Unit 3: Anti-Derivatives

1) The anti derivative of the function f(y) = secy tan y is

A) sec y tan y
B) $\sec^2 y$
C) secy + c
D) tany

2) The anti derivative of zero is

A) 1
B) 0
C) x
D) constant

3) The anti derivative of the function f(y) = 4^y is

A) 4^{y+1} + C
B) $4^y \ln 4$
C) $\frac{4^y}{\ln 4} + C$
D) 4^y + C

4) The anti derivative of the function f(y) = $\tan^2 y \operatorname{cosec}^2 y$ is

A) $\tan^2 y$ + c
B) tany + c
C) $\operatorname{cosec}^2 y$ + c
D) cosecy + c

5) The anti derivative of the function f(z) = $(3z-8)^5$ is

A) $\frac{(3z-8)^6}{6} + c$
B) $\frac{(3z-8)^6}{12} + c$
C) $\frac{(3z-8)^6}{18} + c$
D) $6(3z-8)^6 + c$

6) The value of $\int \frac{4y^3 - 4y}{y^4 - 2y^2 + 3} dy$ is

A) $\ln(y^3 - 4y) + c$
B) $\ln(y^4 - 2y + 3) + c$
C) $\ln(y^4 - 2y^2 + 3) + c$
D) $\ln(4y^3 - 4y) + c$

7) The value of $\int \frac{1}{y \ln y} dy$ is

A) $\ln|y| + c$
B) $\ln \frac{1}{y} + c$
C) $\frac{1}{y} + c$
D) $\ln[\ln|y|] + c$

8) The value of $\int \frac{\sec^2 y}{\tan 45^o} dy$ is

A) $\ln|\tan y| + c$
B) $\ln|\tan 45^o| + c$
C) tan y + c
D) sec y + c

9) The anti derivative of the function f(y) = y tan 45^o is

A) $\sec^2 45^o$ + C
B) y $\sec^2 45^o$
C) $\frac{y^2}{2} \sec^2 45^o$
D) ½ y^2 + c

10) The value of $\int (\tan 45^o) \sec^2 y \, dy$ is

A) $\frac{(\tan 45^o)^4}{4} + c$

B) $\frac{(\tan 45^o)^4}{4}$

C) $\frac{(\tan 45^o)^4}{4}\tan y + c$

D) Tan y + c

11) The value of $\int (\cot 45^o)^5 \cos ec^2 y\, dy$

A) $\frac{(\cot 45^o)^5}{6}$

B) $-\frac{(\cot 45^o)^6}{6} + c$

C) $\frac{(\cot 45^o)^6}{6} + c$

D) – cot y + c

12) The value of $\int (\sin a)^3 \cos x\, dx$ is

A) $\frac{(\sin a)^4}{4}$

B) $\frac{(\sin a)^4}{4} + c$

C) $\frac{(\sin a)^3}{3} + c$

D) $(\sin a)^3 \sin x + c$

13) The value of $\int \sin x \cos a\, dx$

A) $\frac{(\sin x)^2}{2}$

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

C) $-\cos x \cos a + c$

D) $\cos x \cos a + c$

14) the value of $\int \sec^3 a\, dy$ is

A) tan α + c

B) – tan α + c

C) y $\sec^2$ α + c

D) y tanα + c

15) The value of $\int \cos ec^2 a\, dx$ is

A) – cot a + c

B) cot a + c

C) x cot a + c

D) x cosec^2 a + c

16) The value of $\int \frac{\cot x \cot 45^o}{\ln \sin x} dx$ is

A) lnsinx + c

B) ln cotx + c

C) ln (ln sinx) + c

D) $-\ln$ (ln cotx) + c

17) The value of $\int \tan^2 y \sec^2 y\, dy$ is

A) $\frac{(\tan y)^3}{3} + c$

B) $\frac{(\tan y)^2}{2} + c$

C) $\frac{(\tan y)^3}{4} + c$

D) $\frac{1}{2}(\tan y)^3 + c$

18) The value of $\int (y^2 + y + 5)^4 (2y + 1)\, dy$

A) $\frac{y^3}{3} + \frac{y^2}{2} + 5y + c$

B) $\frac{(y^2 + y + 5)^4}{4}(y^2 + y) + c$

C) $\frac{(2y = 1)^5}{5} + c$

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

19) The partial fraction of $\frac{2x-1}{x(x-1)}$ are

A) $\frac{Ax + b}{x^2 - x}$

B) $\frac{A}{x} + \frac{B}{x-1}$

C) $\frac{A}{x} - \frac{B}{x-1}$

D) $\frac{A}{x-1} - \frac{B}{x}$

20) In the form of partial fractions the rational function $\frac{(3x^2-1)(2x+1)}{(x-1)(x^2+1)}$ can be written as

A) $\frac{A}{x-1}+\frac{B}{x^2+1}$
B) $\frac{A}{x-1}-\frac{B}{x^2+1}$
C) $\frac{A}{x-1}+\frac{Bx}{x^2+1}$
D) $\frac{A}{x-1}+\frac{Bx+c}{x^2+1}$

21) In the form of partial fractions the rational function $\frac{x^3+x^2+2x+3}{(x^2+1)(x^2+2)}$ can be written as

A) $\frac{A}{x^2+1}+\frac{B}{x^2+2}$
B) $\frac{Ax+B}{x^2+1}+\frac{Cx+D}{x^2+2}$
C) $\frac{Ax-B}{x^2+1}+\frac{Cx-D}{x^2+2}$
D) $\frac{A+B}{x^2+1}+\frac{C+D}{x^2+2}$

22) In the form of partial fraction the rational function $\frac{x^2+2x}{(x+1)^2(x^2+1)}$ can be written as

A) $\frac{A}{x+1}+\frac{B}{x^2+1}$
B) $\frac{A}{x+1}+\frac{Bx+C}{x^2+1}$
C) $\frac{A}{(x+1)^2}+\frac{Bx+C}{x^2+1}$
D) $\frac{A}{x+1}+\frac{B}{(x+1)^2}+\frac{Cx+D}{x^2+1}$

23) The value of $\int\frac{dx}{(x+2)^2+4}$ is

A) $Tan^{-1}(x+2)$
B) $Tan^{-1}\frac{(x+2)}{2}$
C) $\frac{1}{2}Tan^{-1}\frac{(x+2)}{2}+C$
D) $\frac{1}{4}Tan^{-1}\left(\frac{x+2}{4}\right)+C$

24) The value of $\int\frac{dx}{x^2-1}$ is

A) $\ln\left|\frac{x-1}{x+1}\right|+C$
B) $\ln\left|\frac{x+1}{x-1}\right|+C$
C) $\frac{1}{2}\ln\left|\frac{x+1}{x-1}\right|+C$
D) $\frac{1}{2}\ln\left|\frac{x-1}{x+1}\right|+C$

25) The value of $\int\frac{dx}{4-x^2}$ is

A) $\ln\left|\frac{2-x}{2+x}\right|+C$
B) $\ln\left|\frac{2+x}{2-x}\right|+C$
C) $\frac{1}{4}\ln\left|\frac{2+x}{2-x}\right|+C$
D) $\frac{1}{4}\ln\left|\frac{2-x}{2+x}\right|+C$

26) The value of $\int\frac{1+\cos x}{x+\sin x}dx$ is

A) $\ln|x+\sin x|+C$
B) $x+\sin x+C$
C) $\ln|x+\cos x|+C$
D) $\ln|\sin x+\cos x|+C$

27) The indefinite integral of the function $f(y)=\frac{2y}{y^2+1}$ is

A) $y^3\ y + C$
B) $\frac{y^3}{3}+y$
C) $y^2 + C$

D) $\ln\left|y^2+1\right|+C$

7. Integration by Substitution

1) The indefinite integral of $f(y)=\dfrac{e^y}{1+e^{2y}}$ is

A) $\ln\left|1+e^{2y}\right|+C$
B) e^y+C
C) $Tan^{-1}e^y+C$
D) $Cot^{-1}e^y+C$

2) The indefinite integral of f(x) = l_n x is

A) $\dfrac{1}{x}+c$
B) $\dfrac{\ln x}{x}+c$
C) ln x – x + c
D) x ln x – x + c

3) The anti derivative of $f(y)=e^y\left(\cos^{-1}y-\dfrac{1}{\sqrt{1-y^2}}\right)$ is

A) $e^y Sin^{-1}y+c$
B) $e^y Cos^{-1}y+c$
C) $-e^y Cos^{-1}y+c$
D) $-e^y Sin^{-1}y+c$

4) The value of $\int e^y\left(\sec^{-1}y+\dfrac{1}{y\sqrt{y^2-1}}\right)dy$ is

A) $e^y Co\sec^{-1}y+c$
B) $-e^y Co\sec^{-1}y+c$
C) $e^y Sec^{-1}y+c$
D) $-e^y Sec^{-1}y+c$

5) The anti derivative of $f(x)=e^x\left(Co\sec^{-1}x-\dfrac{1}{x\sqrt{x^2-1}}\right)$ is

A) $e^x Sec^{-1}x+c$
B) $e^x Co\sec^{-1}x+c$
C) $-e^x Sec^{-1}x+c$
D) $-e^x Co\sec^{-1}x+c$

6) The value of $\int e^y(y^3+3y^2)\,dy$ is

A) $e^y\left(\dfrac{y^4}{4}+y^3\right)+c$
B) $e^y\left(y^4+y^3\right)+c$
C) $e^y y^3+c$
D) $3e^y y^2+c$

7) The anti derivative of $f(x)=e^x x^3+3e^x x^2$ is

A) $e^x\dfrac{x^4}{4}+e^x x^3+c$
B) $e^x x^4+3e^x x^2$
C) $e^x\dfrac{x^4}{4}+3e^x x^3+c$
D) $e^x x^3+c$

8) The value of $\int\left(e^z Cosz-e^z Sinz\right)dz$ is

A) $-e^z\sin z+c$
B) $e^z\cos z+c$
C) $-e^z\cos z+c$
D) $e^z\sin z+c$

9) The definite integral of $f(y)=e^y Coty-e^y Co\sec^2 y$ is

A) $e^y Co\sec^2 y+c$
B) $-e^y Co\sec^2 y+c$
C) $-e^y\tan y+c$
D) $e^y\cot y+c$

10) The anti derivative of $f(z)=e^z Secz+e^z Secz\tan z$ is

A) e^z Cosecz + c
B) e^z secz + c
C) – e^z secz tanz + c
D) e^z Secz tan z + c

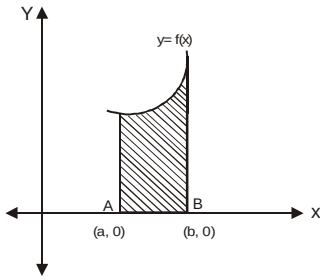
11) The value of $\int \left(e^y Co\sec y - e^y Co\sec y Coty\right)dy$ is

A) e^y Cosecy Coty + c
B) $-e^y$ Cosecy Coty + c
C) e^y Cosec y + c
D) $-e^y$ Cosecy + c

12) The value of $\int_{\frac{p}{4}}^{\frac{p}{4}} \left(Sec^2 y + Co\sec^2 y\right)dy$ is

A) 0
B) $Tan\frac{p}{4}$
C) 1
D) $-Cot\frac{p}{4}$

13) The shaded area in the figure can be represented by



A) $\int_0^a f(x)\,dx$
B) $\int_0^b f(x)\,dx$
C) $\int_b^a f(x)\,dx$
D) $\int_a^b f(x)\,dx$

14) The value of $\int_3^3 (x^3 + 3x^2 + 2x + 1)\,dx$ is

A) 27
B) 54
C) 52
D) 0

15) The value of $\int_1^3 (z^5 + 4z^4 + z^3)\,dz$ is

A) 1
B) 243
C) 324
D) $-\int_3^1 (z^5 + 4z^4 + z^3)\,dz$

16) The value of $\int_0^{\frac{p}{3}} \sin y\ dy$ is

A) 0
B) 1
C) $\frac{\sqrt{3}}{2}$
D) $-\int_{\frac{p}{3}}^0 \sin y\ dy$

17) The value of $\int_0^{\frac{p}{4}} \tan y \sec^2 y\ dy$ is

A) 0
B) 1
C) – 1
D) $-\int_{\frac{p}{4}}^0 \tan y \sec^2 y\ dy$

18) The value of $\int_1^3 (x^2 + 2x)^5\,dx + \int_3^5 (y^2 + 2y)^5\,dy$ is

A) $\int_1^5 (x^2 + 2x)^5\,dx$
B) $\int_3^5 (y^2 + 2y)^5\,dy$
C) $\int_1^3 (y^2 + 2y)^5\,dy$
D) $\int_1^5 (y^2 + 2y)^6\,dy$

19) The value of $\int_0^2 (y^3+3y^2)^6\,dy + \int_2^4 (z^3+3z^2)^6\,dz$ is

A) 204
B) 364
C) $\int_0^4 (z^3+3z^2)^6\,dz$
D) ¾

20) If f and g are continuous functions and $\int_1^3 f(y)\,dy = 8, \int_3^7 f(z)\,dz = 9$ then the value of $\int_1^7 f(z)\,dz$ is

A) 7
B) 1
C) 6
D) 17

21) IF f and g are continuous functions on (a, b), s.t. $\int_a^b f(x)\,dx = 12$ *and* $\int_a^b g(x)\,dx = 5$ then the value of $\int_a^b [f(x)-g(x)]\,dx$ is

A) 7ab
B) 7(a – b)
C) 7(b – a)
D) 7

22) If f and g are continuous functions on (1, 5), such that $\int_1^5 f(y)\,dy = 5$ and $\int_1^5 g(y)\,dy = 3$ then the value of $\int_1^5 [f(y)+g(y)]\,dy$ is

A) 6
B) 8
C) 4
D) 2

23) If $\int_2^5 f(x)\,dx = 5$ then the value of $\int_2^5 5f(y)\,dy$ is

A) 5
B) 3
C) 25
D) 10

24) If $\int_1^3 f(x)\,dx = 4$ then the value of $\int_3^1 f(y)\,dy$ is

A) 2
B) – 2
C) 3
D) – 4

25) The solution of the equation $\frac{dy}{dx} = 2x$ is

A) y = 2x
B) $y = x^2 + c$
C) $y = 2x^2 + c$
D) $y = 3x^2 + c$

26) Let f be continuous on (1, 7) and $\int_1^7 f(x)\,dx = 9, \int_1^7 f(y)\,dy = 19$ then the value of $\int_3^7 f(z)\,dz$ is

A) 10
B) 28
C) 7
D) 4

27) The solution of $\frac{dy}{dx} = \frac{x}{y}$ is

A) $x^2 + c$
B) $y^2 = x^2 + c$
C) $y^2 = x + 2c$
D) $y^2 = 2x$

28) If the acceleration of a particle is given by $z = 2t$, then its velocity at any time t is:

A) $2t^2 + c$
B) $3t^2 + c$
C) $t^2 + c$
D) 2

29) If the velocity of a particle moving in a straight line is given by $v = 3t^2$ then the distance traveled by it in the first T seconds is

A) $3t^2 + c$
B) $t^3 + c$
C) $3t^2 + c$
D) $T^3 + c$

30) The solution of $\frac{dy}{dx} = \frac{1}{x}$ is

A) $y = x^2 + c$
B) $y = \ln|Cx|$
C) $y = \ln\left|\frac{1}{x}\right|$
D) $y = \frac{1}{x} + c$

****

Written by NAUMAN IDREES
(nomi255@yahoo.com)
FSc (Session: 2007-09)
ICMS College System Hayatabad, Peshawar