(b) Use your graph to estimate

(i) the frequency of oscillations when a mass of 0.07 kg is attached to the spring,

(ii) the mass, to the nearest gram, which produces 15 oscillations per second,

(iii) the value of g.

When the spring is replaced by another spring, the relation between f and m is represented by $f^2 = \frac{2}{m} + 100$. On the same diagram, draw the line representing the second spring.

(c) Hence, find the mass which produces the same frequency of oscillations by both springs and the corresponding frequency of oscillations for this mass.

29. A particle, moving in a certain medium with speed v m s^{-1}, experiences a resistance to motion of F newtons. It is believed that F and v are related by the equation $F = kA^v$, where A and k are constants. The table below shows experimental values of the variables F and v.

Speed, v m s^{-1}	1	2	3	4	5
Force, F newtons	14.0	19.6	27.4	38.4	53.8

(a) Express the equation in a form suitable for drawing a straight line graph.

(b) Plot the graph using the given data and use it to estimate

(i) the value of A and of k,

(ii) the resistance for which the speed is 3.5 m s^{-1}.

(c) Determine the equation of the straight line which must be drawn on your graph to obtain the solution to the equation $kA^v = 4^v$. Use your graph to estimate the speed, v, that satisfies the equation $kA^v = 4^v$.

Learning Outcomes Checklist

I am now able to

- transform given relationships, including $y = ax^n$ and $y = kb^x$, to linear form to determine the unknown constants from the straight line graph