

$$1. \sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$2. \sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$5. \tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$6. \tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$9. \cot(A + B) = \frac{\cot A \cot B - 1}{\cot B + \cot A}$$

$$11. 2\sin A \cos B = \sin(A + B) + \sin(A - B)$$

$$12. 2\cos A \sin B = \sin(A + B) - \sin(A - B)$$

$$13. 2\cos A \cos B = \cos(A + B) + \cos(A - B)$$

$$14. 2\sin A \sin B = \cos(A - B) - \cos(A + B)$$

$$19. \sin 2A = 2\sin A \cos A$$

$$21. 1 + \cos 2A = 2\cos^2 A$$

$$23. \tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$

$$25. \sin 2A = \frac{2\tan A}{1 + \tan^2 A}$$

$$27. \cos 2A = \frac{1 - \tan^2 A}{1 + \tan^2 A}$$

ত্রিকোণমিতি

$$3. \cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$4. \cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$7. \sin(A + B)\sin(A - B) = \sin^2 A - \sin^2 B = \cos^2 B - \cos^2 A$$

$$8. \cos(A + B)\cos(A - B) = \cos^2 A - \sin^2 B = \cos^2 B - \sin^2 A$$

$$10. \cot(A - B) = \frac{\cot A \cot B + 1}{\cot B - \cot A}$$

$$15. \sin C + \sin D = 2\sin \frac{C + D}{2} \cos \frac{C - D}{2}$$

$$16. \sin C - \sin D = 2\sin \frac{C - D}{2} \cos \frac{C + D}{2}$$

$$17. \cos C + \cos D = 2\cos \frac{C + D}{2} \cos \frac{C - D}{2}$$

$$18. \cos C - \cos D = 2\sin \frac{C + D}{2} \sin \frac{D - C}{2}$$

$$20. \cos 2A = \cos^2 A - \sin^2 A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$$

$$22. 1 - \cos 2A = 2\sin^2 A$$

$$24. \sin 3A = 3\sin A - 4\sin^3 A$$

$$26. \cos 3A = 4\cos^3 A - 3\cos A$$

$$28. \tan 3A = \frac{3\tan A - \tan^3 A}{1 - 3\tan^2 A}$$

অন্তরীকরণ

1. $\frac{d}{dx}(x^n) = nx^{n-1}$
2. $\frac{d}{dx}(x) = 1$
3. $\frac{d}{dx}\left(\frac{1}{x}\right) = -\frac{1}{x^2}$
4. $\frac{d}{dx}(\sqrt{x}) = \frac{1}{2\sqrt{x}}$
5. $\frac{d}{dx}(\text{ধ্রুবক}) = 0$
6. $\frac{d}{dx}\{c \cdot f(x)\} = c \cdot \frac{d}{dx}\{f(x)\}$
7. $\frac{d}{dx}(a^x) = a^x \ln a$
8. $\frac{d}{dx}(e^x) = e^x$
9. $\frac{d}{dx}(e^{mx}) = me^{mx}$
10. $\frac{d}{dx}(\ln x) = \frac{1}{x}$
11. $\frac{d}{dx}(\log_a x) = \frac{1}{x} \log_a e$
12. $\frac{d}{dx}(\sin x) = \cos x$
13. $\frac{d}{dx}(\cos x) = -\sin x$
14. $\frac{d}{dx}(\tan x) = \sec^2 x$
15. $\frac{d}{dx}(\cot x) = -\operatorname{cosec}^2 x$
16. $\frac{d}{dx}(\sec x) = \sec x \tan x$
17. $\frac{d}{dx}(\operatorname{cosec} x) = -\operatorname{cosec} x \cot x$
18. $\frac{d}{dx}(\sin^2 x) = \sin 2x$
19. $\frac{d}{dx}(\cos^2 x) = -\sin 2x$
20. $\frac{d}{dx}(u + v) = \frac{d}{dx}(u) + \frac{d}{dx}(v)$
21. $\frac{d}{dx}(u - v) = \frac{d}{dx}(u) - \frac{d}{dx}(v)$
22. $\frac{d}{dx}(uv) = u \frac{d}{dx}(v) + v \frac{d}{dx}(u)$
23. $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v \frac{d}{dx}(u) - u \frac{d}{dx}(v)}{v^2}$
24. $\frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$
25. $\frac{d}{dx}(\cos^{-1} x) = \frac{-1}{\sqrt{1-x^2}}$
26. $\frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$
27. $\frac{d}{dx}(\cot^{-1} x) = \frac{-1}{1+x^2}$
28. $\frac{d}{dx}(\sec^{-1} x) = \frac{1}{x \sqrt{x^2-1}}$
29. $\frac{d}{dx}(\operatorname{cosec}^{-1} x) = \frac{-1}{x \sqrt{x^2-1}}$
30. $\frac{d}{dx}(u^v) = u^v \frac{d}{dx}(v \ln u)$

যোগজীকরণ

1. $\int x^n dx = \frac{x^{n+1}}{n+1} + c, n \neq -1$
2. $\int \frac{1}{x} dx = \ln|x| + c$
3. $\int e^x dx = e^x + c$
4. $\int e^{mx} dx = \frac{1}{m} e^{mx} + c$
5. $\int a^x dx = \frac{a^x}{\ln a} + c$
6. $\int \sin x dx = -\cos x + c$
7. $\int \cos x dx = \sin x + c$
8. $\int \tan x dx = \ln|\sec x| + c$
9. $\int \cot x dx = \ln|\sin x| + c$
10. $\int \sec x dx = \ln|\sec x + \tan x| + c$
11. $\int \operatorname{cosec} x dx = \ln \left| \tan \frac{x}{2} \right| + c$
22. $\int \frac{f'(x)}{f(x)} dx = \ln|f(x)| + c$
24. $\int uv dx = u \int v dx - \int \left\{ \frac{d}{dx} (u) \int v dx \right\} dx$
26. $\int \sqrt{a^2 - x^2} dx = \frac{x\sqrt{a^2 - x^2}}{2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + c$
27. $\int \sqrt{x^2 - a^2} dx = \frac{x\sqrt{x^2 - a^2}}{2} - \frac{a^2}{2} \ln(x + \sqrt{x^2 - a^2}) + c$
28. $\int \sqrt{x^2 + a^2} dx = \frac{x\sqrt{x^2 + a^2}}{2} + \frac{a^2}{2} \ln(x + \sqrt{x^2 + a^2}) + c$
29. $\int \frac{dx}{\sqrt{x^2 + a^2}} = \ln(x + \sqrt{x^2 + a^2}) + c$
30. $\int \frac{dx}{\sqrt{x^2 - a^2}} = \ln(x + \sqrt{x^2 - a^2}) + c$
12. $\int \sec^2 x dx = \tan x + c$
13. $\int \operatorname{cosec}^2 x dx = -\cot x + c$
14. $\int \sec x \tan x dx = \sec x + c$
15. $\int \operatorname{cosec} x \cot x dx = -\operatorname{cosec} x + c$
16. $\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1} \frac{x}{a} + c$
17. $\int \frac{dx}{1 + x^2} = \tan^{-1} x + c$
18. $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \frac{x}{a} + c$
19. $\int \frac{dx}{\sqrt{1 - x^2}} = \sin^{-1} x + c$
20. $\int \frac{dx}{x^2 - a^2} = \frac{1}{2a} \ln \left| \frac{x - a}{x + a} \right| + c$
21. $\int \frac{dx}{a^2 - x^2} = \frac{1}{2a} \ln \left| \frac{a + x}{a - x} \right| + c$
23. $\int \frac{f'(x)}{\sqrt{f(x)}} dx = 2\sqrt{f(x)} + c$
25. $\int 0 dx = c$

प्रश्न :

⇒ 1. True error (E_t) = Exact value - Approximate value

↓
True value

2. Relative true error (E_t) = $\frac{\text{True Error}}{\text{Exact value}}$

3. Absolute relative true error = $|E_t|$

⇒ 4. Equation to have the Approx value $f'(x) \approx \frac{f(x+h) - f(x)}{h}$ $\Delta x = h$

⇒ 5. Approximate Error (E_a) = Present ^{current} Approx - Previous Approx

6. Relative Approximate Error (E_a) = $\frac{\text{Approximate Error}}{\text{present Approximate}}$

7. Absolute relative Approximate Error $|E_a|$

अवश्या Absolute relative error को percentage में देना

⇒ 8. Forward Difference Approximation:

$$f'(x) \approx \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

⇒ 9. Backward Difference Approximation:

$$f'(x) \approx \frac{f(x) - f(x-\Delta x)}{\Delta x}$$

⇒ 10. Central divided difference:

$$f'(x) \approx \frac{f(x+\Delta x) - f(x-\Delta x)}{2\Delta x}$$