
Complete the following problems. Show all work to receive full credit.

1. Find all possible functions with the following derivatives:

(a) $f'(x) = 2x - 1$

$$f(x) = x^2 - x + C$$

(b) $f'(\theta) = \sqrt{\theta} - \sec^2 \theta$

$$\frac{2}{3}\theta^{\frac{3}{2}} - \tan \theta + C$$

2. Find the function with derivative $f'(x) = e^{2x}$ that passes through the point $\left(0, \frac{3}{2}\right)$

$$f(x) = \frac{1}{2}e^{2x} + C$$

Using the initial condition, we have:

$$f(0) = \frac{1}{2}e^{2 \cdot 0} + C = \frac{3}{2}$$

$$\frac{1}{2} + C = \frac{3}{2}$$

$$C = 1$$

$$f(x) = \frac{1}{2}e^{2x} + 1$$