

1 Find the following indefinite integrals.

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

b $\int \cos x \, dx$

c $\int \sin x \, dx$

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

e $\int 2 \cos x \, dx$

f $\int \cos 2x \, dx$

g $\int \frac{1}{2} \cos x \, dx$

h $\int \cos \frac{1}{2}x \, dx$

i $\int \sin 2x \, dx$

j $\int \sec^2 5x \, dx$

k $\int \cos 3x \, dx$

l $\int \sec^2 \frac{1}{3}x \, dx$

m $\int \sin \frac{x}{2} \, dx$

n $\int -\cos \frac{1}{5}x \, dx$

o $\int -4 \sin 2x \, dx$

p $\int \frac{1}{4} \sin \frac{1}{4}x \, dx$

q $\int 12 \sec^2 \frac{1}{3}x \, dx$

r $\int 2 \cos \frac{x}{3} \, dx$

2 Find the value of:

a $\int_0^{\frac{\pi}{2}} \cos x \, dx$

b $\int_0^{\frac{\pi}{6}} \cos x \, dx$

c $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \sin x \, dx$

d $\int_0^{\frac{\pi}{3}} \sec^2 x \, dx$

e $\int_0^{\frac{\pi}{4}} 2 \cos 2x \, dx$

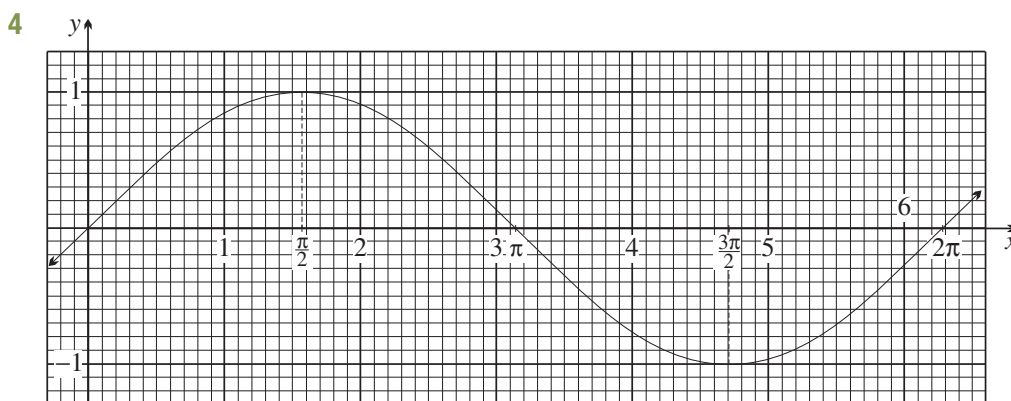
f $\int_0^{\frac{\pi}{3}} \sin 2x \, dx$

g $\int_0^{\frac{\pi}{2}} \sec^2\left(\frac{1}{2}x\right) \, dx$

h $\int_{\frac{\pi}{3}}^{\pi} \cos\left(\frac{1}{2}x\right) \, dx$

i $\int_0^{\pi} (2 \sin x - \sin 2x) \, dx$

- 3 **a** The gradient function of a certain curve is given by $\frac{dy}{dx} = \sin x$. If the curve passes through the origin, find its equation.
- b** Another curve passing through the origin has gradient function $y' = \cos x - 2 \sin 2x$. Find its equation.
- c** If $\frac{dy}{dx} = \sin x + \cos x$, and $y = -2$ when $x = \pi$, find y as a function of x .



The graph of $y = \sin x$ is sketched above.