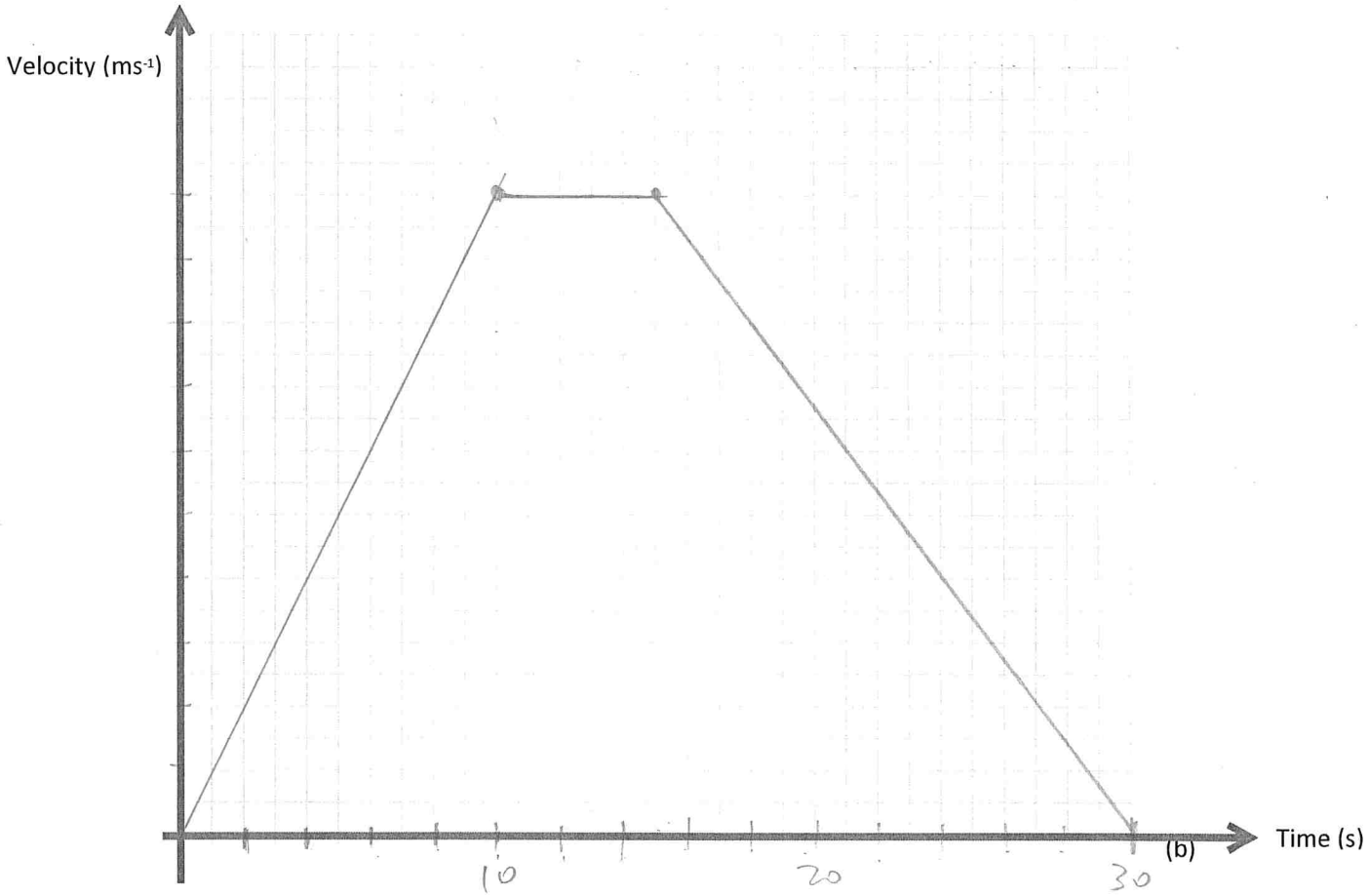
1. An object starts from rest and accelerates uniformly for 10 seconds up to a maximum speed of 20 ms^{-1}. It maintains this speed for an additional 5 seconds and then comes to rest in another 15 seconds.

(a) Sketch a velocity / time graph describing the motion (3 marks)



(b)

1/ $V_2 = V_1 + a\Delta t$

$20 = 0 + a.10$

$a = 2ms^{-2}$

$s = V_1\Delta t + \frac{1}{2}a\Delta t^2$

$s = 0 + \frac{1}{2}(2)(10^2)$

$= +100m$

2/ $V = \vec{s}/\Delta t$

$\vec{s} = (20)(5) = +100m$

200m

3/ $V_2 = V_1 + a\Delta t$

$0 = 20 + a.(15)$

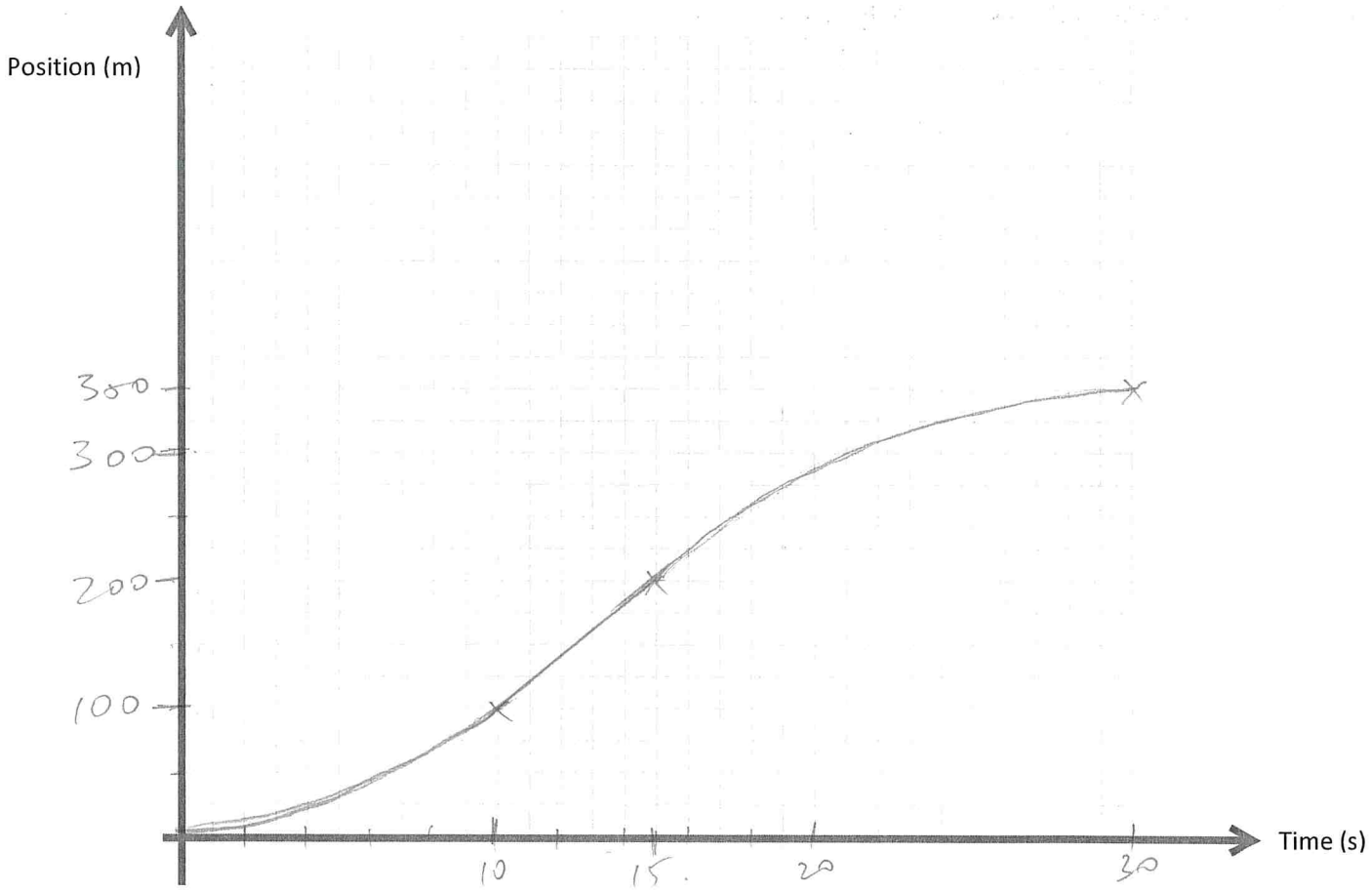
$a = \frac{-20}{15}$

$s = 20(15) + \frac{1}{2}\left(\frac{-20}{15}\right).15^2$

$= 300 - 150$

$= +150m$

Sketch an accurate position / time graph describing the motion (4 marks)



(c) Determine the total average speed for the journey 2 marks