2015 F=ma Exam: Problem 2

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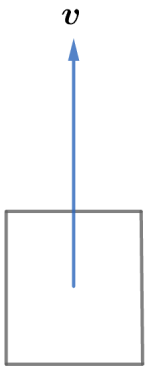

The average speed v is

$$v = \frac{d}{t}$$

where d is the distance travelled and t is the time taken. We are given that the car travels at speed v_1 for distance d_1 in the first part of the journey and at v_2 for d_2 in the second part of the journey. The total distance is

$$d = d_1 + d_2$$

The time for the first part is $t_1 = d_1/v_1$. The time for the second part is $t_2 = d_2/v_2$. Thus, the total time is

$$t = t_1 + t_2 = \frac{d_1}{v_1} + \frac{d_2}{v_2}$$

Putting everything together,

$$v = \frac{d_1 + d_2}{\frac{d_1}{v_1} + \frac{d_2}{v_2}} = \frac{25 + 75}{\frac{25}{80} + \frac{75}{50}}\,\text{km/hr} = 55.2\,\text{km/hr}$$

so the answer is $\boxed{\text{A}}$.