Equations 2 and 4

The increase in displacement, s, is equal to the area under the line on the graph. This area is the area of the rectangle plus the area of the triangle.

The area of the rectangle is its base multiplied by its height, in other words:

$u \times t$

The area of a triangle is half its base multiplied by its height, that is:

$\frac{1}{2}(v - u)t$

Adding these areas together, we find that:

$s = ut + \frac{1}{2}(v - u)t$

$s = ut + \frac{1}{2}vt - \frac{1}{2}ut$

$s = \frac{1}{2}(v + u)t$

This is Equation 4.

We also know from Equation 1 that:

$v - u = at$

Therefore:

$s = ut + \frac{1}{2}at^2$

This is Equation 2.