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Ejercicios de cinemática.

$$1 \quad d_1 = v_1 \cdot t_1 \quad d_2 = v_2 \cdot t_2$$

$$d_1 = 1200 \cdot 9 \quad d_1 = 10800 \text{ cm}$$

$$d_2 = 480 \cdot 7 \quad d_2 = 3360 \text{ cm}$$

$$v_1 = 1200 \text{ cm/s}$$

$$t_1 = 9 \text{ s}$$

$$v_2 = 480 \text{ cm/s}$$

$$t_2 = 7 \text{ s}$$

$$d_t = d_1 + d_2 \quad d_t = 10800 + 3360 \quad d_t = 14160 \text{ cm}$$

$$v_m = \frac{d_t}{t} \quad v_m = \frac{14160}{16} \quad v_m = 885 \text{ cm/s}$$

$$2 \quad t = \frac{d}{v} \quad t = \frac{2040 \text{ m}}{330 \text{ m/s}}$$

$$d = 2.04 \text{ km}$$

$$v = 330 \text{ m/s}$$

$$t = 6.18 \text{ segundos}$$

1 km = 1000 m
2.04 km = 2040 m

$$3 \quad t_1 = \frac{d}{v_1} \quad t_2 = \frac{d}{v_2}$$

$$v_1 = 330 \text{ m/s}$$

$$v_2 = 300,000 \text{ km/s}$$

$$d = 50 \text{ km}$$

$$t_1 = \frac{50000 \text{ m}}{330 \text{ m/s}} \quad t_1 = 151.51 \text{ segundos}$$

$$t_2 = \frac{50 \text{ km}}{300000 \text{ km/s}} \quad t_2 = .00016 \text{ segundos}$$

$$\Delta t = t_1 - t_2 \quad \Delta t = 151.51515 - .00016$$

$$\Delta t = 151.51499$$

El policía ve 151.51499 segundos el disparo antes de escucharlo.

$$4 - d_1 + d_2 = 300 \text{ km}$$

$$d_1 = v_1 * t_1 \quad d_1 = 60 \text{ km/h} * (t + 2h) \quad d = 300 \text{ km}$$

$$d_2 = v_2 * t_2 \quad d_2 = 40 \text{ km/h} * t \quad v_1 = 60 \text{ km/h}$$

$$v_2 = 40 \text{ km/h}$$

$$t_1 = t + 2 \text{ horas}$$

$$60 \text{ km/h} * (t + 2h) + 40 \text{ km/h} * t = 300 \text{ km}$$

$$60 \text{ km/h} * t + 120 \text{ km} + 40 \text{ km/h} * t = 300 \text{ km}$$

$$100 \text{ km/h} * t = 180 \text{ km} \quad t = \frac{180 \text{ km}}{100 \text{ km/h}} \quad t = 1.8 \text{ horas}$$

$$t_1 = t_2 + 2 \text{ horas} \quad t_1 = 1.8 + 2 \quad t_1 = 3.8 \text{ horas}$$

$$d_2 = 40 \frac{\text{km}}{\text{h}} * 1.8 \text{ h} \quad d_2 = 72 \text{ km}$$

$$d_1 = 60 \frac{\text{km}}{\text{h}} * 3.8 \text{ h} \quad d_1 = 228 \text{ km}$$

$$5 - d = v_1 * t \quad d_1 = 20 \text{ km/h} * 4 \text{ h} \quad h = 100 \text{ km}$$

$$d_1 = 80 \text{ km} \quad v_1 = 20 \text{ km/h}$$

$$t = 4 \text{ horas}$$

$$d_2 = \sqrt{h^2 - d_1^2} \quad d_2 = \sqrt{100^2 - 80^2}$$

$$d_2 = \sqrt{10000 - 6400} \quad d_2 = \sqrt{3600} \quad d_2 = 60 \text{ km}$$

$$v_2 = \frac{d_2}{t} \quad v_2 = \frac{60 \text{ km}}{4 \text{ h}} \quad v_2 = 15 \text{ km/h}$$

$$6. \quad v_x = 10 \text{ km/h} \quad t = 6 \text{ h} \quad d_x = ?$$

$$v_y = 12 \text{ km/h} \quad d_y = ?$$

$$v = d/t \quad d = v * t \quad d_x = 10 \text{ km/h} * 6 \text{ h} \quad d_x = 60 \text{ km}$$

$$d_y = 12 \text{ km/h} * 6 \text{ h} = 72 \text{ km}$$

$$d = \sqrt{(60)^2 + (72)^2} \quad d = \sqrt{3600 + 5184}$$

$$d = \sqrt{8784} \quad d = 93,73 \text{ km}$$

$$7. \quad v_1 = 42 \text{ km/h} \quad t = 6 \text{ horas}$$

$$d = 126 \text{ km}$$

$$v_2 = ?$$

$$d_2 = d + (v_1 * t)$$

$$d_2 = 126 \text{ km} + (42 \text{ km/h} * 6 \text{ h}) \quad d_2 = 378 \text{ km}$$

$$v_2 = d_2/t$$

$$v_2 = 378 \text{ km} / 6 \text{ horas}$$

$$v_2 = 63 \text{ km/h}$$

$$8. \quad v_1 = 30 \text{ km/h} \quad t = 7 \text{ horas}$$

$$v_2 = 6 \text{ km/h}$$

$$v = d/t$$

$$d = t * v$$

$$t_1 + t_2 = 7$$

$$t_1 = 7 - t_2$$

$$30 t_1 = 6 t_2$$

$$30(7 - t_2) = 6 t_2$$

$$210 - 30 t_2 = 6 t_2$$

$$210 = 6 t_2 + 30 t_2$$

$$210 = 36 t_2$$

$$t_2 = 210 / 36$$

$$t_2 = 5.83$$

9- $t = 10s$ $v = d/t$ $d = t * v$

$v_f = 60 \text{ km/h}$

$60 \text{ km/h} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) \left(\frac{1 \text{ h}}{3600 \text{ s}} \right)$

$60000/3600$ $v_f = 16.67 \text{ m/s}$

$a t = v_f - v_0$

$a(10s) = 16.67 \text{ m/s} - 0 \text{ m/s}$

$a = \frac{16.67 \text{ m/s}}{10 \text{ s}}$

aceleración = 1.67 m/s^2
constante

$v_f^2 - v_0^2 = 2(a)d$

$(16.67 \text{ m/s})^2 - (0 \text{ m/s})^2 = 2(1.67) d$

$277 \text{ m/s}^2 = 3.34 d$

$d = \frac{277 \text{ m/s}^2}{3.34}$

$d = 82.94 \text{ metros}$

10- $v_0 = 12 \text{ m/s}$

$a = 2 \text{ m/s}^2$

$v_f = 144 \text{ km/h}$

$144 \text{ km/h} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) \left(\frac{1 \text{ h}}{3600 \text{ s}} \right)$

$144000/3600$ $v_f = 40 \text{ m/s}$

$a t = v_f - v_0$

$(2 \text{ m/s}^2) t = 40 \text{ m/s} - 12 \text{ m/s}$

$2 \text{ m/s}^2 t = 28 \text{ m/s}$

$t = \frac{28 \text{ m/s}}{2 \text{ m/s}^2}$

$t = 14 \text{ segundos}$

$$11. \quad V_0 = 8 \text{ cm/s} \quad t = ?$$

$$a = 2 \text{ cm/s}^2$$

$$d = 210 \text{ cm}$$

$$(V_f)^2 - (V_0)^2 = 2(a)(d) \quad \star$$

$$V_f^2 - (8)^2 = 2(2)(210)$$

$$V_f^2 - 64 = 840$$

$$V_f = \sqrt{840 + 64}$$

$$V_f = \sqrt{904}$$

$$V_f = 30.06 \text{ m/s}$$

$$a = (V_f - V_0) / t \quad \star$$

$$2 = (30.06 - 8) / t$$

$$t = (30.06 - 8) / 2$$

$$t = 11.03$$