

13) Найти: $\int \frac{dx}{2x-5}$

Решение:

$$\int \frac{dx}{2x-5} =$$

$$t = 2x - 5 \Rightarrow$$

$$\Rightarrow dt = d(2x-5) = d(2x) = 2dx \Leftrightarrow dx = \frac{dt}{2}$$

$$= \int \frac{1}{t} \cdot \frac{dt}{2} = \int \frac{dt}{2t} =$$

$$\frac{dt}{2t} = \frac{1}{2} \frac{dt}{t} = \frac{1}{2} d \ln |t| = d \left(\frac{\ln |t|}{2} \right)$$

$$= \int d \left(\frac{\ln |t|}{2} \right) = \frac{\ln |t|}{2} + C =$$

$$t = 2x - 5$$

$$= \frac{1}{2} \ln |2x - 5| + C$$

Проверка:

$$\frac{d}{dx} \left(\frac{1}{2} \ln |2x - 5| + C \right) = \frac{d}{dx} \left(\frac{1}{2} \ln |2x - 5| \right) = \frac{1}{2} \frac{d}{dx} \ln |2x - 5| =$$

$$= \frac{1}{2} \cdot \frac{1}{2x - 5} \cdot \frac{d}{dx} (2x - 5) = \frac{1}{2} \cdot \frac{1}{2x - 5} \cdot \frac{d}{dx} (2x) = \frac{1}{2} \cdot \frac{1}{2x - 5} \cdot 2 =$$

$$= \frac{2}{2(2x - 5)} = \frac{1}{2x - 5}$$

Ответ:

$$\boxed{\int \frac{dx}{2x-5} = \frac{1}{2} \ln |2x-5| + C}$$