2, 6, 7, 8

(2) $\bar{S} = \frac{\text{tot. } d}{\text{tot. } t}$

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

$\underbrace{t = \frac{d}{S}}$

$\bar{S} = \frac{60\,km}{(t_1 + t_2)}$

$t_1 = \frac{30\,km}{40\,\frac{km}{hr.}} = \bigcirc$

$d = 60\,km$

$t_2 = \frac{30\,km}{60\,\frac{km}{hr.}} = \bigcirc$

Sep 23-10:32 AM

(6) $\bar{S} = \frac{\text{tot. } d}{\text{tot. } t}$

$50\,\frac{km}{hr} = \frac{(40+40)\,km}{(1\,hr + X)}$

$50 = \frac{80}{(1 + x)}$

t_1 t_2

$\underbrace{X = \square\, hr.} \Rightarrow S_2 = \frac{40\,km}{\square}$

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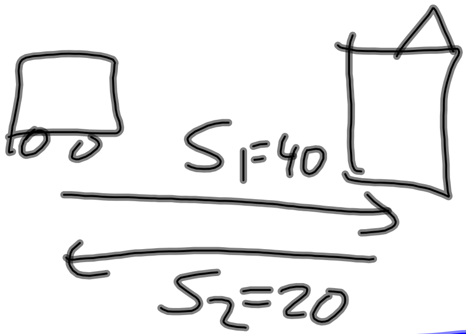
7

$$\bar{S} = \frac{\text{tot. } d}{\text{tot. } t}$$

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



S_1

$$S_2 = \frac{1}{2} S_1$$

$$\bar{S} = \frac{d}{3t_1}$$

$$\bar{S} = \frac{(d_1 + d_2)}{t_1 + 2t_1}$$

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8

$$\bar{S} = \frac{\text{tot. } d}{\text{tot. } t}$$

$$50 = \frac{200}{t_1 + t_2}$$

$$t_1 = \frac{d_1}{S_1}$$

$$t_1 = \frac{100}{50}$$

$$t_1 = \underline{2 \text{ hr.}}$$

$$100 = \frac{200}{2 + t_2}$$

Sep 23-10:35 AM

5 parameters fully describe motion.

Δx → DISPLACEMENT $\Delta x = x_f - x_0$

V_0 → INITIAL VELOCITY

V → FINAL —"—

a → ACCELERATION

t → TIME $t = \Delta t$ (SPAN)

$\Delta t = t$

$\begin{cases} \Delta t = t_f - t_0 \\ t_0 = 0 \end{cases}$

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Big 5

1. $V = V_o + a \cdot t$
2. $\Delta x = \frac{1}{2} \cdot (V_o + V) \cdot t$
3. $\Delta x = V_o \cdot t + \frac{1}{2} \cdot a \cdot t^2$
4. $\Delta x = V \cdot t - \frac{1}{2} \cdot a \cdot t^2$
5. $\Delta x = \dfrac{V^2 - V_o{}^2}{2a}$

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Big 5

MISSING

1. $V = V_o + a \cdot t$ — Δx
2. $\Delta x = \frac{1}{2} \cdot (V_o + V) \cdot t$ — a
3. $\Delta x = V_o \cdot t + \frac{1}{2} \cdot a \cdot t^2$ — V
4. $\Delta x = V \cdot t - \frac{1}{2} \cdot a \cdot t^2$ — V_o
5. $\Delta x = \dfrac{V^2 - V_o^{\,2}}{2a}$ — t (MISSING t)

QUADRATICS

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Assumptions for the development of Big 5.

Basic kinematics definitions:

$$\Delta x = x - x_o$$

$$V = \frac{\Delta x}{\Delta t}$$

$$a = \frac{\Delta V}{\Delta t}$$

$$\boxed{a = \text{CONSTANT}} \Rightarrow \bar{a} = a_{\text{INSTANT}}!$$

$$\left.\begin{matrix} t_o = 0 \\ t_F = t \end{matrix}\right\} \Delta t = t$$

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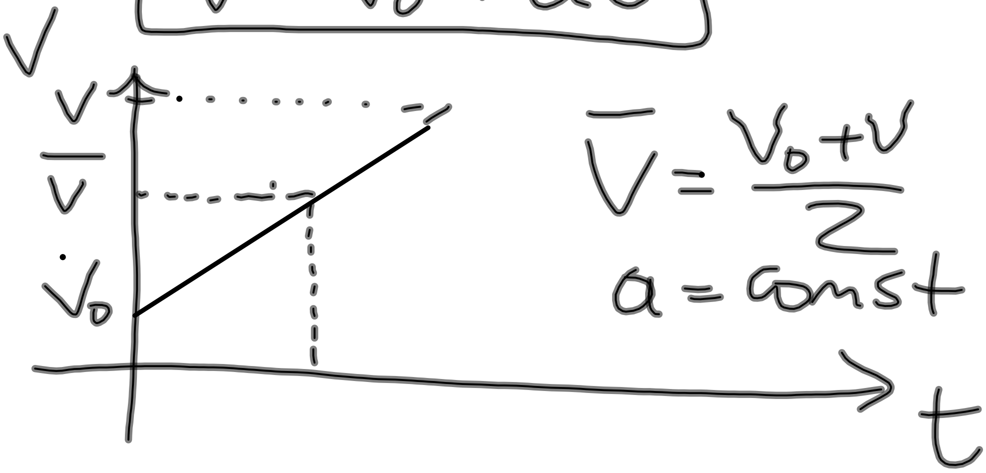
Derivation of the Big 5 (kinematics formulas).

$$a = \frac{\Delta v}{\Delta t} = \frac{v - v_0}{t}$$

$$\boxed{v = v_0 + at}$$



$$\bar{v} = \frac{v_0 + v}{2}$$

a = const !

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Δx As $f(t)$

$x_0 = 0$

$t_0 = 0$

$$\bar{v} = \frac{\Delta x}{t} \Rightarrow \Delta x = \bar{v} \cdot t = \left(\frac{v_0 + v}{2}\right) \cdot t$$

$\boxed{\Delta x = \frac{1}{2}(v_0 + v)t}$ & $v = v_0 + at$

$\boxed{\Delta x = v_0 t + \frac{1}{2} a t^2}$ a = CONST. !

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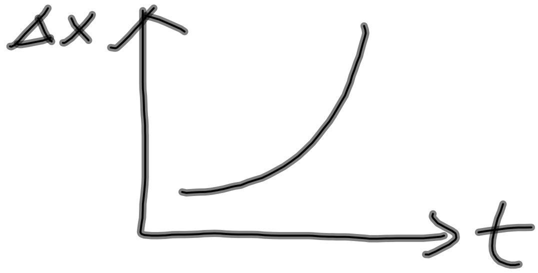

EQ. WITH NO TIME IN IT.

$$\Delta x = \frac{1}{2}(V_0 + V)t \qquad t = \frac{V - V_0}{a}$$

$$\Delta x = \frac{1}{2}(V_0 + V)\left(\frac{V - V_0}{a}\right)$$

$$\boxed{\Delta x = \frac{V^2 - V_0^2}{2a}}$$

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