Velocity sample problems. (SOLUTIONS)

① $\Delta d = ?$ (DISPLACEMENT IS Δd, d is DISTANCE)

$t = 1.0\ \text{min} = 60\ \text{s}$

$v = 360\ \text{m/s}$ (2 SIG FIGS)

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

$= \left(360 \frac{\text{m}}{\text{s}}\right)(60\ \text{s})$

$= 21600\ \text{m}$

$= \underline{2.2 \times 10^4\ \text{m}}$

Note the answer in scientific notation & 2 sig. figs.

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② YOU

$\Delta t_1 = ?$

$\Delta d_1 = 50\ \text{km}$

$v_1 = 90\ \text{km/h}$

$v = \frac{\Delta d}{\Delta t}$ $\therefore \Delta t_1 = \frac{\Delta d}{v_1}$

$= \frac{50\ \text{km}}{90\ \text{km/h}}$

$= 0.5\bar{5}\ \text{h}$

FRIEND

$\Delta t_2 = ?$

$\Delta d_2 = 50\ \text{km}$

$v_2 = 95\ \text{km/h}$

$\Delta t_2 = \frac{\Delta d_2}{v_2}$

$= \frac{50\ \text{km}}{95\ \text{km/h}}$

$= 0.5263\ \text{h}$

Don't round until the end.

WAIT TIME $= \Delta t_1 - \Delta t_2 = 0.5\bar{5}\ \text{h} - 0.5263\ \text{h}$

$= \underline{2.9 \times 10^{-2}\ \text{h}}$

③ $\Delta d = ?$

$v = 55 \frac{km}{h}$

$\Delta t = 0.75\Delta$

To convert $\frac{km}{h}$ to $\frac{m}{s}$

$55 \frac{km}{h} = \frac{55000 m}{3600 s}$

$= 15.27\overline{7} m/s$

↑ DON'T ROUND OR KEEP AS FRACTION

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

$\therefore \Delta d = v \Delta t$

$= \left(\frac{55000}{3600} \frac{m}{s}\right)(0.75\Delta)$

$= 11.458 m = \underline{\underline{11 m}}$

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④ Average speed = $\frac{\text{Total distance}}{\text{Total time}}$

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

STEP 1 Find distance covered at $40 \pm$ km/h.

$d_1 = ?$
$t_1 = 2.0 h$
$v_1 = 40 \pm km/h$

$d_1 = v_1 \cdot t_1$
$= (40 \frac{km}{h})(2.0 h)$
$= \underline{\underline{80 \pm km}}$

STEP 2 Find distance covered at $60 \pm$ km/h

$d_2 = ?$
$t_2 = 1.5 h$
$v_2 = 60 \pm \frac{km}{h}$

$d_2 = v_2 t_2$
$= (60 \pm \frac{km}{h})(1.5 h$
$= 90 km.$

STEP 3

$v_{AVG} = \frac{d_{TOTAL}}{t_{TOTAL}} = \frac{170 km}{3.5 h} = 48.57 \frac{km}{h} = \underline{\underline{49 \frac{km}{h}}}$