

Parabola Reflection Property

Given: the parabola $y^2 = 4px$, F is the focus, QA is tangent to $y^2 = 4px$ at Q.

Prove: at any point Q, angle 1 = angle 3

Proof:	Statements	Reasons
1.	$y^2 = 4px$ let $m_1 =$ slope of QA let $m_2 =$ slope of DF	1. _____
2.	$QD = QF$	2. _____
3.	$m_1 = y' =$ _____	3. _____
4.	$m_2 =$ _____	4. Definition of slope
5.	So $DF \perp AQ$	5. _____
6.	$AQ = AQ$	6. _____
7.	$\triangle ADQ \cong \triangle AFQ$	7. _____
8.	$\angle 2 = \angle 1$	8. _____
9.	$\angle 2 = \angle 3$	9. _____
10.	$\angle 1 = \angle 3$	10. _____

The diagram shows a coordinate system with x and y axes. A parabola $y^2 = 4px$ opens to the right with its vertex at the origin O . The focus is $F(p, 0)$ and the directrix is the vertical line $x = -p$. A point $Q(x, y)$ is on the upper branch of the parabola. A tangent line AQ is drawn at Q , where A is on the y-axis. A line DF is drawn from the focus F to the directrix at point $D(-p, y)$. A horizontal dashed line QD is drawn from Q to the directrix. Angles are labeled: $\angle 1$ is between DF and QD ; $\angle 2$ is between DF and AQ ; $\angle 3$ is between QD and AQ . A right-angle symbol is shown at A between AQ and the y-axis.

Elliptical Reflection Property

Given: an Ellipse

To Show that a line drawn from one focus to the ellipse would reflect to the other focus

