

**Task**

Find  $f$ . (Use  $C$  for the constant of the first antiderivative and  $D$  for the constant of the second antiderivative.)

$$f''(x) = 8 + x^3 + x^5$$

**Solution**

Find  $f'(x)$ :

$$f'(x) = \int (8 + x^3 + x^5) dx = \int 8 dx + \int x^3 dx + \int x^5 dx = 8x + \frac{x^4}{4} + \frac{x^6}{6} + C$$

Find  $f(x)$ :

$$\begin{aligned} f(x) &= \int f'(x) dx = \int \left( 8x + \frac{x^4}{4} + \frac{x^6}{6} + C \right) dx = \int 8x dx + \int \frac{x^4}{4} dx + \int \frac{x^6}{6} dx + \int C dx = \\ &= 8 \frac{x^2}{2} + \frac{x^5}{4 \times 5} + \frac{x^7}{6 \times 7} + Cx + D = 4x^2 + \frac{x^5}{4 \times 5} + \frac{x^7}{6 \times 7} + Cx + D \end{aligned}$$

**Answer**

$$f(x) = 4x^2 + \frac{x^5}{20} + \frac{x^7}{42} + Cx + D$$