

10. Using integration, find the area of the region bounded by the line $2y = 5x + 7$, x-axis and the lines $x = 2$ and $x = 8$.

Sol. We have, $2y = 5x + 7$

or $y = \frac{5x}{2} + \frac{7}{2}$

The graph is as shown in the adjacent figure.
From the figure, area of shaded region

$$\begin{aligned} &= \int_2^8 \frac{5x+7}{2} dx \\ &= \frac{1}{2} \left[5 \cdot \frac{x^2}{2} + 7x \right]_2^8 \\ &= \frac{1}{2} [5 \times 32 + 7 \times 8 - 10 - 14] \\ &= \frac{1}{2} [160 + 56 - 24] = 96 \text{ sq. units} \end{aligned}$$

