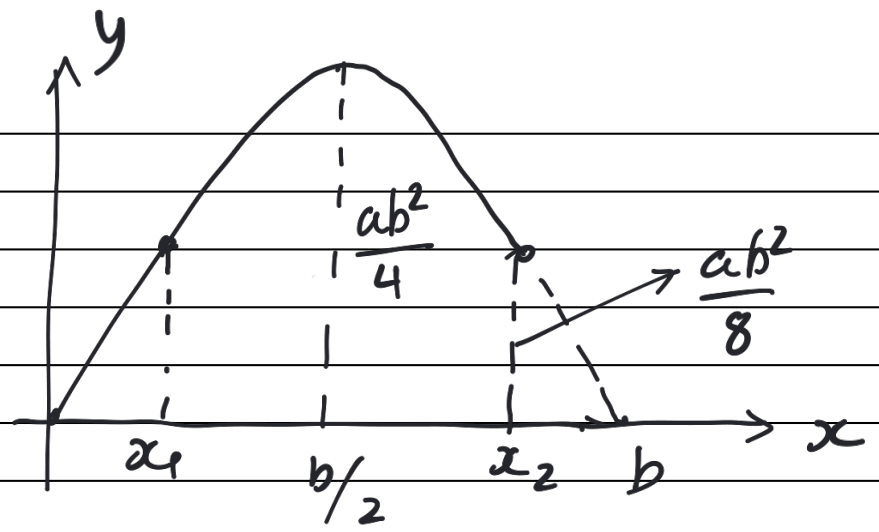

The path of the rock $y = ax(b-x)$

Turning point $\left(\frac{b}{2}, \frac{ab^2}{4}\right)$

The height of the pole $\frac{ab^2}{8}$

$$\frac{ab^2}{8} = ax(b-x) \qquad 8bx - 8x^2 = b^2$$

$$8x^2 - 8bx + b^2 = 0$$

$$\Delta = 32b^2$$

$$x = \frac{8b \pm 4\sqrt{2}b}{16} = \frac{2b \pm \sqrt{2}b}{4}$$

$$x_2 - x_1 = \frac{\sqrt{2}b}{2}$$

Time taken by the bird : $\frac{\frac{\sqrt{2}b}{2}}{10} = \frac{\sqrt{2}b}{20}$

Horizontal distance by the rock $\frac{2b+\sqrt{2}b}{4} = x_2$

$\rightarrow$ Horizontal velocity of the rock

$$\frac{\frac{2b+\sqrt{2}b}{4}}{\frac{\sqrt{2}b}{20}} = 5(\sqrt{2}+1) \text{ m/s}$$

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