

# Ex 6

$$a) \int \frac{dx}{1+x^2} = \arctan x + C$$

$$b) \int \frac{dx}{1+4x^2} = \int \frac{dx}{4(\frac{1}{4}+x^2)} = \frac{1}{4} \cdot \frac{1}{\frac{1}{2}} \arctan \frac{x}{\frac{1}{2}} + C =$$
$$a = \frac{1}{2}$$
$$= \frac{1}{2} \arctan 2x + C$$

$$c) \int \frac{dx}{3+27x^2} = \int \frac{dx}{27(\frac{1}{9}+x^2)} = \frac{1}{27} \cdot \frac{1}{\frac{1}{3}} \arctan \frac{x}{\frac{1}{3}} + C =$$
$$a = \frac{1}{3}$$
$$= \frac{1}{9} \arctan 3x + C$$

$$d) \int \frac{dx}{4+x^2} = \frac{1}{2} \arctan \frac{x}{2} + C$$
$$a = 2$$

$$e) \int \cos x e^{\sin x} dx = \int e^{\sin x} d\sin x = e^{\sin x} + C$$

$$f) \int \sin^3 x \cos x dx = \int \sin^2 x d\sin x = \frac{(\sin x)^4}{4} + C$$

$$g) \int \frac{dx}{2x+3} = \int \frac{dx}{2(x+\frac{3}{2})} = \frac{1}{2} \cdot \ln |x+\frac{3}{2}| + C$$

$$h) \int \frac{\ln x}{x} dx = \int \ln x d\ln x = \frac{(\ln x)^2}{2} + C$$

$$i) \int \frac{2x}{x^2+1} dx = \int \frac{dx^2}{x^2+1} = \int \frac{du}{u+1} = \ln |u+1| + C =$$

$$= \ln |x^2+1| + C$$

$$j) \int \frac{3x+1}{9x^2+6x+2} dx = \int \frac{1}{6} \frac{6(3x+1)}{9x^2+6x+2} dx = \frac{1}{6} \int \frac{d(9x^2+6x+2)}{9x^2+6x+2} =$$

$$= \frac{1}{6} \ln |9x^2+6x+2| + C$$

$$k) \int \frac{\cos x}{\sin x} dx = \int \frac{d\sin x}{\sin x} = \ln |\sin x| + C$$

$$l) \int \frac{1+\tan^2 x}{\tan^2 x} dx = \int \frac{d \cdot \tan x}{\tan^2 x} = -\frac{1}{\tan x} + C = -\cot x + C$$