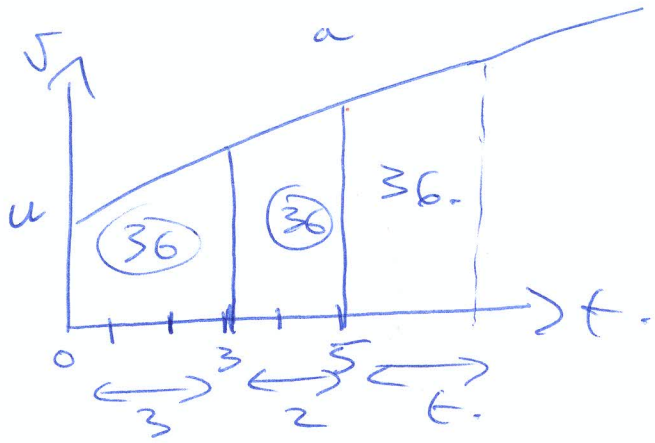
1974



Let initial speed be u

Let acceleration be a.

|ab|: $s = ut + \frac{1}{2}at^2$.

$36 = 3u + \frac{1}{2}a3^2$

$36 = 3u + 4.5a$.

|ac|: $s = ut + \frac{1}{2}at^2$.

$72 = 5u + \frac{1}{2}a(5)^2$

$72 = 5u + 12.5a$.

∴ solve for u and a:

$72 = 5u + 12.5a$

$36 = 3u + 4.5a$.

$\Rightarrow$ $216 = 15u + 37.5a$

$180 = 15u + 22.5a$

$36 = 15a$

$a = 2.4\ ms^{-2}$

$\Rightarrow$ $36 = 3u + 4.5(2.4)$

$\Rightarrow$ $36 = 3u + 10.8$

$\Rightarrow$ $25.2 = 3u$

$8.4\ ms^{-1} = u$

|ad|: time = 5+t.

Distance = 108

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

$108 = 8.4(5+t) + \frac{1}{2}(2.4)(5+t)^2$.

$108 = 42 + 8.4t + 1.2[25 + 10t + t^2]$

$108 = 42 + 8.4t + 30 + 12t + 1.2t^2$.

$1.2t^2 + 20.4t - 36 = 0$.

$t^2 + 17t - 30 = 0$.

$t = \frac{-17 \pm \sqrt{17^2 - 4(1)(-30)}}{2(1)}$

$t = \frac{-17 \pm \sqrt{289 + 120}}{2} = \frac{-17 \pm \sqrt{409}}{2} = \frac{-17 + 20.21}{2}$

$t = \frac{3.22}{2} = 1.6\ sec$.

t = x

$108 = 8.4x + \frac{1}{2}2.4x^2$

$\Rightarrow 108 = 8.4x + 1.2x^2$.

$\Rightarrow 1.2x^2 + 8.4x - 108 = 0$.

$x = \frac{-8.4 \pm \sqrt{(8.4)^2 - 4(1.2)(-108)}}{2(1.2)}$.

etc. ---