

11.1) Integrating standard functions

Worked example

By thinking about integration as the reverse of differentiation, find:

$$\int x^n dx$$

$$\int e^x dx$$

Your turn

By thinking about integration as the reverse of differentiation, find:

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

Worked example

By thinking about integration as the reverse of differentiation, find:

$$\int \sin x \, dx$$

$$\int \operatorname{cosec} x \cot x \, dx$$

$$\int \sec^2 x \, dx$$

Your turn

By thinking about integration as the reverse of differentiation, find:

$$\int \cos x \, dx$$

$\sin x + c$

$$\int \sec x \tan x \, dx$$

$\sec x + c$

$$\int \operatorname{cosec}^2 x \, dx$$

$-\cot x + c$

Worked example

By thinking about integration as the reverse of differentiation, find:

$$\int -\sin x \, dx$$

$$\int -\operatorname{cosec} x \cot x \, dx$$

$$\int -\sec^2 x \, dx$$

Your turn

By thinking about integration as the reverse of differentiation, find:

$$\int -\cos x \, dx$$
$$-\sin x + c$$

$$\int -\sec x \tan x \, dx$$
$$-\sec x + c$$

$$\int -\operatorname{cosec}^2 x \, dx$$
$$\cot x + c$$

Worked example

Find:

$$\int 3 \sin x - \frac{4}{x^2} + \sqrt[3]{x} \, dx$$

Your turn

Find:

$$\int 2 \cos x + \frac{3}{x} - \sqrt{x} \, dx$$

$$2 \sin x + 3 \ln |x| - \frac{2}{3} x^{\frac{3}{2}} + c$$

Worked example

Find:

$$\int \frac{\sin x}{\cos^2 x} dx$$

Your turn

Find:

$$\int \frac{\cos x}{\sin^2 x} dx$$

$$-\operatorname{cosec} x + c$$

Worked example

Given that

$$\int_a^{5a} \frac{3x-1}{x} dx = \ln 2,$$

find the exact value of a .

Your turn

Given that

$$\int_a^{3a} \frac{2x+1}{x} dx = \ln 12,$$

find the exact value of a .

$$a = \frac{1}{4} \ln 4$$