The distance travelled by a boy in the nth second is given by the expression (2+3n).find the initial velocity and the acceleration and also find final velocity in 2 second?

By definition:

$v = \frac{\Delta l}{\Delta t}$

Δl – distance travelled in time Δt

In our case, distance travelled by a boy in the nth second is given by the expression (2+3n), so

$v(n) = \frac{2+3n}{1} = 2 + 3n$

$v(n)$ – average velocity during nth second.

Acceleration equals:

$a = \frac{\Delta v}{\Delta t} = \frac{v(n+1)-v(n)}{n+1-n} = 2 + 3(n+1) - (2+3n) = 3$

Answer: Acceleration equals 3 $\frac{units}{second^2}$.

Average velocity during first second equals:

$v(1) = 2 + 3 = 5$

And he moved with acceleration$a = 3$.

$v_0 + 3 * 1 = v_1$

v_0 - the initial velocity

v_1 - the final velocity in 1st second

He moved with constant acceleration, so:

$v(1) = \frac{v_0+v_1}{2} = 5$

Therefore, we have system of equations:

$$\begin{cases} v_0 + 3 = v_1 \\ \frac{v_0+v_1}{2} = 5 \end{cases}$$

Substitute 1 to 2:

$(v_0 + v_0 + 3) = 2 * 5$

$2v_0 = 10 - 3 \quad v_0 = 7/2$

Answer: the initial velocity equals 7/2 $\frac{units}{second}$.

Average velocity during 2 second equals:

$v(2) = 2 + 3 * 2 = 8$

And he moved with acceleration$a = 3$.

$v_0 + 3 * 1 = v_1$

v_0 - the initial velocity in 2nd second

v_1 - the final velocity in 2nd second

He moved with constant acceleration, so:

$v(2) = \frac{v_0+v_1}{2} = 8$

Therefore, we have system of equations:

$$\begin{cases} v_0 + 3 = v_1 \\ \frac{v_0+v_1}{2} = 8 \end{cases}$$

From second: $v_0 = 16 - v_1$

Substitute 1:

$16 - v_1 + 3 = v_1$

$2v_1 = 19 \quad v_1 = 19/2$

Answer: final velocity in 2 second equals $\frac{19}{2}\frac{units}{second}$