

Section 9.1

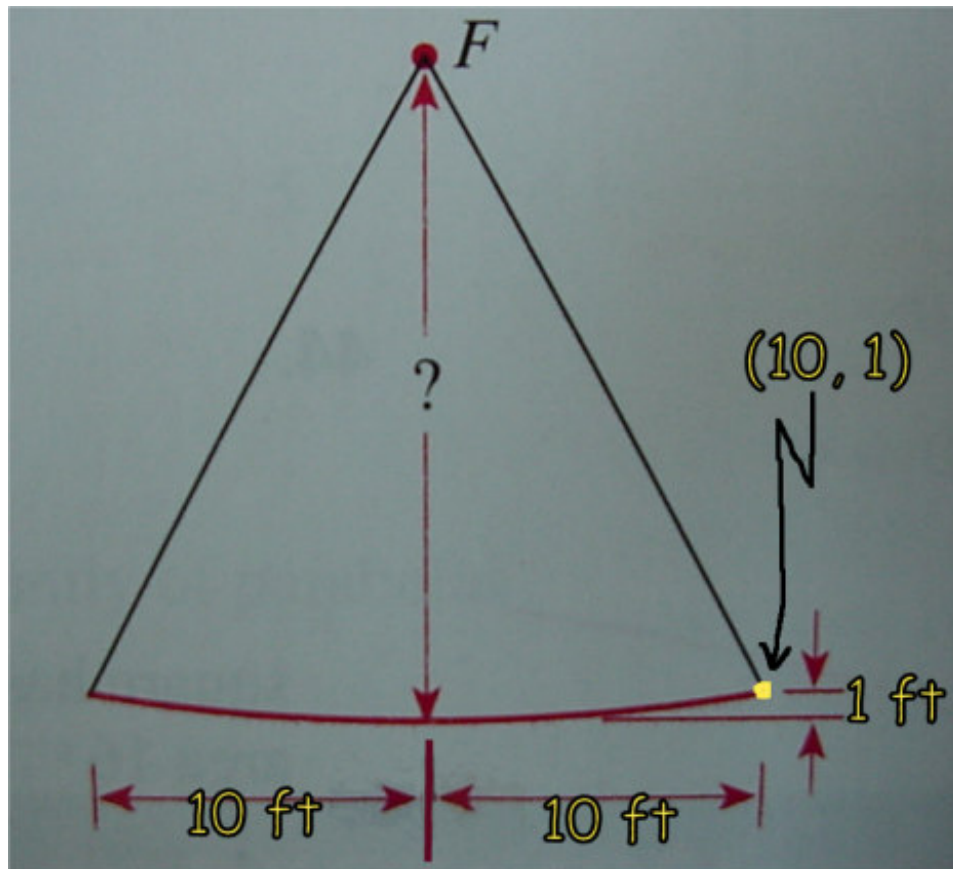
Solutions and Hints

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for the book:

Precalculus, Mathematics for Calculus 4th Edition
by James Stewart, Lothar Redlin and Saleem Watson.

48. A reflector for a satellite dish is parabolic in cross section, with the receiver at the focus F . The reflector is 1 foot deep and 20 feet wide from rim to rim. How far is the receiver from the vertex of the parabolic reflector.



Notice we align the vertex on the coordinate (0,0). This allows us to say the parabolic arc is vertical and apply the equation $x^2 = 4py$.

Thus

the vertex is at: (0, 0)

the focus is at: (0, p)

directrix is at: $y = -p$

Thus if we find p then we will have the distance the focus is from the vertex.

Notice as we have set things up the point (10, 1) is on the parabola so:

$$10^2 = 4 * p * 1 \quad \rightarrow 100 = 4p$$

$$\rightarrow 25 = p$$

So the answer is:

The receiver is 25 ft from the vertex of the reflector.