Тема: Определенный интеграл

Задание. *Вычислить определенный интеграл*

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin 6x \sin 7x \, dx.$$

Решение.

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin 6x \sin 7x \, dx = \frac{1}{2} \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} (\cos(-x) - \cos(13x)) \, dx =$$

$$= \frac{1}{2} \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \cos(x) \, dx - \frac{1}{26} \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \cos(13x) \, d13x =$$

$$= \frac{1}{2} \sin x \Big|_{\frac{\pi}{6}}^{\frac{\pi}{3}} - \frac{1}{26} \sin(13x) \Big|_{\frac{\pi}{6}}^{\frac{\pi}{3}} = \frac{1}{2} \left(\frac{\sqrt{3}}{2} - \frac{1}{2} \right) - \frac{1}{26} \left(\frac{\sqrt{3}}{2} - \frac{1}{2} \right) = \frac{3}{13} (\sqrt{3} - 1).$$