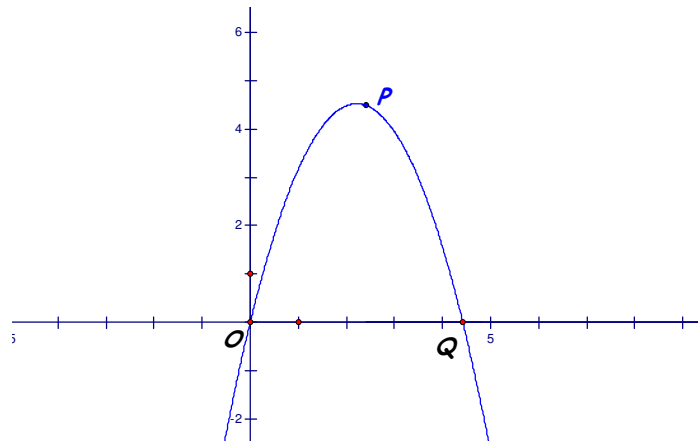


Parabola Problem



- (a) Points $O(0, 0)$ and $P(m, n)$ are two fixed points with $m > 0$ and $n > 0$. There is a family of parabolas that pass through O and P with their maximum to the left of P . Each parabola in this family will intersect the x -axis in a point $Q(k, 0)$ for some k . Find a general rule for the family of parabolas. What restrictions must be placed on the number values for k ?
- (b) Find the general rule for the family of parabolas that are the reflection in the line $x = m$ of the parabolas in part (a).
- (c) For $m = 4$ and $n = 8$ choose any three of the possible values for k . With the aid of a graphing or a CAS calculator draw on the same set of axes the graph of the parabola and its reflection for each of the values of k .
- (d) The maximum points for all the parabolas in part (a) lie on the graph of a function. Find the rule for this function.