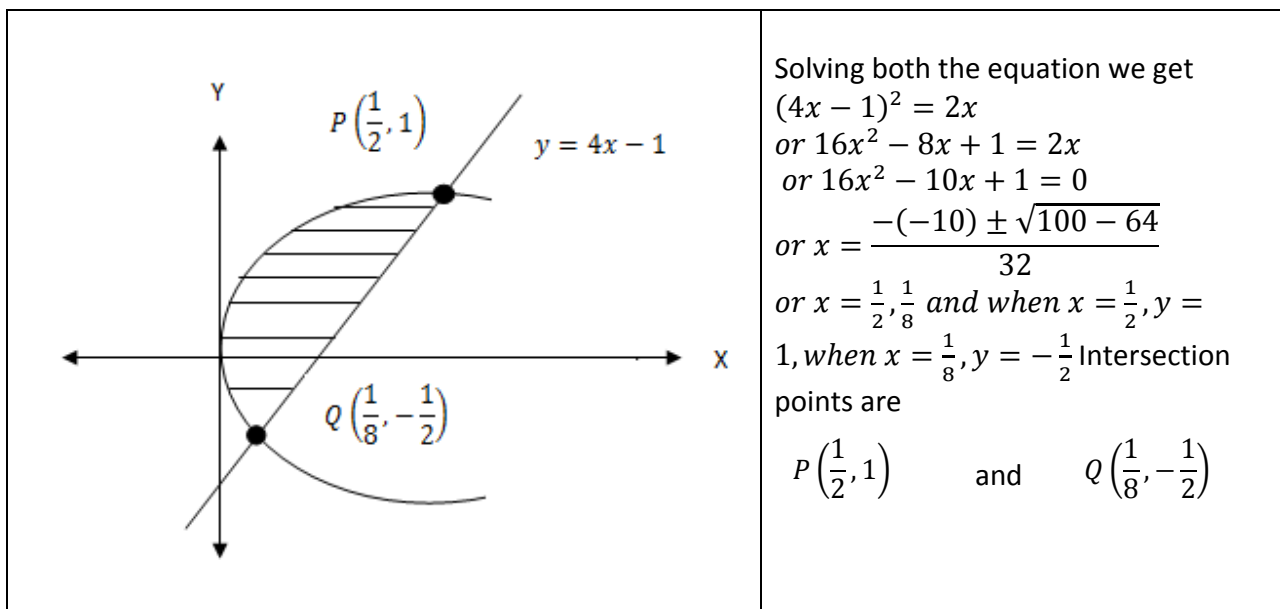




16. The area (in sq. units) of the region described by $\{(x, y); y^2 \leq 2x\}$ and $y \geq 4x - 1$ is
 (1) $\frac{7}{32}$ (2) $\frac{5}{64}$ (3) $\frac{15}{64}$ (4) $\frac{9}{32}$

Answer: $y^2 \leq 2x$ is a parabola and $y \geq 4x - 1$ is straight line, plotting both the graph to find point of intersection and bounded region for finding limits of integration.



Therefore the shaded region (derived after considering one internal point to satisfy inequality) between the straight line and parabola can be obtained by integrating between the limits $y = -\frac{1}{2}$ and $y = 1$

$$\int_{-\frac{1}{2}}^1 \left(\frac{y+1}{4} - \frac{y^2}{2} \right) dy = \left[\frac{\frac{y^2}{2} + y}{4} - \frac{y^3}{6} \right]_{-\frac{1}{2}}^1 = \left(\frac{3}{8} - \frac{1}{6} \right) - \left(-\frac{3}{32} + \frac{1}{48} \right) = \frac{5}{48} + \frac{7}{96} = \frac{27}{96} = \frac{9}{32}$$

Therefore correct option is (4) $\frac{9}{32}$