

16)  $\cos^2 A + \sin^2 A = 1$

17)  $\sec^2 A = 1 + \tan^2 A$

18)  $\operatorname{cosec}^2 A = 1 + \cot^2 A$

19)  $\cos 2A = 2 \cos^2 A - 1$

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

21)  $\cos 2A = \cos^2 A - \sin^2 A$

22)  $\sin 2A = 2 \sin A \cos A$

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

30)  $\frac{d}{dx}(x^n) = nx^{n-1}$

31)  $\frac{d}{dx}(\sin kx) = k \cos kx$

32)  $\frac{d}{dx}(\cos kx) = -k \sin kx$

33)  $\frac{d}{dx}(e^{kx}) = ke^{kx}$

34)  $\frac{d}{dx}(\ln x) = \frac{1}{x}$

35)  $\frac{d}{dx}(f(x) + g(x)) = f'(x) + g'(x)$

36)  $\frac{d}{dx}(f(x)g(x)) = f'(x)g(x) + f(x)g'(x)$

37)  $\frac{d}{dx}(f(g(x))) = f'(g(x))g'(x)$

38)  $\int x^n dx = \frac{1}{n+1}x^{n+1} + c$

39)  $\int \cos kx dx = \frac{1}{k} \sin kx + c$

40)  $\int \sin kx dx = -\frac{1}{k} \cos kx + c$

41)  $\int e^{kx} dx = \frac{1}{k} e^{kx} + c$

42)  $\int \frac{1}{x} dx = \ln|x| + c$

43)  $\int f'(x) + g'(x) dx = f(x) + g(x)$

44)  $\int f'(g(x))g'(x) dx = f(g(x)) + c$

## Trigonometric identities

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B} \quad (A \pm B \neq (k + \frac{1}{2})\pi)$$

## Differentiation

$$\mathbf{f(x)} \quad \mathbf{f'(x)}$$

$$\tan kx \quad k \sec^2 kx$$

$$\sec kx \quad k \sec kx \tan kx$$

$$\cot kx \quad -k \operatorname{cosec}^2 kx$$

$$\operatorname{cosec} kx \quad -k \operatorname{cosec} kx \cot kx$$

$$\frac{f(x)}{g(x)} \quad \frac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}$$

## Integration (+ constant)

$$\mathbf{f(x)} \quad \int \mathbf{f(x) dx}$$

$$\sec^2 kx \quad \frac{1}{k} \tan kx$$

$$\tan kx \quad \frac{1}{k} \ln |\sec kx|$$

$$\cot kx \quad \frac{1}{k} \ln |\sin kx|$$

$$\operatorname{cosec} kx \quad -\frac{1}{k} \ln |\operatorname{cosec} kx + \cot kx|, \quad \frac{1}{k} \ln |\tan(\frac{1}{2} kx)|$$

$$\sec kx \quad \frac{1}{k} \ln |\sec kx + \tan kx|, \quad \frac{1}{k} \ln |\tan(\frac{1}{2} kx + \frac{1}{4} \pi)|$$

$$\int u \frac{dv}{dx} dx = uv - \int v \frac{du}{dx} dx$$