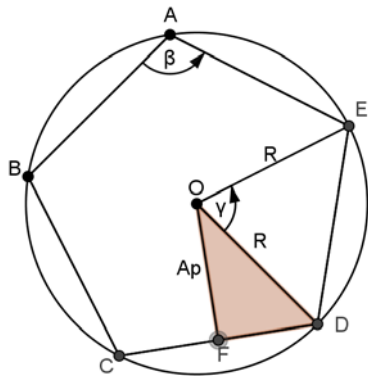
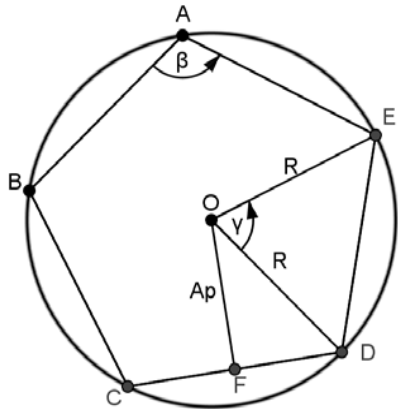


FORMULAS DE APLICACIÓN

MATEMATICA 1C

POLIGONOS REGULARES SUPERFICIES

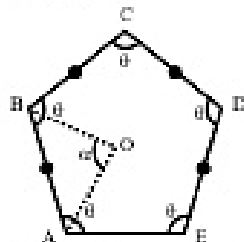


- Superficie= $\frac{\text{perímetro} \times \text{apotema}}{2}$

- Superficie= 2x n x Sup. triangulo OFD

n: número de lados del polígono regular.

- Polígono Regular
Cuando los ángulos y lados tienen la misma medida.



Donde: "O" es el centro del polígono.

PROPIEDADES

I. Relación de lados, vértices, ángulo:

N° vértices = N° lados = N° ángulos = n

II. Suma de medidas de los ángulos interiores (Si):

$$Si = 180 (n - 2)$$

n = número de lados

III. Suma de medidas de los ángulos exteriores (Se):

$$Se = 360^{\circ}$$

IV. Medida de un ángulo interior en polígonos equiángulos (α_i):

$$\alpha_i = \frac{180 (n - 2)}{n}$$

n = número de lados

V. Medida de un ángulo exterior en polígonos equiángulos (α_e):

$$\alpha_e = \frac{360}{n}$$

NOTA

Solo en polígono regular
Ángulo central = ángulo exterior

$$\alpha_c = \alpha_e$$

VI. Suma de un ángulo interior y un ángulo exterior:

$$\alpha_i + \alpha_e = 180^{\circ}$$

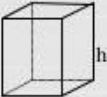
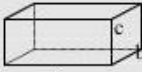
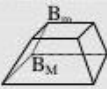
Número Total
Diagonales en
Polígono de "n"
lados

$$= \frac{n(n - 3)}{2}$$

Número de diagonales por
vértice en un polígono regular

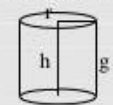
$$d = n - 3$$

FÓRMULAS DE LAS ÁREAS Y VOLÚMENES DE LOS CUERPOS GEOMÉTRICOS

Cuerpos	Área total (A_T)	Área lateral (A_L)	Área base/s (A_B)	Volumen (V)
PRISMAS RECTOS 	$A_T = A_L + 2A_B$	$A_L = P_B \cdot h$	$A_B = \begin{cases} \frac{b \cdot a}{2} & (1) \\ l^2 & (2) \\ \frac{P \cdot ap}{2} & (3) \end{cases}$	$V = A_B \cdot h$
ORTOEDRO 	$A_T = 2ab + 2ac + 2bc$	$A_L = 2ac + 2bc$	$A_B = 2ab$	$V = a \cdot b \cdot c$
CUBO 	$A_T = 6a^2$	$A_L = 4a^2$	$A_B = 2a^2$	$V = a^3$
PIRÁMIDES RECTAS 	$A_T = A_L + A_B$	$A_L = \frac{P_B \cdot ap}{2}$	$A_B = \begin{cases} \frac{b \cdot a}{2} & (1) \\ l^2 & (2) \\ \frac{P \cdot ap}{2} & (3) \end{cases}$	$V = \frac{1}{3} A_B \cdot h$ o $V = \frac{A_B \cdot h}{3}$
TRONCO DE PIRÁMIDE 	$A_T = A_L + A_{Bm} + A_{Bn}$	$A_L = \frac{(B + b) \cdot a}{2} \cdot n$	$A_B = \text{igual que en la pirámide}$	

$$V_{\text{Pir truncada}} = \frac{h}{3} (A + A' + \sqrt{A \times A'})$$

FÓRMULAS DE LAS ÁREAS Y VOLÚMENES DE LOS CUERPOS GEOMÉTRICOS

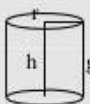
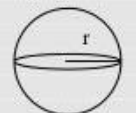
Cuerpos	Área total (A_T)	Área lateral (A_L)	Área base/s (A_B)	Volumen (V)
CILINDRO 	$A_T = A_L + 2A_B$ $A_T = 2\pi rg + 2\pi r^2$	$A_L = 2\pi rg$	$A_B = \pi r^2$	$V = \pi r^2 \cdot h$
CONO 	$A_T = A_L + A_B$ $A_T = \pi rg + \pi r^2$	$A_L = \pi rg$	$A_B = \pi r^2$	$V = \frac{1}{3} \cdot \pi r^2 \cdot h$ o $V = \frac{\pi r^2 \cdot h}{3}$
TRONCO DE CONO 	$A_T = \pi g(R+r) + \pi R^2 + \pi r^2$	$A_L = \pi g \cdot (R+r)$	$A_{Bm} = \pi R^2$ $A_{Bn} = \pi r^2$	
ESFERA 	$A = 4\pi r^2$			$V = \frac{4}{3} \cdot \pi r^3$

(1) Base triangular (b=base, a=altura). (2) Base cuadrada (l=lado). (3) Polígono regular (P=perímetro, ap=apotema).

<https://www.pinterest.es/pin/448460075387018120/?lp=true>

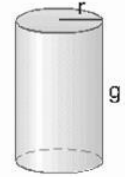
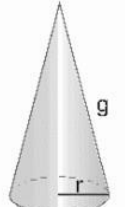
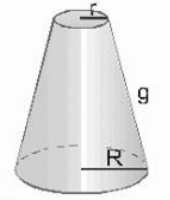
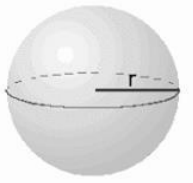
$$V_{\text{cono truncado}} = \frac{h\pi}{3} (r_1^2 + r_2^2 + r_1 \times r_2)$$

Superficies y volúmenes de poliedros irregulares y superficies redondas

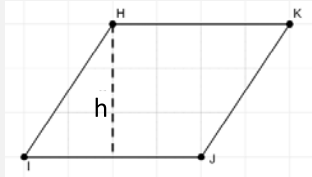
CILINDRO 	$A_T = A_L + 2A_B$ $A_T = 2\pi r g + 2\pi r^2$	$A_L = 2\pi r g$	$A_B = \pi r^2$	$V = \pi r^2 \cdot h$
CONO  TRONCO DE CONO 	$A_T = A_L + A_B$ $A_T = \pi r g + \pi r^2$ $A_T = \pi g(R+r) + \pi R^2 + \pi r^2$	$A_L = \pi r g$ $A_L = \pi g \cdot (R+r)$	$A_B = \pi r^2$ $A_{BM} = \pi R^2$ $A_{Bm} = \pi r^2$	$V = \frac{1}{3} \cdot \pi r^2 \cdot h$ ó $V = \frac{\pi r^2 \cdot h}{3}$
ESFERA 	$A = 4\pi r^2$			$V = \frac{4}{3} \cdot \pi r^3$

(1) Base triangular (b=base, a=altura). (2) Base cuadrada (l=lado). (3) Polígono regular (P=perímetro, ap=apotema).

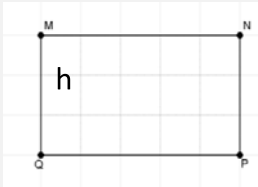
<https://technologynatura.wordpress.com/2014/10/09/desarrollos-areas-y-volumenes-de-poliedros/>

Área de cuerpos geométricos	
Figura	Área
 Cilindro	$A_{lateral} = 2\pi r \cdot g$ $A_{total} = 2\pi r \cdot (g + r)$
 Cono	$A_{lateral} = \pi r \cdot g$ $A_{total} = \pi r \cdot (g + r)$
 Tronco de cono	$A_{lateral} = \pi g \cdot (R + r)$ $A_{total} = \pi g \cdot (R + r) + \pi R^2 + \pi r^2$
 Esfera	$A = 4\pi r^2$

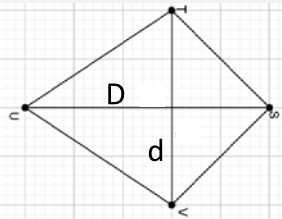
POLIGONOS IRREGULARES SUPERFICIES



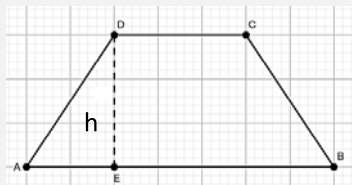
$$\text{Sup} = \text{Base} \times h$$



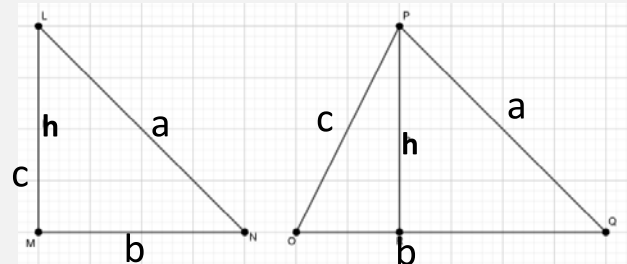
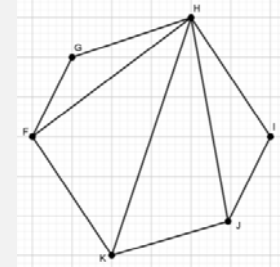
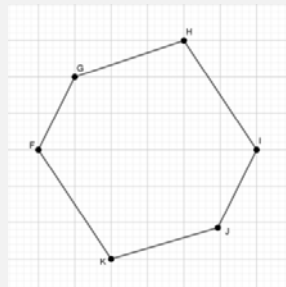
$$\text{Sup} = \text{Base} \times h$$



$$\text{Sup} = \frac{D \times d}{2}$$



$$\frac{(Bm + bm)}{2} \times h = \text{Sup}$$

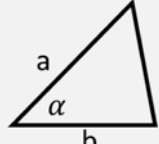


. Si los datos conocidos son solo los lados del triángulo:

$$S = \sqrt{p(p-a)(p-b)(p-c)} \text{ donde}$$

$$p = \frac{a+b+c}{2}$$

. Si se conocen solo dos lados y el ángulo entre ellos comprendido.



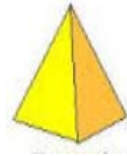
$$\text{Sup} = \frac{a \cdot b \cdot \text{sen} \alpha}{2}$$

Áreas y Volúmenes de Poliedros Regulares

Tetraedro

$$Sup = a^2 \times \sqrt{3} = a^2 \times 1,732050808$$

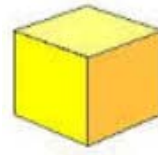
$$Vol = a^3 \times \frac{\sqrt{2}}{12} = a^3 \times 0,11785113$$



Hexaedro o Cubo

$$Sup = 6 a^2$$

$$Vol = a^3$$



Octaedro

$$Sup = 2 a^2 \times \sqrt{3} = a^2 \times 3,464101615$$

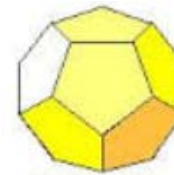
$$Vol = a^3 \times \frac{\sqrt{2}}{3} = a^3 \times 0,47140452$$



Dodecaedro

$$Sup = 3 a^2 x \sqrt{5(5 + 2\sqrt{5})} = a^2 x 20,64572881$$

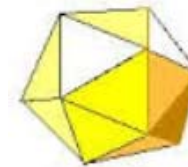
$$Vol = a^3 x \frac{(15+7\sqrt{5})}{4} = a^3 x 7,663118961$$



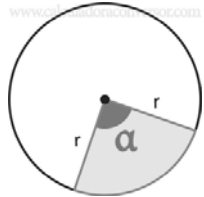
Icosaedro

$$Sup = 5 a^2 x \sqrt{3} = a^2 x 8,660254038$$

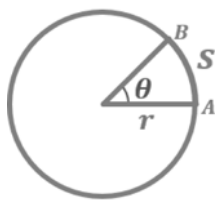
$$Vol = 5 a^3 x \frac{(3 + \sqrt{5})}{12} = a^3 x 2,181694991$$



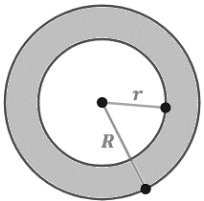
CALCULO DE AREAS Y PERIMETROS DE FIGURAS CURVAS PLANAS



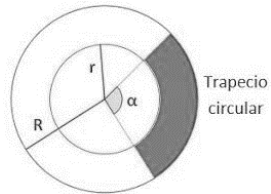
$$\text{Área sector circular} = \frac{\pi \cdot r^2 \cdot \alpha^\circ}{360^\circ}$$



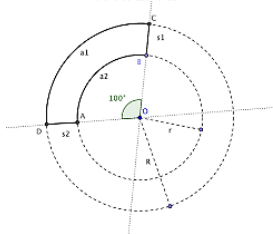
$$\text{Longitud arco circunferencia "S"} = \frac{\pi \cdot 2 \cdot r \cdot \theta^\circ}{360^\circ}$$



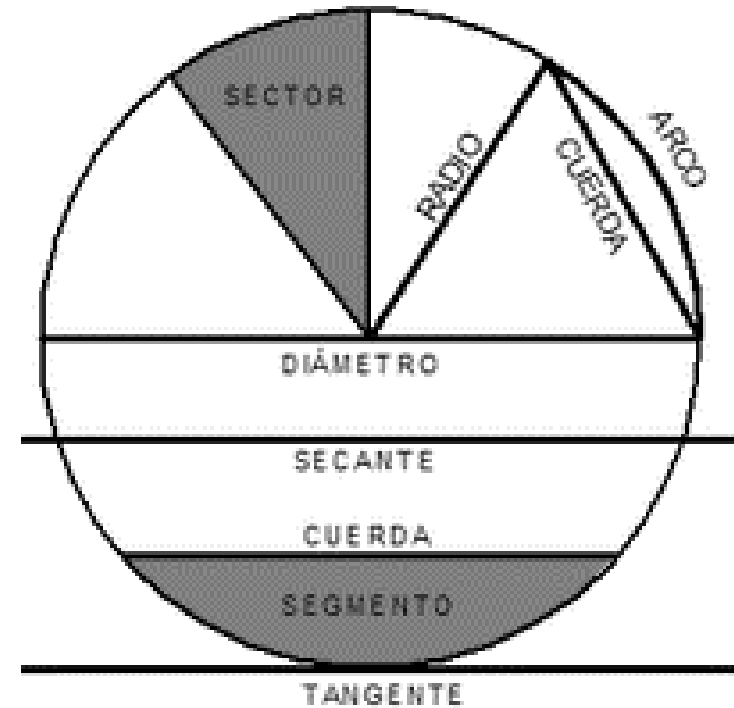
$$\text{Área anillo circular} = \pi R^2 - \pi r^2$$



$$\text{Area trapezio circular} = \frac{(\pi R^2 - \pi r^2) \cdot \alpha^\circ}{360^\circ}$$



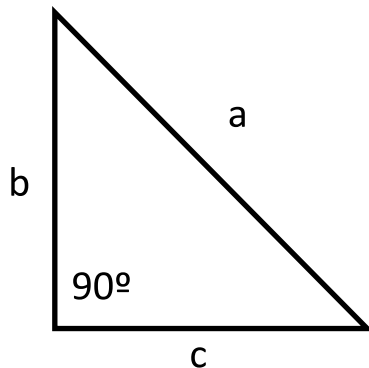
$$\text{Perimetro trapezio circular} = 2(R-r) + \frac{(2\pi R + 2\pi r) \cdot \alpha^\circ}{360^\circ}$$



ANGULOS SISTEMAS SEXAGESIMAL- CENTESIMAL Y RADIAN- TEOREMA DE PITÁGORAS- FUNCIONES TRIGONOMETRICAS

- $\frac{\alpha \text{ radian}}{2\pi \text{ radianes}} = \frac{\alpha^\circ}{360^\circ} = \frac{\alpha^G}{400^G}$ equivalencia entre los tres sistemas

- TEOREMA DE PITAGORAS



$$b^2 + c^2 = a^2$$

Funciones trigonométricas

- Funciones trigonométricas del ángulo α

- $\text{sen } \alpha = \frac{\text{cateto opuesto}}{\text{hipotenusa}} = \frac{c}{a}$

- $\text{cos } \alpha = \frac{\text{cateto adyacente}}{\text{hipotenusa}} = \frac{b}{a}$

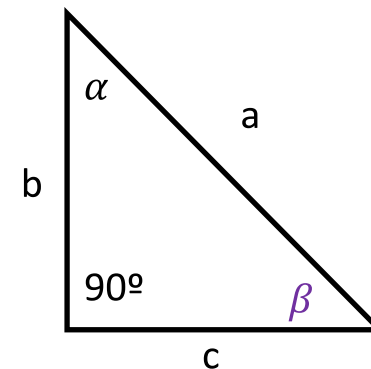
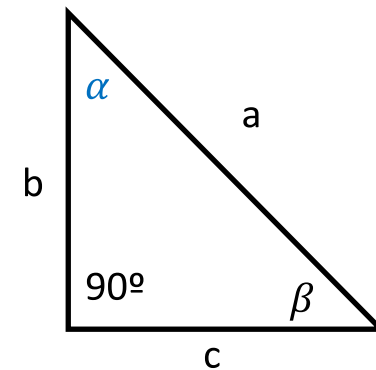
- $\text{tag } \alpha = \frac{\text{cateto opuesto}}{\text{cateto adyacente}} = \frac{c}{b}$

- Funciones trigonométricas del ángulo β

- $\text{sen } \beta = \frac{\text{cateto opuesto}}{\text{hipotenusa}} = \frac{b}{a}$

- $\text{cos } \beta = \frac{\text{cateto adyacente}}{\text{hipotenusa}} = \frac{c}{a}$

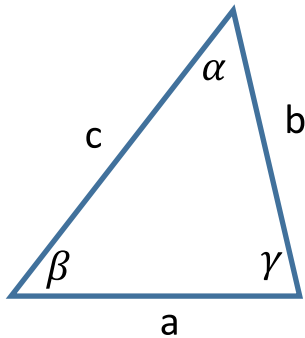
- $\text{tag } \beta = \frac{\text{cateto opuesto}}{\text{cateto adyacente}} = \frac{b}{c}$



TEOREMAS DEL SENO Y DEL COSENO

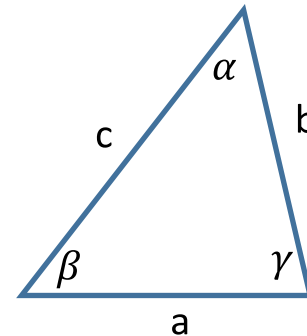
TEOREMA DEL SENO

- $$\frac{a}{\operatorname{sen} \alpha} = \frac{b}{\operatorname{sen} \beta} = \frac{c}{\operatorname{sen} \gamma}$$



TEOREMA DEL COSENO

- $a^2 = b^2 + c^2 - 2b.c.\cos \alpha$
- $b^2 = a^2 + c^2 - 2a.c.\cos \beta$
- $c^2 = a^2 + b^2 - 2a.b.\cos \gamma$



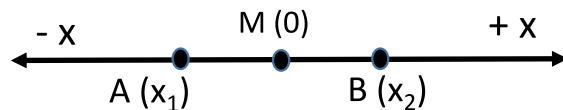
SISTEMAS DE COORDENADAS EN EL PLANO

A- Coordenadas cartesianas o rectangulares

SISTEMA UNIDIMENSIONAL:

- Distancia entre dos puntos :

A- En horizontal:



Distancia entre:

Punto A (x_1) y Punto B (x_2)

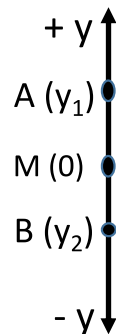
$$|BA| = |AB| = |x_1 - x_2| = |x_2 - x_1|$$

B- En vertical:

Distancia entre:

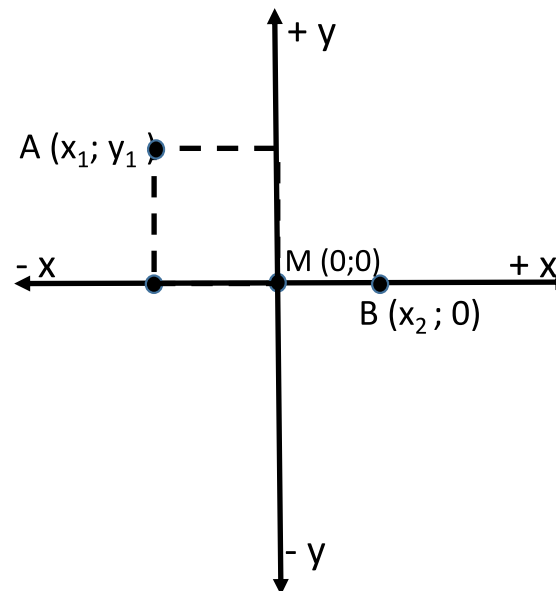
Punto A (x_1) y Punto B (x_2)

$$|BA| = |AB| = |x_1 - x_2| = |x_2 - x_1|$$



SISTEMA BIDIMENSIONAL:

- Distancia entre dos puntos :

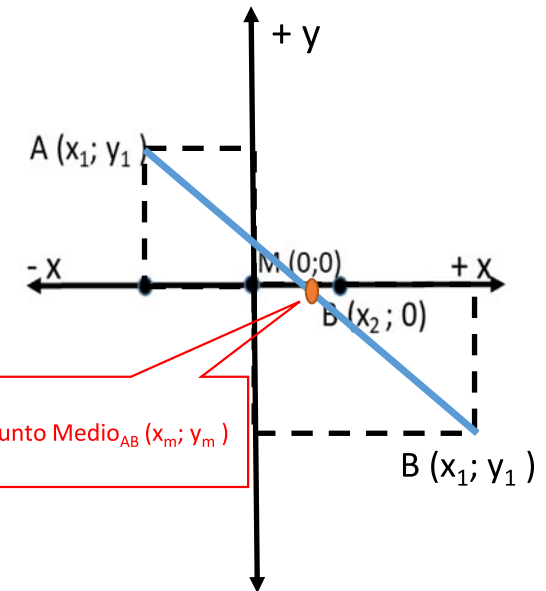


Distancia entre dos puntos

$$|BA| = |AB| = \sqrt{(X_1 - X_2)^2 + (Y_1 - Y_2)^2}$$

SISTEMA BIDIMENSIONAL:

- | Punto medio



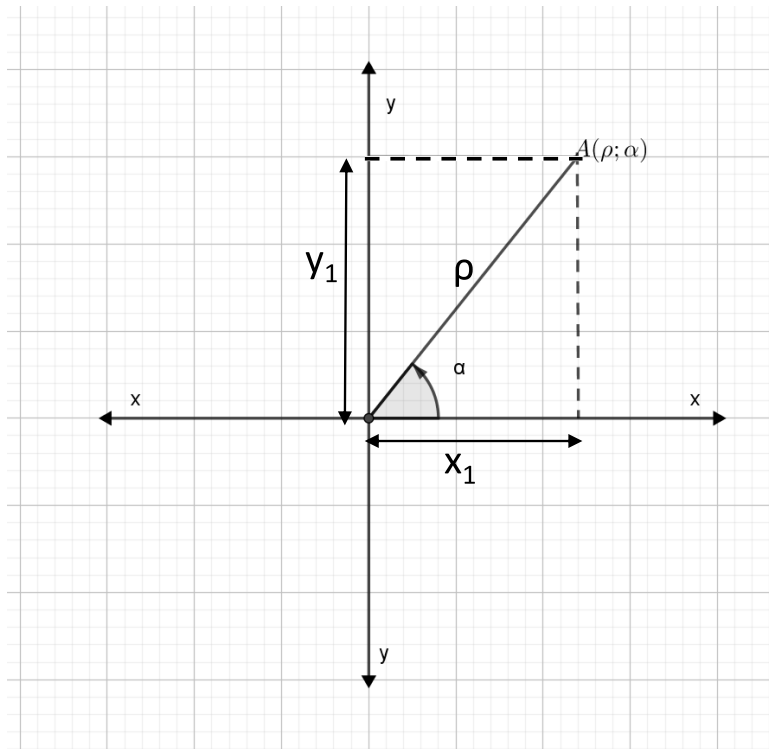
$$X_m = \frac{x_1 + x_2}{2}$$

$$Y_m = \frac{y_1 + y_2}{2}$$

Coordenadas del punto medio

SISTEMAS DE COORDENADAS EN EL PLANO

A- Coordenadas polares



COORDENADAS POLARES DEL PUNTO "A"

- $\rho^2 = (X_1)^2 + (Y_1)^2$
- $\alpha = \text{arc.tg} \left(\frac{Y_1}{X_1} \right)$

PASAJE DEL SISTEMA POLAR AL CARTESIANO

$$x_1 = \rho \cdot \cos \alpha$$

$$y_1 = \rho \cdot \text{sen } \alpha$$

PASAJE DEL SISTEMA CARTESIANO AL POLAR

- $\rho^2 = (X_1)^2 + (Y_1)^2$

- $\alpha = \text{arc.tg} \left(\frac{Y_1}{X_1} \right)$