

1. Find each of the following indefinite integrals. Check your answers by differentiation.

(a)  $\int 4^x dx$

(b)  $\int (5^x + x^5 + 5^5) dx$

$$(c) \int \left( 3y^2 + \frac{3}{y^2} + 3\sqrt{y} + \frac{3}{\sqrt{y}} \right) dy$$

$$(d) \int (12 \sin(x) + \sin(12x) + x \sin(12)) dx$$

2. Find each of the following definite integrals:

(a)  $\int_0^1 (e^{u/3} + 2) du$

(b)  $\int_{-1}^1 \frac{1}{1+x^2} dx$  (Here, you may wish to recall that  $\tan(-\pi/4) = -1$  and  $\tan(\pi/4) = 1$ .)

3. Solve the initial value problem

$$F'(x) = 2 - x + \cos(x), \quad F(0) = -2.$$

4. Find the area under the graph of  $f(x) = 2 - x + \cos(x)$  from  $x = 0$  to  $x = \pi/2$ .

