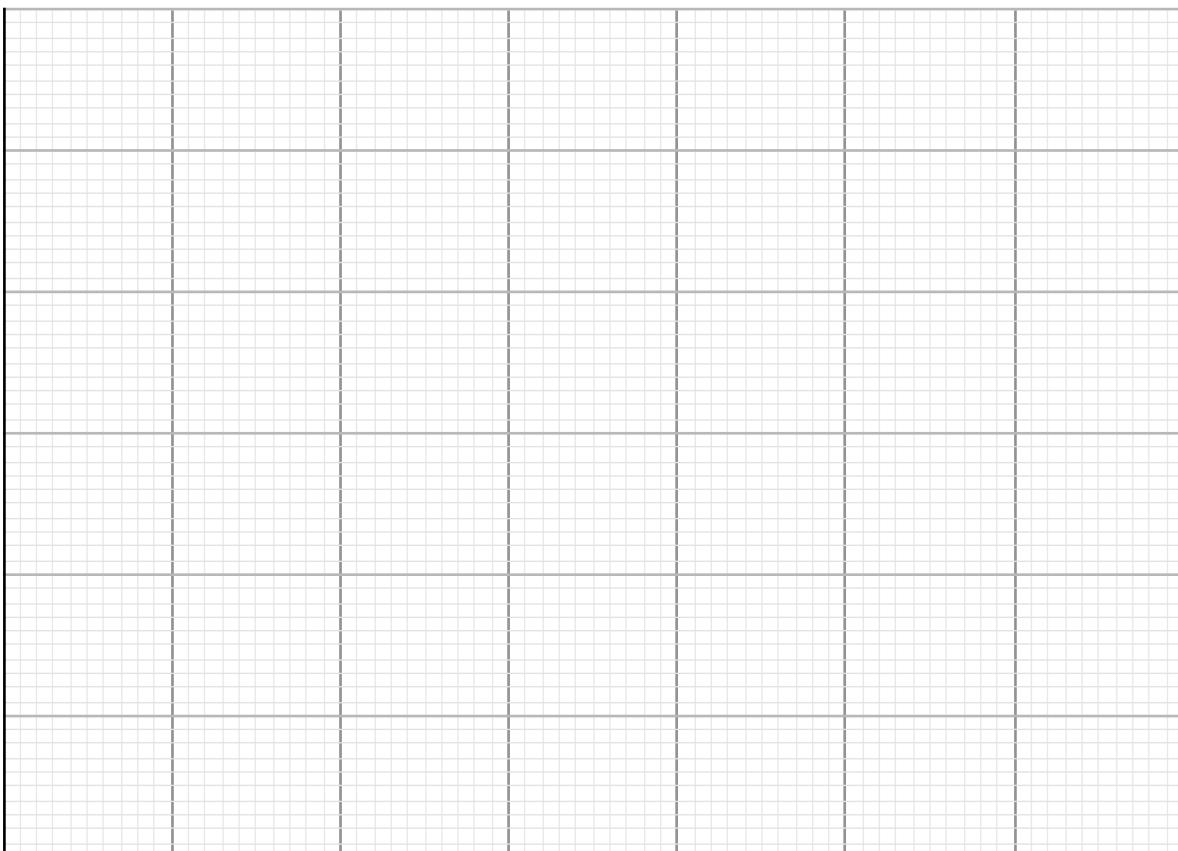


Graph Skills 2 : Uniform Acceleration

1. Complete this table of data for initial velocity and braking distance. Then plot the results onto the graph grid below by using an appropriate set of scales on the axes.
(Use a false origin.)

u (m s⁻¹)	s (m)	u² (.....)
10	22	
12	35	
14	42	
16	55	
18	74	
20	89	

Plot u^2 (y-axis) against s (x-axis). Equation of the line: $u^2 = v^2 - 2as$



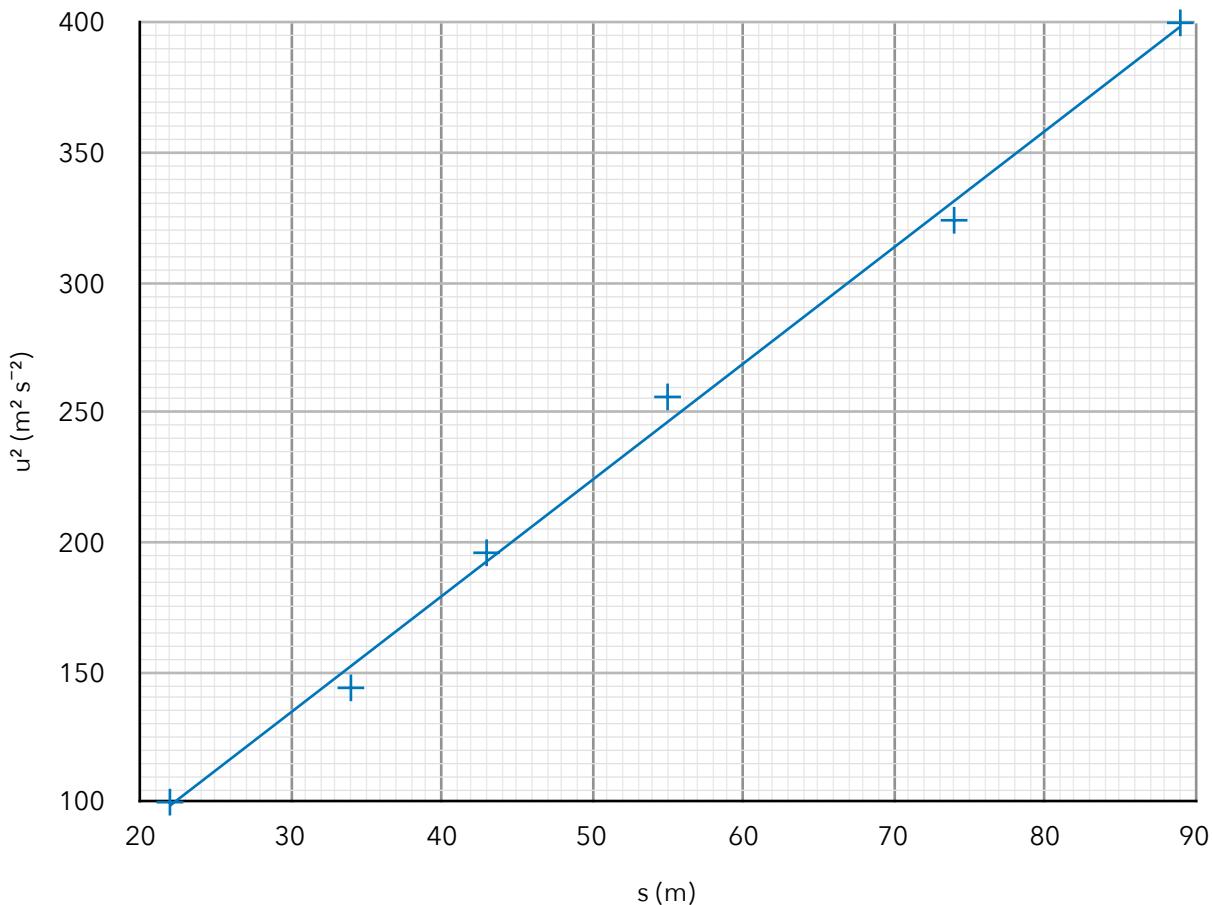
2. Draw a straight line of best fit.
3. Determine the gradient of the line and the y-intercept.
4. Analyse the graph to determine the values of a and v .

Graph Skills 2 Solutions

1. Table of data.

$u \text{ (m s}^{-1}\text{)}$	$s \text{ (m)}$	$u^2 \text{ (m}^2 \text{s}^{-2}\text{)}$
10	22	100
12	35	144
14	42	196
16	55	256
18	74	324
20	89	400

2. Graph with line of best fit.



3. Calculate gradient: $\text{gradient} = (y_2 - y_1) \div (x_2 - x_1) = (385 - 130) \div (86 - 29) = \underline{\underline{4.47}}$

Calculate y-intercept: $c = y_1 - mx_1 = 130 - (4.47 \times 29) = \underline{\underline{0.26}}$

4. Equation of line: $u^2 = v^2 - 2as \Rightarrow u^2 = (-2a)s + v^2$ u^2 is plotted on y-axis, s plotted on x-axis
 $y = m x + c$ $-2a$ multiplied by s : **gradient = $-2a$**
 v^2 is the second term on RHS: **y -int = v^2**

$a = \text{gradient} \div (-2) = 4.47 \div -2 = \underline{\underline{-2.2 \text{ m s}^{-2}}}$

$v = \sqrt{\text{y-intercept}} = \sqrt{0.26} = \underline{\underline{0.51 \text{ m s}^{-1}}}$