# 2.13: The Lazy Way

The convergence and power method has great advantages when you have a complex systems of many lenses, mirrors and interfaces in succession. You just add the powers one after the other. But I expect there are some readers who don't want to be bothered with all of that, and just want to do simple single-lens calculations with a simple formula that they are accustomed to, in particular the well-known $\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$, , which is appropriate for the "real is positive" sign convention – and they want to get the calculation over with as soon as possible and with as little effort as possible. This section is for them! I have drawn a simple diagram in Figure II.23. It is not extremely accurate – it is the best I can do with this infernal machine that I am sitting in front of. All you need in order to draw a really good version of it is a sheet of graph paper. There are three axes, labelled $p$, $q$ and $f$. For any particular problem, to solve the above equation, all you do is to lay the edge of a ruler across the figure. For example: $p$ = 40 cm, $f$ = 26 cm. What is $q$? The dashed line gives the answer: $q = 75$cm. Another example: $p = 33$ cm, $q = -60$ cm. What is $f$? The dotted line gives the answer: $f = 73$ cm.

This diagram can also be used for resistors in parallel, capacitors in series, synodic and sidereal periods of planets...

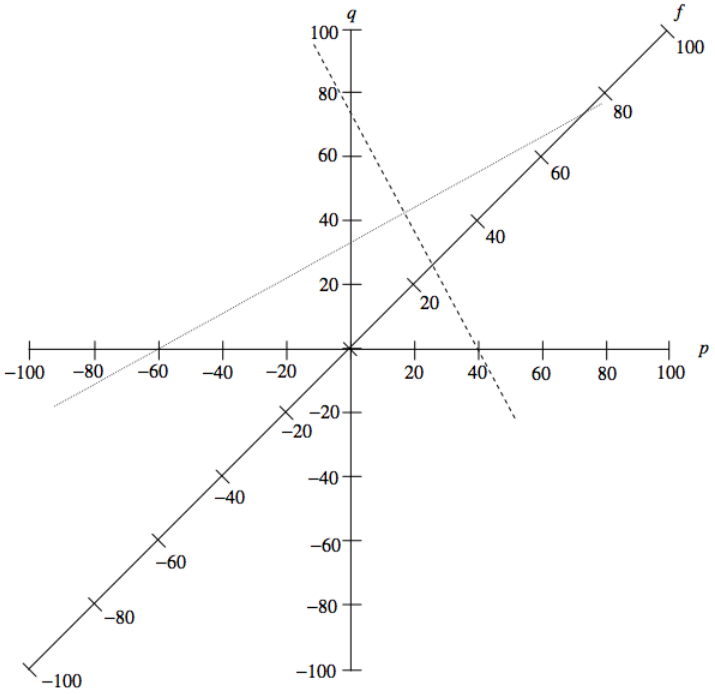


FIGURE II.23