

# Tangents to a Parabola from a Point P outside the Curve

**To draw a tangent from a point P outside the directrix.**

**Method 1**

Fig. 8.13

With P as centre swing an arc from the focus F onto the directrix giving points r and q.

Project these points parallel to the axis to give the points of contact.

Draw the tangents.

**Note:** The lines from r and q drawn parallel to the axis can be considered to be lines drawn from a focal point at infinity and hence this method will tie in with similar methods for the ellipse and hyperbola.

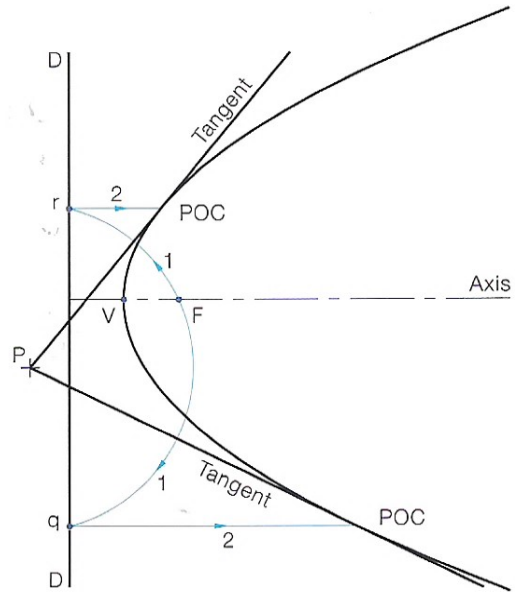


Fig. 8.13

**Method 2**

Fig. 8.14

Join P to the focus. Bisect this line and draw a circle with PF as diameter. Draw a tangent to the parabola at the vertex V. This tangent will intersect the circle at two places, giving points q and r, which will be points on the required tangents. Draw the tangents.

**Note:** The tangent drawn at V can be considered to be a circle through V with a radius of infinity. This will tie this construction in with similar methods used for the ellipse and hyperbola.

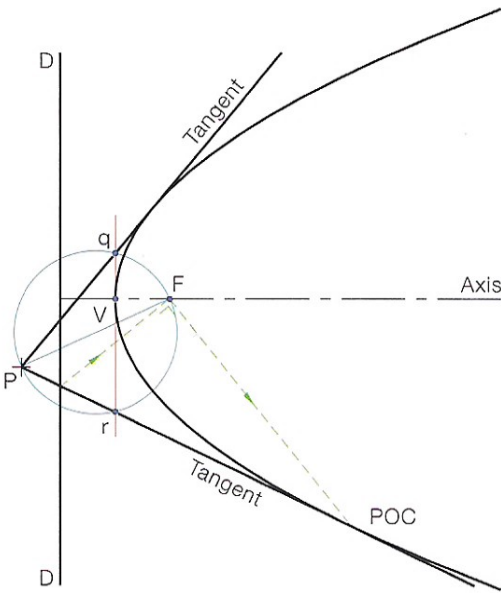


Fig. 8.14

**To draw a tangent to a parabola from a point inside the directrix.**

**Method 1**

Fig. 8.15

Similar construction to Fig. 8.14 above.

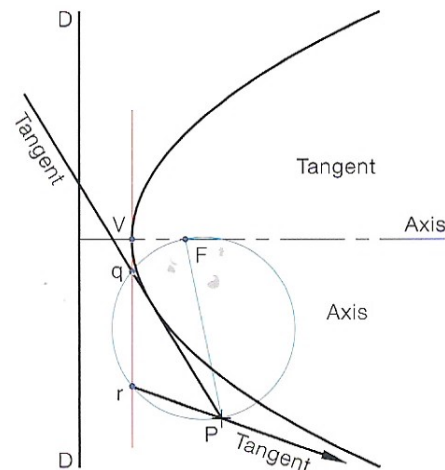


Fig. 8.15

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