Integration technique for trigonometric functions:

Case 1: $\int \cos^m(x)\sin^n(x)\,dx$

If m is odd, then let $u = \sin x$ and if n is odd, then $u = \sin(x)$

Ex: Integrate the following:

a) $\int \cos^3(2x)\sin^4(2x)\,dx$

b) $\int \sqrt[5]{\cos^3(4x)}\sin^5(4x)\,dx$

c) $\int \cos^3(5x)\sqrt{\sin^7(5x)}dx$

d) $\int \tan^3(2x)\,dx$

e) $\int \cot(7x)\,dx$

Case 2: $\int \cos^m(x)\sin^n(x)\,dx$ no odd power➔ Double angle formula

Ex: Integrate the following:

a) $\int \cos^4(3x)\,dx$

b) $\int \sin^4(5x)\,dx$

Case 3: For tangent with secant and cotangent with cosecant.

Ex: Integrate the following:

a) $\int \sec^4(3x)\tan^2(3x)\,dx$

b) $\int \csc^3(2x)\cot^3(2x)\,dx$

c) $\int \tan^4(3x)\,dx$

d) $\int \sec^4(5x)\,dx$

Other:

e) $\int \sec(x)\,dx$

f) $\int \tan(x)\,dx$

g) $\int \sqrt{1+\cos(3x)}dx$

h) $\int \frac{dx}{\cos(x)-1}$

g) $\int \sqrt{\frac{1-\sin x}{1+\sin x}}dx$