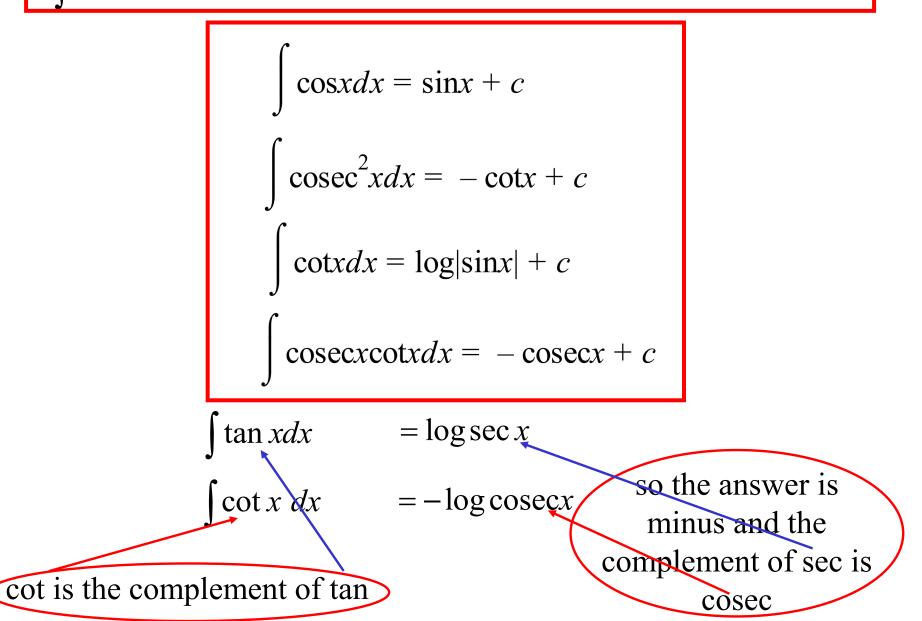
(1) Basic Integrals

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\int \sin x \, dx = -\cos x + c
  \int \cos x dx = \sin x + c
\int \sec^2 x dx = \tan x + c
 \int \tan x \, dx = \int \frac{\sin x}{\cos x} \, dx
                = -\log|\cos x| + c OR \log|\sec x| + c
   \operatorname{secxtan} x dx = \operatorname{secx} + c
```

(2) Complementary Ratios

complementary trig ratio = -complement of the answer



(3) Squares of Trig Functions

$$\int \sin^2 x dx = \frac{1}{2} \int (1 - \cos 2x) dx \qquad = \frac{x}{2} - \frac{1}{4} \sin 2x + c$$
$$\left(= \frac{x}{2} - \frac{1}{2} \sin x \cos x + c \right)$$
$$\int \cos^2 x dx = \frac{1}{2} \int (1 + \cos 2x) dx \qquad = \frac{x}{2} + \frac{1}{4} \sin 2x + c$$
$$\left(= \frac{x}{2} + \frac{1}{2} \cos x \sin x + c \right)$$
$$\int \sec^2 x dx = \tan x + c \qquad \int \csc^2 x dx = -\cot x + c$$
$$\int \tan^2 x dx = \int (\sec^2 x - 1) dx \qquad = \tan x - x + c$$
$$\int \cot^2 x dx = \int (\csc^2 x - 1) dx \qquad = -\cot x - x + c$$

e.g. (i)
$$\int \cos^2 3x \, dx = \frac{1}{2} \int (1 + \cos 6x) dx$$

 $= \frac{x}{2} + \frac{1}{12} \sin 6x + c$
(ii) $\int \sin x \cos 2x \, dx$
 $= \frac{1}{2} \int (\sin 3x + \sin(-x)) dx$
 $= \frac{1}{2} \int (\sin 3x - \sin x) dx$
 $= -\frac{\cos 3x}{6} + \frac{\cos x}{2} + c$
Exercise 12C; 4c, 5ace, 6, 8bdfh,
9, 10ab i, 11ad, 12, 13, 14
 $= \frac{1}{2} \int (\cos^2 x) dx$
 $= \frac{1}{2} \int (\sin^2 x) dx$
 $= \left[\frac{\cos^4 x}{4} \right]_{\frac{\pi}{4}}^{0}$
 $= \frac{1}{4} \left(1 - \frac{1}{4} \right)$
 $= \frac{3}{16}$

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