25. For an object in front of a thin lens, the object distance p and the image distance i are related by $(1/p)+(1/i) = (1/f)$, where f is the focal length of the lens. For the situation described by the problem, all quantities are positive, so the distance x between the object and image is $x = p + i$. We substitute $i = x - p$ into the thin lens equation and solve for x:

$$x = \frac{p^2}{p - f} \ .$$

To find the minimum value of x, we set $dx/dp = 0$ and solve for p. Since

$$\frac{dx}{dp} = \frac{p(p - 2f)}{(p - f)^2} \ ,$$

the result is $p = 2f$. The minimum distance is

$$x_{\rm min} = \frac{p^2}{p - f} = \frac{(2f)^2}{2f - f} = 4f \ .$$

This is a minimum, rather than a maximum, since the image distance i becomes large without bound as the object approaches the focal point.