



22. Let O be the vertex and Q be any point on the parabola, $x^2 = 8y$. If the point P divides the line segment OQ internally in the ratio 1:3, then the locus of P is

(1) $x^2 = y$

(2) $y^2 = x$

(3) $y^2 = 2x$

(4) $x^2 = 2y$

Answer:

	<p>We can consider any point $Q(4t, 2t^2)$ on $x^2 = 8y$</p> <p>Let $P(h, k)$ be the point which divides OQ in the ratio 1:3 therefore</p> $h = \frac{1 \times 4t + 3 \times 0}{1 + 3} = t \rightarrow (1)$ $k = \frac{1 \times 2t^2 + 3 \times 0}{1 + 3} = \frac{t^2}{2} \rightarrow (2)$ <p>For (1) and (2) we get $k = \frac{h^2}{2}$ replacing (h,k) by (x, y), $y = \frac{x^2}{2}$ or $x^2 = 2y$</p> <p>Correct option is (4) $x^2 = 2y$</p>
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