

ARITMETICA - ALGEBRA

$$\begin{array}{r} x^4 \\ -x^4 - ax^3 - bx^2 \\ \hline -ax^3 - bx^2 \\ +ax^3 + ax^2 + abx \\ \hline (a^2-b)x^2 + abx + 4 \\ - (a^2-b)x^2 - (a^2-b)ax - (a^2-b)b \\ \hline ax[6 - (a^2-b)] + 4 - b(a^2-b) \end{array}$$

$$(a^2-b)x^2 + abx + 4$$

$$- (a^2-b)x^2 - (a^2-b)ax - (a^2-b)b$$

$$ax[6 - (a^2-b)] + 4 - b(a^2-b)$$

$$ax[2b - a^2] = 0 ; 4 - b(a^2 - b) = 0$$

$$a^2 = 2b$$

$$a^2 = 2 \times 2$$

$$\Rightarrow a = 2$$

$$4 - b(2b - b) = 0$$

$$4 - b^2 = 0$$

$$\Rightarrow b = 2$$

$$a \times b = 4$$

$$(\sqrt{11x-6})^2 = (\sqrt{4x+5} - \sqrt{x-1})^2$$

$$11x-6 = 4x+5+x-1-2\sqrt{\sqrt{4x+5}\sqrt{x-1}}$$

$$(2\sqrt{(4x+5)(x-1)})^2 = (10-6x)^2$$

$$4x^2+x-5 = 25-30x+9x^2$$

$$5x^2-31x+30=0$$

$$x_1 = 5 ; x_2 = \frac{6}{5}$$

SOLUC. CORRECTA

$$x = \frac{6}{5}$$

$$\sqrt{11(\frac{6}{5})-6} = \sqrt{4(\frac{6}{5})+5} - \sqrt{\frac{6}{5}-1}$$

$$\sqrt{\frac{36}{5}} = \sqrt{\frac{49}{5}} - \sqrt{\frac{1}{5}}$$

$$\frac{6}{\sqrt{5}} = \frac{7}{\sqrt{5}} - \frac{1}{\sqrt{5}}$$

$$\log_2 x + \log_x 2 = 4 - 2 \log_x 4$$

$$\log_2 x + \log_x 2 = 4 - 2 \log_x 2$$

$$\log_2 x + 3 \log_x 2 = 4$$

$$\frac{1}{\log_x 2} + 3 \log_x 2 = 4$$

$$3(\log_x 2)^2 - 4 \log_x 2 + 1 = 0$$

$$a = \log_x 2$$

$$3a^2 - 4a + 1 = 0$$

$$a_1 = 1 ; a_2 = \frac{1}{3}$$

$$\log_x 2 = 1 \quad \log_x 2 = \frac{1}{3}$$

$$x^1 = 2$$

$$x = 2$$

$$x^{\frac{1}{3}} = 2$$

$$x = 8$$

$$\Rightarrow 2 + 8 = 10$$

X = CANT. DE EST.

Y = PREC. UNIT.

$$\textcircled{I} \quad xy = (x+10)(y-5)$$

$$xy = xy - 5x + 10y - 50$$

$$x - 2y + 10 = 0 \quad \textcircled{A}$$

$$\textcircled{II} \quad xy = (x-6)(y+5)$$

$$xy = xy + 5x - 6y - 30$$

$$5x - 6y - 30 = 0 \quad \textcircled{B}$$

$$\textcircled{A} \quad -3x + 6y - 30 = 0$$

$$\textcircled{B} \quad 5x - 6y - 30 = 0$$

$$2x - 60 = 0$$

$$\Rightarrow x = 30$$

RESOLUCION GEOMETRIA TRIGONOMETRIA

$$\begin{aligned}
 \text{G1. } F &= \frac{\sin 2\theta + \sin 4\theta}{\sin 2\theta - \sin 4\theta} + \frac{\tan 3\theta}{\tan \theta} = \frac{2 \sin\left(\frac{2\theta+4\theta}{2}\right) \cos\left(\frac{2\theta-4\theta}{2}\right)}{2 \cos\left(\frac{2\theta+4\theta}{2}\right) \sin\left(\frac{2\theta-4\theta}{2}\right)} + \frac{\tan 3\theta}{\tan \theta} = \\
 &= \frac{2 \sin(3\theta) \cos(-\theta)}{2 \cos(3\theta) \sin(-\theta)} + \frac{\tan 3\theta}{\tan \theta} = \frac{2 \sin(3\theta) \cos(\theta)}{-2 \cos(3\theta) \sin(\theta)} + \frac{\tan 3\theta}{\tan \theta} = \\
 &= -\tan(3\theta) \cot(\theta) + \frac{\tan 3\theta}{\tan \theta} = -\frac{\tan(3\theta)}{\tan(\theta)} + \frac{\tan 3\theta}{\tan \theta} = 0 \quad \boxed{\text{(B) 0}}
 \end{aligned}$$

1. Trazamos $r = \overline{DE}$ y \overline{AD}
 2. $\hat{A} = \hat{C} = (180^\circ - 120^\circ) \frac{1}{2}$ (ΔABC ISÓSCELES)
 $= 30^\circ$
 3. \overline{AD} es bisectriz de $\angle BAE$ (\overline{AB} y \overline{AE} tangentes)
 4. $2\theta = 30^\circ \Rightarrow \theta = 15^\circ$

5. $\tan 15^\circ = \frac{R}{AE} \Rightarrow \overline{AE} = \frac{R}{\tan 15^\circ} = \frac{R}{\tan 30^\circ} = \frac{R}{\frac{\sin 60^\circ}{1 + \cos 30^\circ}} = \frac{R(1 + \cos 30^\circ)}{\sin 30^\circ}$

6. $\overline{AC} = 2R(2 + \sqrt{3})$

Piden: $m \cos 2\alpha + n \cos 2\alpha$

$CD = m \cos 2\alpha + n \cos 2\alpha$
 $CD = (m+n) \cos 2\alpha \dots (I)$

Dato: $\tan \alpha \cdot \tan 2\alpha = \frac{m}{n}$

Usando la identidad $\tan \alpha \cdot \tan 2\alpha = \sec 2\alpha - 1$, tenemos

$$\sec 2\alpha - 1 = \frac{m}{n}$$

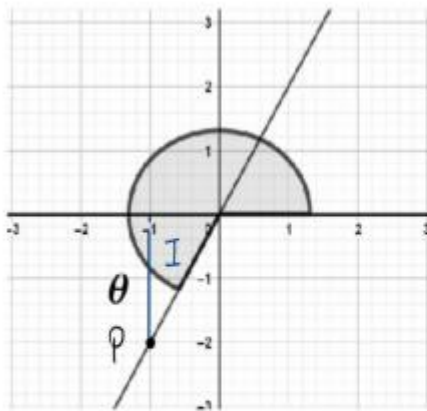
$$\sec 2\alpha = \frac{m+n}{n}$$

$$\cos 2\alpha = \frac{n}{m+n} \dots (II)$$

(II) en (I): $CD(m+n) \left(\frac{n}{m+n} \right)$
 $\therefore CD = n$

Respuesta

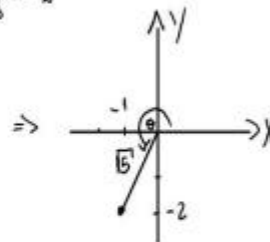
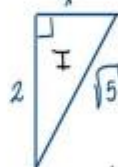
n



E.c. de la recta $y = 2x$

$$\Rightarrow \text{Si } x = -1 \Rightarrow y = -2$$

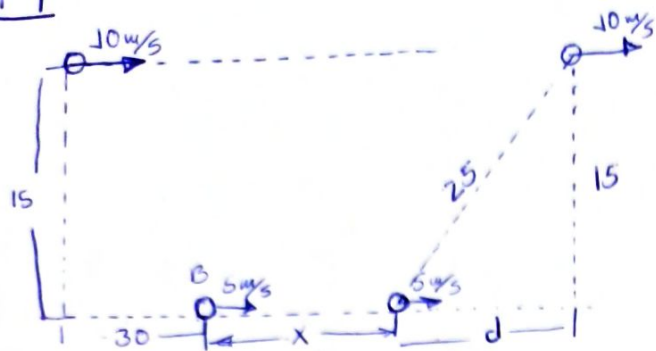
$$\Rightarrow P = (-1, -2)$$



$$\Rightarrow \cos \theta = \frac{-1}{\sqrt{5}} \text{ y } \tan \theta = \frac{-2}{-1} = 2$$

$$\Rightarrow \cos^2 \theta + \tan^2 \theta = \frac{1}{5} + 2 = \frac{11}{5}$$

F9



$$25^2 = 15^2 + d^2$$

$$5^2 \cdot 5^2 - 3^2 \cdot 5^2 = d^2$$

$$\sqrt{5^2(5^2 - 3^2)} = \sqrt{d^2}$$

$$5\sqrt{16} = d$$

$$\boxed{20\text{ m} = d}$$

$$\textcircled{A} \quad 30 + x + d = 10t$$

$$\textcircled{B} \quad x = 5t$$

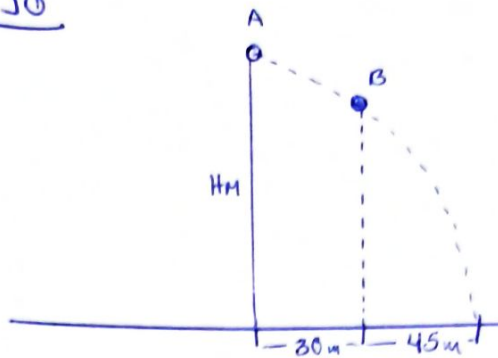
$$\textcircled{B} \text{ en } \textcircled{A}$$

$$50 + 5t = 10t$$

$$50 = 5t$$

$$\boxed{10\text{ s} = t}$$

F10



"x" A-B

$$d_{AB} = v_x t_{AB}$$

$$30 = v_x \cdot 2$$

$$\boxed{15\text{ m/s} = v_x}$$

A-C

$$d_{AC} = v_x t_{AC}$$

$$75 = 15 t_{AC}$$

$$\boxed{5\text{ s} = t_{AC}}$$

$$\text{A-C } y' = y_0 + v_{y0}t - \frac{1}{2}gt^2$$

$$0 = H - \frac{1}{2}(10)(5)^2$$

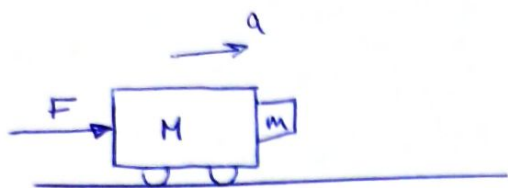
$$0 = H - 5(5)^2$$

$$\boxed{H = 125\text{ m}}$$

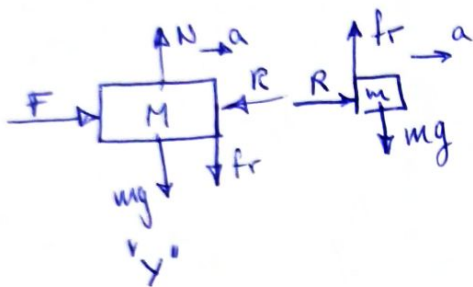
F11

$$M = 50 \quad \mu = 0,4$$

$$m = 10$$



$$F = (M+m)a \dots (1)$$



$$f_r = mg$$

$$\mu R = mg \dots (1)$$

$$R = ma \dots (2)$$

$$\mu ma = mg$$

$$a = \frac{g}{\mu}$$

$$a \text{ en } (1)$$

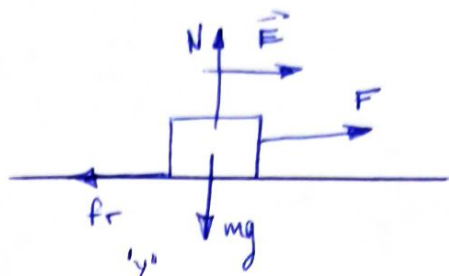
$$F = (M+m) \cdot \frac{g}{\mu}$$

$$F = (50+10) \cdot \frac{10}{0,4}$$

$$F = 60 \cdot \frac{100}{4}$$

$$F = 1500 \text{ N}$$

F12/



$$N - mg = 0$$

$$N = mg$$

$$F - f_r = ma$$

$$E.g - \mu N = ma$$

$$E.g = \mu mg + ma$$

$$E.g = m(\mu g + a)$$

$$\frac{E.g}{\mu g + a} = m$$

$$\frac{100 \cdot 1 \times 10^{-3}}{0,5 \cdot 10 + 3} = m$$

$$\frac{0,1}{5+3} = m$$

$$m = \frac{0,1 \cdot 1000}{8} \cdot \frac{1000 \text{ g}}{1 \text{ kg}}$$

$$m = \frac{100}{8} \text{ g}$$

$$m = 12,5 \text{ [g]}$$

En un recipiente cilíndrico que contiene un sólido que pueda capturar vapor de agua, se agrega una mezcla de nitrógeno y vapor de agua, es así; que los gases combinados generan una presión de 760,0 mm Hg. Al día siguiente se mide una presión constante en el recipiente de 752,4 mm Hg y no se detecta la presencia de vapor de agua. Determinar la fracción molar del vapor de agua en la mezcla inicial. Considerar que el sólido en ningún momento ejerce alguna presión sobre el recipiente.

a) 0,01

b) 0,10

c) 0,90

d) 0,99

e) Ninguno

$$\text{Inicio: } P_T = P_{N_2} + P_{H_2O}$$

$$P_{H_2O} = P_T - P_{N_2} = 760 - 752,4$$

$$\text{Final: } P_T = P_{N_2} = 752,4 \text{ mm Hg}$$

$$P_{H_2O} = 7,6 \text{ mm Hg}$$

$$P_{H_2O} = X_{H_2O} P_{T_0} \Rightarrow X_{H_2O} = \frac{P_{H_2O}}{P_{T_0}} = \frac{7,6}{760} = 0,01 //$$

Para la siguiente reacción: Ácido nítrico + Zinc \rightarrow Agua + Nitrógeno gaseoso + Nitrato de Zinc. Determinar el valor de la sumatoria de todos de los coeficientes estequiométricos de los productos.

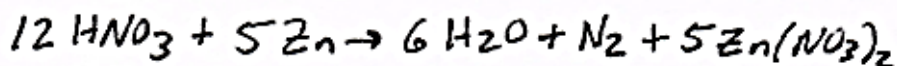
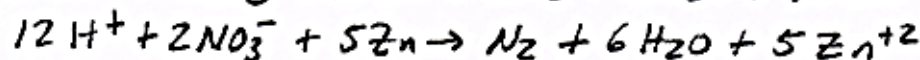
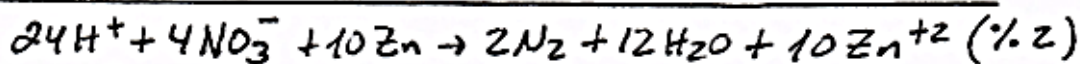
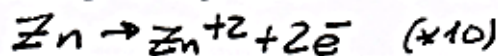
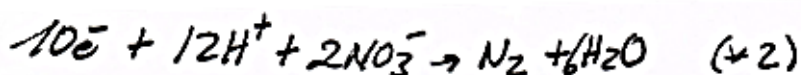
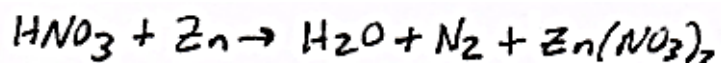
a) 12

b) 17

c) 19

d) 21

e) Ninguno



$$\sum \text{coef. productos} = 6 + 1 + 5 = 12 //$$

Para la siguiente reacción: Dicromato de litio + Ácido Clorhídrico → Agua + Cloro gaseoso + Cloruro de litio + Cloruro Crómico. Determinar el valor de la sumatoria de todos de los coeficientes estequiométricos de los reactivos.

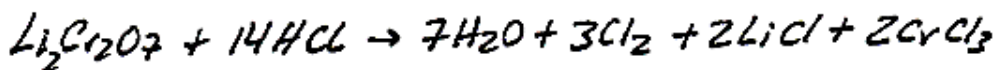
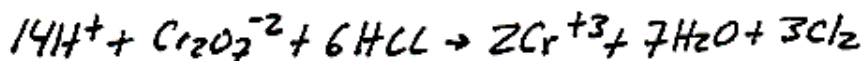
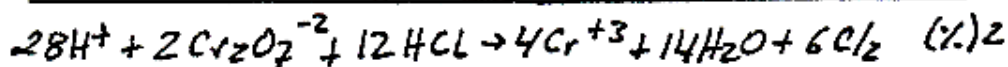
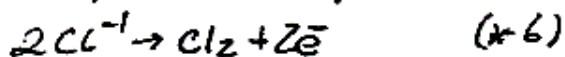
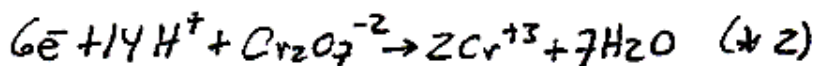
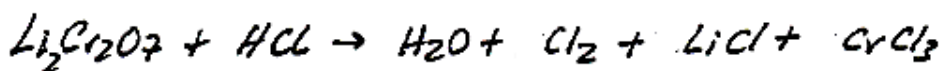
a) 15

b) 11

c) 17

d) 5

e) Ninguno



$$\Sigma \text{coef. reactivos} = 1 + 14 = \underline{15} //$$

El yodo molecular reacciona con el ácido nítrico para producir: monóxido de nitrógeno, ácido yódico y agua. Determinar los gramos de yodo molecular que se requiere para obtener 300 g de monóxido de nitrógeno.

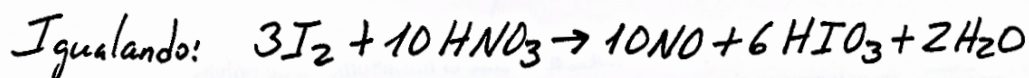
a) 762

b) 508

c) 254

d) 127

e) Ninguno



$$300\text{g NO} \times \frac{1\text{mol NO}}{30\text{g NO}} \times \frac{3\text{mol I}_2}{10\text{mol NO}} \times \frac{254\text{g I}_2}{1\text{mol I}_2} = \underline{762\text{g I}_2} //$$