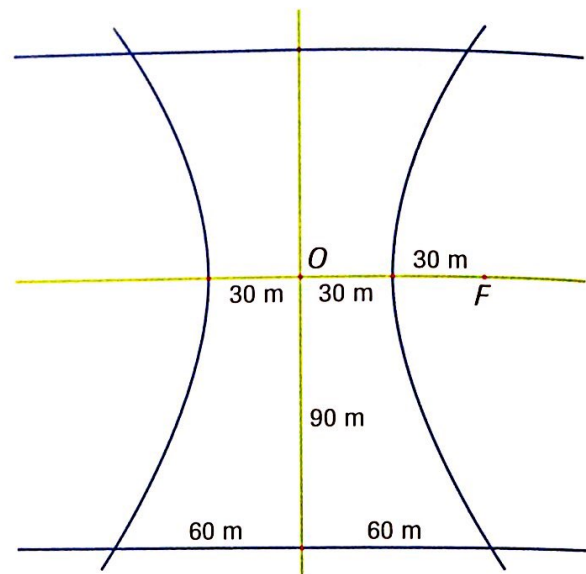
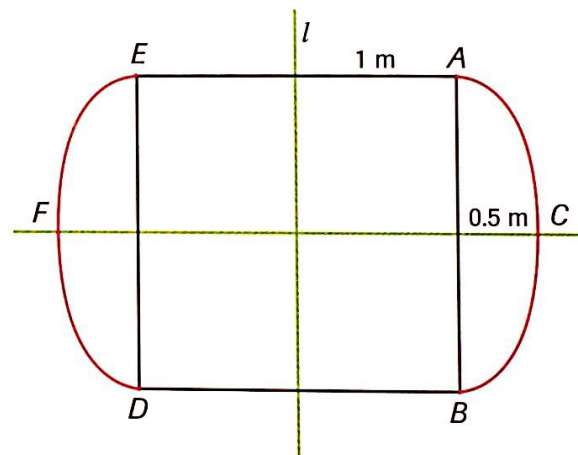


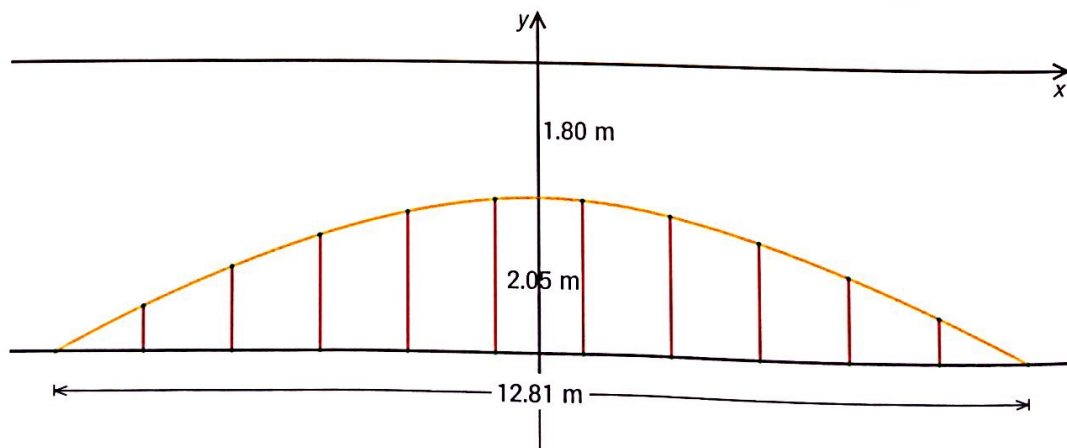
- 53** The diagram on the right shows the cooling tower of a nuclear power plant. It is shaped like a hyperbolic arc with centre O , and axes of symmetry $x'Ox$ and $y'Oy$. Find the equation of the hyperbola that contains these two arcs.



- 54** Consider a reservoir that is a solid of revolution whose axis is FC . A cross-section of this reservoir is graphed on a plane containing the axis of revolution. Line l is an axis of symmetry, and the curve ACB is a semi-ellipse with major axis AB . Given this information and that $ABDE$ is a square, find the equation of the ellipse having A , C and B as its vertices.

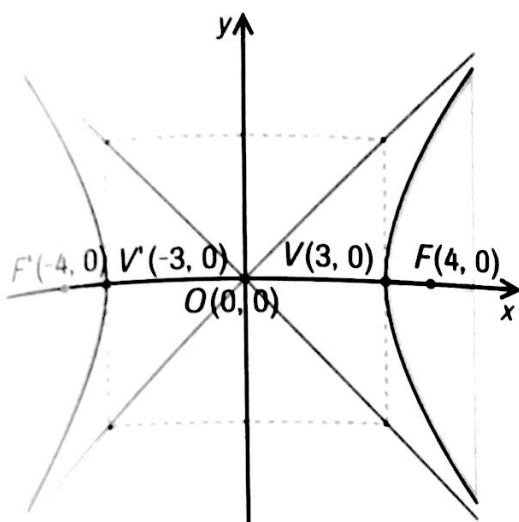


- 55** The edge of an arch bridge is hyperbolic. What is the equation of this hyperbola in a system of axes if the hyperbola's axis of symmetry is the y -axis and the x -axis passes through its centre? The bridge's deck passes through the focus of the hyperbola.

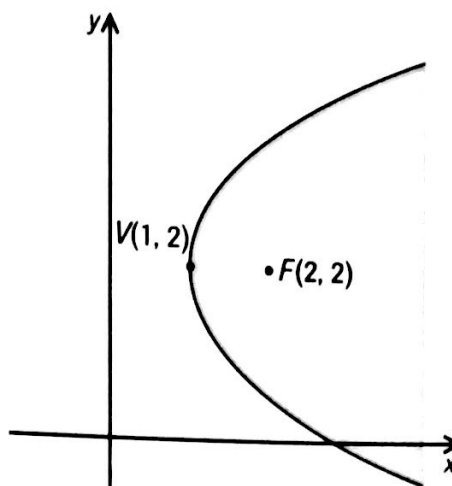


Find the inequalities that represent the shaded regions.

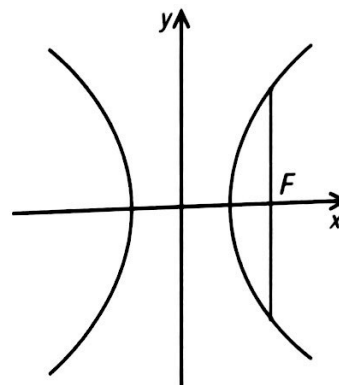
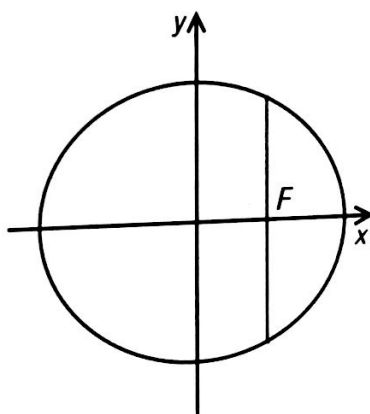
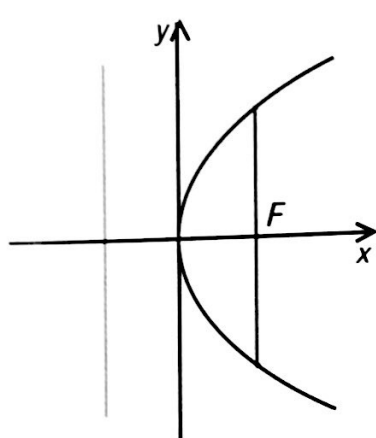
a)



b)



One way to measure the curvature of a conic is to use the chord that passes through the focus (or one of the foci) and is perpendicular to its transverse axis. This chord is known as the *latus rectum*.



Calculate the measure of the *latus rectum* of the conics defined by the following equations:

a) $y^2 = 11x$

b) $\frac{x^2}{8} + \frac{y^2}{5} = 1$

c) $x^2 = 11y$

d) $x^2 - 7y^2 - 11 = 0$

e) $\frac{x^2}{5} + \frac{y^2}{8} = 1$

f) $x^2 + y^2 = 25$

Find, algebraically, the formula for calculating the *latus rectum* of a parabola, ellipse and hyperbola.

Find the coordinates of the points of intersection of the geometric loci defined by the equations below:

a) $\frac{x^2}{36} + \frac{y^2}{25} = 1$ and $2x - y - 3 = 0$

b) $\frac{x^2}{28} - \frac{y^2}{28} = 1$ and $y = -x$

c) $x^2 - y^2 = 1$ and $2x + y + 5 = 0$

d) $\frac{x^2}{11} + \frac{y^2}{18} = 1$ and $y = \sqrt{18}$

e) $x^2 - 3y^2 = 1$ and $\frac{x^2}{4} + y^2 = 1$