 0, a \neq 1$ )

(D.G.K 2010)

(a)  $a^x + C$

(b)  $-\frac{a^x}{\ln a} + C$

(c)  $\frac{a^x}{\ln x} + C$

(d)  $\frac{a^x}{\ln a} + C$

(66)  $\int_0^{\frac{1}{\sqrt{2}}} \frac{dx}{\sqrt{1-x^2}}$  equals to

(D.G.K 2010)

(a)  $\pi/3$

(b)  $\pi/4$

(c)  $\pi/2$

(d)  $\pi/6$

(67)  $\int_0^{\frac{\pi}{2}} \cos 2x dx$  equal

(D.G.K 2010)

(a) 1

(b) 2

(c) -2

(d) 0

(68) The solution of differential equation  $\frac{dy}{dx} = \frac{x}{y}$  is

(D.G.K 2010)

(a)  $x^2 + y^2 = C$

(b)  $y^2 = x^2 + C$

(c)  $x^2 y^2 = C$

(d)  $\frac{x^2}{y^2} = C$

(69)  $\int \cot x dx$  equals to

(D.G.K 2011)

(a)  $\operatorname{Cosec}^2 x + C$

(b)  $-\operatorname{Cosec}^2 x$

(c)  $\ln \cos x + C$

(d)  $\ln \sin x + C$

(70)  $\int \frac{f'(x)}{f(x)} dx$  is equal to

(D.G.K 2011)

(a)  $\ln f(x) + C$

(b)  $\ln f'(x) + C$

(c)  $f(x) + C$

(d)  $f'(x) + C$

(71)  $\int e^x dx$  is equals

(D.G.K 2011)

(a)  $x e^x + C$

(b)  $x e^{x-1} + C$

(c)  $e^x + C$

(d)  $e^{x-1} + C$

(72) The antiderivative of  $\frac{1}{(1+x^2)\tan^{-1}x} dx$  is equal to

(D.G.K 2011)

(a)  $\ln(\tan^{-1} x) + C$

(b)  $\ln(\tan x) + C$

(c)  $\tan^{-1} x + C$

(d)  $\tan x + C$





- (73)  $\int_{-1}^1 \frac{1}{1+x^2} dx$  equals  
(a)  $\pi/4$   
(b)  $4/\pi$   
(c)  $-\pi/4$   
(d)  $-4/\pi$   
(D.G.K 2011)
- (74)  $\int e^x (\cos x - \sin x) dx$  is equal to  
(a)  $e^x \cdot \sin x + C$   
(b)  $e^{-x} \cos x + C$   
(c)  $e^x \sin x + C$   
(d)  $e^x \cos x + C$   
(D.G.K 2011)
- (75) If  $\int f(x) dx = \ln|\sec x + \tan x| + c$ ; then  $f(x)$  is  
(a)  $\operatorname{Cosec} x$   
(b)  $\sec x$   
(c)  $\tan x$   
(d)  $\cot x$   
(BWP 2008)
- (76)  $\int_0^{\pi/2} \frac{dx}{1+x^2} =$   
(a)  $\frac{\pi}{3}$   
(b)  $\frac{\pi}{6}$   
(c)  $\frac{2\pi}{3}$   
(d)  $-\frac{\pi}{3}$   
(BWP 2008)
- (77)  $\int \frac{dx}{\sqrt{a^2 - x^2}} =$   
(a)  $-\cos^{-1}\left(\frac{x}{a}\right) + c$   
(b)  $-\sin\left(\frac{x}{a}\right) + c$   
(c)  $\ln\left|\frac{a+x}{a-x}\right| + c$   
(d)  $\frac{1}{2a} \ln\left|\frac{a+x}{a-x}\right| + c$   
(BWP 2008)
- (78)  $\int (3)^x dx =$   
(a)  $\lambda(3)^x + c$   
(b)  $\lambda(3)^{2x} \ln 3 + c$   
(c)  $\frac{(3)^x}{\lambda \ln 3} + c$   
(d)  $\frac{(3)^{2x+1}}{\lambda x + 1}$   
(BWP 2008)
- (79) The solution of differential equation  $y dx + x dy = 0$  is  
(a)  $x^2 + y^2 = c$   
(b)  $\ln x + \ln y = 0$   
(c)  $\ln x + \ln y = c$   
(d)  $x y = c$   
(BWP 2008)
- (80)  $\int \operatorname{Cosec}^2 x dx$  equals  
(a)  $\cot x + c$   
(b)  $-\cot x + c$   
(c)  $-2 \operatorname{Cosec} x + c$   
(d)  $2 \operatorname{Cosec} x + c$   
(BWP 2009)
- (81)  $\int e^{\sin x} \cos x dx$  equals  
(a)  $e^{\sin x} + c$   
(b)  $e^{\cos x} + c$   
(c)  $-e^{\sin x} + c$   
(d)  $-e^{\cos x} + c$   
(BWP 2009)





- (82)  $\int_0^{\frac{\pi}{4}} \sec^2 x \, dx$  equals  
(a) 0  
(c) 1  
(b) -1  
(d) 2  
(BWP 2009)
- (83)  $\int_1^2 \frac{1}{x} \, dx$  equals  
(a)  $\ln 2$   
(c)  $2\ln 2$   
(b)  $-\ln 2$   
(d) 0  
(BWP 2009)
- (84) The solution of differential equation  $\frac{dy}{dx} = \frac{1}{1+x^2}$  is  
(a)  $y = \sin^{-1} x + c$   
(c)  $y = \tan^{-1} x + c$   
(b)  $y = \sec^{-1} x + c$   
(d)  $\cot^{-1} x + c$   
(BWP 2009)
- (85)  $\int_0^1 \frac{dx}{\sqrt{1-x^2}}$  is equal to  
(a)  $\frac{\pi}{6}$   
(c)  $\frac{\pi}{3}$   
(b)  $\frac{\pi}{4}$   
(d)  $\frac{\pi}{2}$   
(BWP 2010)
- (86)  $2\frac{d^3y}{dx^3} + \frac{2d^2y}{dx^2} + \frac{dy}{dx} + y = 0$  is differential equation of order  
(a) Two  
(c) Four  
(b) Three  
(d) Five  
(BWP 2010)
- (87)  $\int e^x [\cos x + \sin x] \, dx$  equals to  
(a)  $e^x \cos x + c$   
(c)  $e^x \tan x + c$   
(b)  $e^x \sin x + c$   
(d)  $e^x \cot x + c$   
(BWP 2010)
- (88)  $\int \frac{\sec^2 x}{\tan x} \, dx$  is equal to  
(a)  $\ln \tan x + c$   
(c)  $\cot x + c$   
(b)  $\ln \cot x + c$   
(d)  $\tan x + c$   
(BWP 2010)
- (89)  $\int x^n \, dx$ , where  $n \neq -1$  is equal to  
(a)  $\frac{x^{n-1}}{n-1} + c$   
(c)  $\frac{x^n}{n} + c$   
(b)  $\frac{x^{n+1}}{n+1} + c$   
(d)  $\frac{x^{n+2}}{n+2} + c$   
(BWP 2010)





(90)  $\frac{dy}{dx} = x^2$  if

(BWP 2011)

(a)  $y = x^2$

(b)  $\frac{x^3}{3}$

(c)  $3x^3$

(d)  $x^3$

(91) Integral of  $x\left(\frac{1}{\sqrt{x}} + 1\right)$  is

(BWP 2011)

(a)  $\frac{2}{3}x^{3/2} + x + c$

(b)  $\frac{2}{3}x^{3/2} + x^2 + c$

(c)  $\frac{2}{3}x^{3/2} + \frac{x^2}{2} + c$

(d)  $\frac{3}{2}x^{3/2} + x^2 + c$

(92) Area of region enclosed between the curve  $y = g(x)$  and the x-axis from  $x = a$  to  $x = b$  is

(BWP 2011)

(a)  $\int_a^b g(x) dx$

(b)  $\int_a^b g'(x) dx$

(c)  $\int_a^b |g(x) + g'(x)| dx$

(d)  $\int_a^b |g(x) - g'(x)| dx$

(93)  $\int_0^2 6x^5 dx$  is equal to

(BWP 2011)

(a) 73

(b) 63

(c) 83

(d) 43

(94) Value of  $\int e^x \left( \tan^{-1} x + \frac{1}{1+x^2} \right) dx$  is

(BWP 2011)

(a)  $e^x \tan^{-1} x + c$

(b)  $x e^x \tan^{-1} x + c$

(c)  $e^x + c$

(d)  $\frac{e^x}{2} + \tan^{-1} x + c$

(95) Solution of differential equation  $\frac{dy}{dx} = \cos x$  is

(BWP 2011)

(a)  $y = \cos x + c$

(b)  $y = \tan x + c$

(c)  $y = \cot x + c$

(d)  $y = \sin x + c$



# ANSWER KEYS

(Topical Multiple Choice Questions)

1	a	16	c	31	b	46	d	61	c	76	b	91	a
2	c	17	b	32	c	47	a	62	c	77	c	92	a
3	b	18	a	33	a	48	a	63	d	78	d	93	d
4	c	19	c	34	c	49	b	64	d	79	a	94	c
5	b	20	a	35	c	50	d	65	a	80	d	95	b
6	a	21	a	36	a	51	b	66	b	81	a	96	a
7	b	22	c	37	d	52	b	67	b	82	c	97	b
8	a	23	c	38	b	53	a	68	a	83	b	98	c
9	b	24	d	39	b	54	d	69	b	84	c	99	a
10	c	25	c	40	b	55	c	70	a	85	b	100	b
11	a	26	b	41	c	56	b	71	c	86	a	101	b
12	b	27	c	42	c	57	a	72	b	87	b	102	b
13	a	28	a	43	a	58	b	73	a	88	b	103	c
14	b	29	b	44	d	59	c	74	c	89	a	104	d
15	a	30	b	45	b	60	a	75	a	90	c	105	a

(KIPS Exercise)

1	a	11	c	21	c	31	a
2	a	12	a	22	a	32	a
3	b	13	b	23	c	33	a
4	c	14	d	24	c	34	a
5	a	15	c	25	a	35	c
6	a	16	d	26	d	36	a
7	c	17	b	27	c	37	a
8	d	18	b	28	a	38	d
9	b	19	c	29	b	39	c
10	b	20	a	30	c	40	c

(From Past Papers 2006-2011)  
(Lahore + Gujranwala Board)

1	b	11	c	21	c	31	c	41	d	51	b	61	b	71	a
2	c	12	c	22	c	32	c	42	b	52	a	62	b	72	a
3	c	13	c	23	c	33	b	43	b	53	d	63	d	73	c
4	a	14	d	24	c	34	a	44	d	54	a	64	c	74	c
5	c	15	c	25	c	35	a	45	a	55	b	65	a	75	d
6	b	16	b	26	d	36	d	46	b	56	a	66	b	76	d
7	c	17	b	27	b	37	b	47	a	57	b	67	b	KIPS	
8	a	18	a	28	b	38	d	48	d	58	a	68	a		
9	a	19	a	29	d	39	d	49	a	59	c	69	c		
10	d	20	b	30	b	40	b	50	d	60	b	70	b		





## Unit 3

Integration

(From Past Papers 2008-2011)  
(Faisalabad + Sargodha + Rawalpindi Board)

1	a	11	c	21	d	31	b	41	b	51	a	61	a	71	a
2	b	12	a	22	a	32	a	42	b	52	a	62	c	72	c
3	c	13	b	23	b	33	c	43	d	53	c	63	a	73	c
4	c	14	b	24	d	34	d	44	b	54	d	64	c	74	c
5	b	15	c	25	b	35	b	45	d	55	c	65	a	75	
6	d	16	d	26	c	36	d	46	b	56	b	66	d	76	d
7	c	17	c	27	c	37	a	47	b	57	a	67	b	77	c
8	d	18	a	28	a	38	b	48	a	58	b	68	a	KIPS	
9	d	19	d	29	c	39	d	49	c	59	d	69	a		
10	a	20	d	30	b	40	d	50	c	60	c	70	b		

(From Past Papers 2008-2011)  
(D.G Khan + Bahawalpur/R.Y Khan + Multan Board)

1	b	11	c	21	d	31	d	41	b	51	a	61	b	71	c	81	a	91	a
2	d	12	a	22	c	32	b	42	d	52	d	62	b	72	a	82	c	92	a
3	b	13	c	23	a	33	b	43	c	53	a	63	c	73	c	83	a	93	b
4	c	14	d	24	b	34	a	44	b	54	a	64	b	74	d	84	c	94	a
5	a	15	c	25	d	35	a	45	d	55	b	65	d	75	b	85	d	95	d
6	c	16	d	26	c	36	c	46	a	56	d	66	b	76	a	86	b	KIPS COLLEGE	
7	a	17	a	27	d	37	b	47	c	57	b	67	d	77	a	87	b		
8	c	18	b	28	b	38	c	48	a	58	c	68	b	78	c	88	a		
9	a	19	a	29	b	39	d	49	d	59	a	69	d	79	d	89	b		
10	a	20	b	30	d	40	a	50	c	60	b	70	a	80	b	90	b		