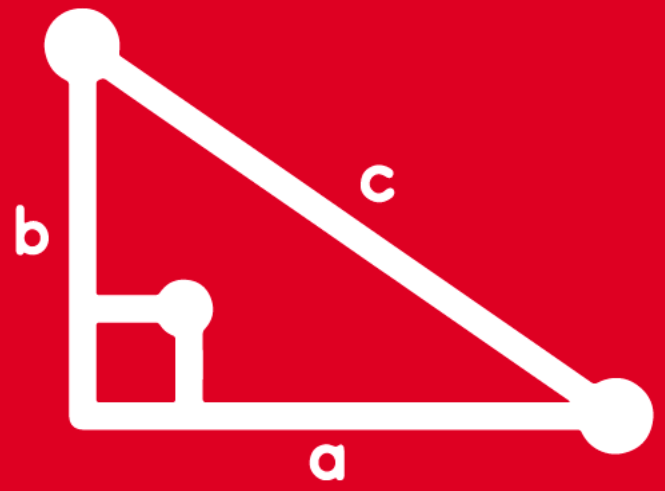
TRIGONOMETRY

Chapter 21

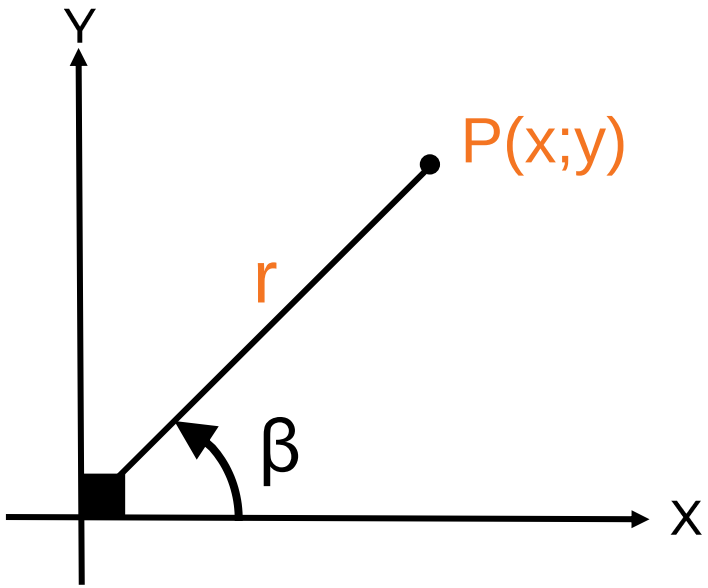
1st
SECONDARY



RAZONES TRIGONÓMETRICAS DE UN ÁNGULO EN POSICIÓN NORMAL III

SACO OLIVEROS

RAZONES TRIGONOMÉTRICAS DE UN ÁNGULO EN POSICIÓN NORMAL



- x = abscisa
- y = ordenada
- r = radio vector

$$r^2 = x^2 + y^2$$

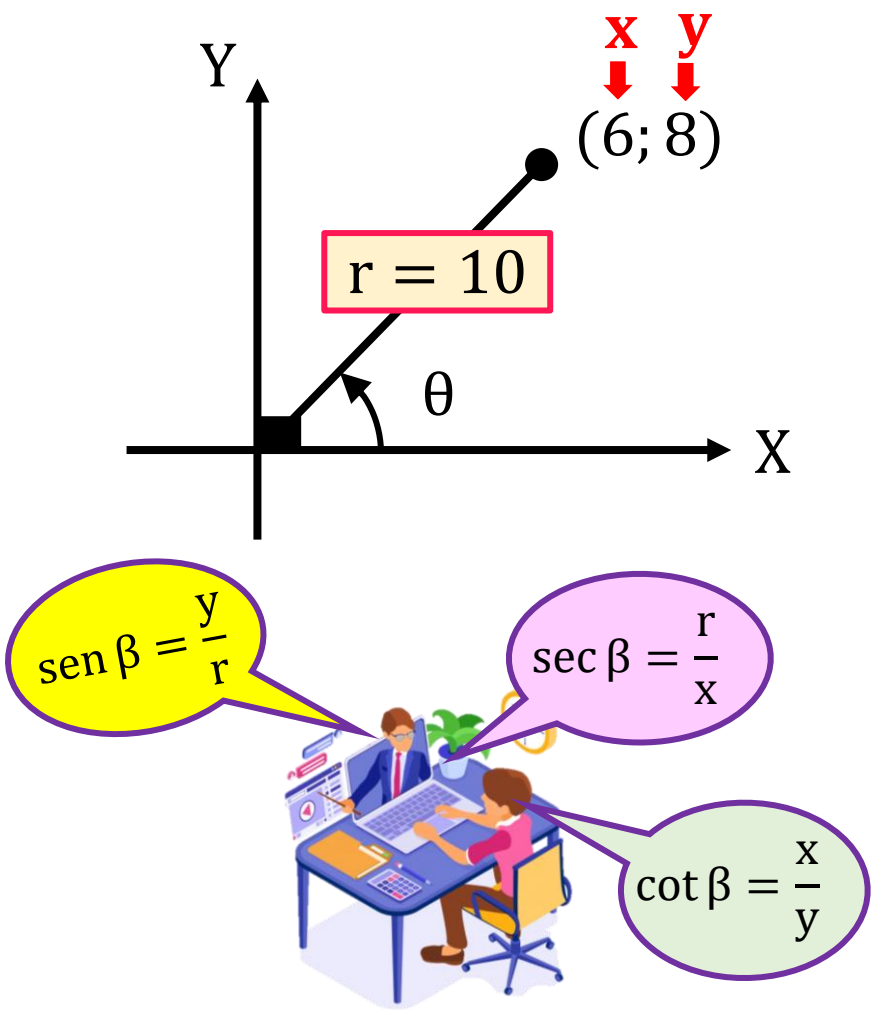
$$\operatorname{sen}\beta = \frac{y}{r} \qquad \cot\beta = \frac{x}{y}$$

$$\cos\beta = \frac{x}{r} \qquad \sec\beta = \frac{r}{x}$$

$$\tan\beta = \frac{y}{x} \qquad \csc\beta = \frac{r}{y}$$

HELICOPRACTICE 1

Según la figura, complete la tabla de razones trigonométricas:



Resolución:

Calculando el radio vector: $r^2 = x^2 + y^2$

$r^2 = (6)^2 + (8)^2$

$r^2 = 36 + 64$

$r = \sqrt{100}$

$\Rightarrow r = 10$

Piden:

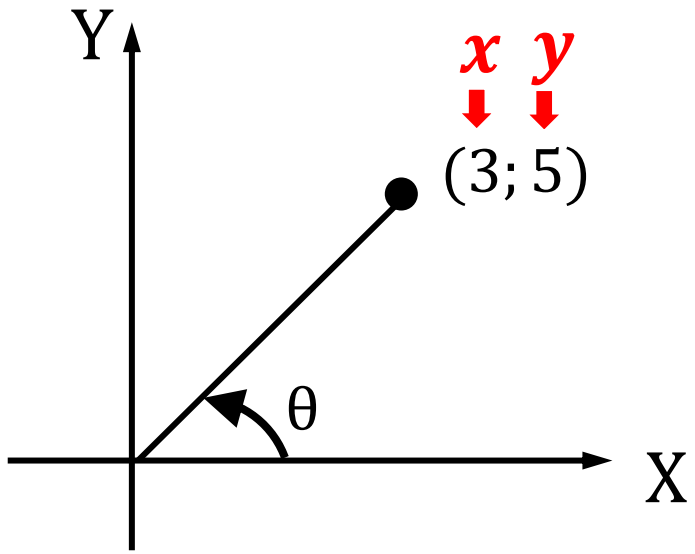
$$10 \operatorname{sen}\theta = \cancel{10} \cdot \left(\frac{8}{\cancel{10}}\right) = 8$$

$$6 \sec\theta = \cancel{6} \cdot \left(\frac{10}{\cancel{6}}\right) = 10$$

$$4 \cot\theta = \overset{1}{\cancel{4}} \cdot \left(\frac{6}{\cancel{8}_{2}}\right) = 3$$

HELICOPRACTICE 2

Del gráfico, efectúe: $E = 15\tan\theta + 1$



Resolución:

Piden:

$$E = 15\tan\theta + 1$$

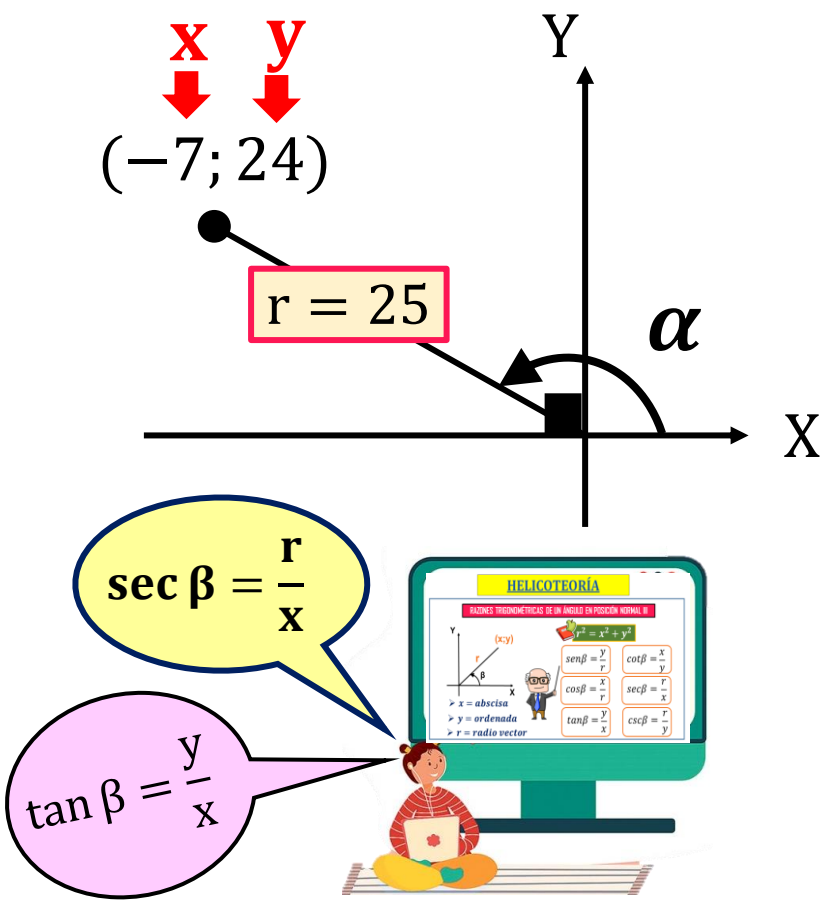
$$E = \cancel{15}^{5} \cdot \left(\frac{5}{\cancel{3}_{1}}\right) + 1$$

$$E = 25 + 1$$

$$\therefore E = 26$$

HELICOPRACTICE 3

Del gráfico, efectúe: $L = \sec\alpha + \tan\alpha$



Resolución:

Calculando el radio vector: $r^2 = x^2 + y^2$

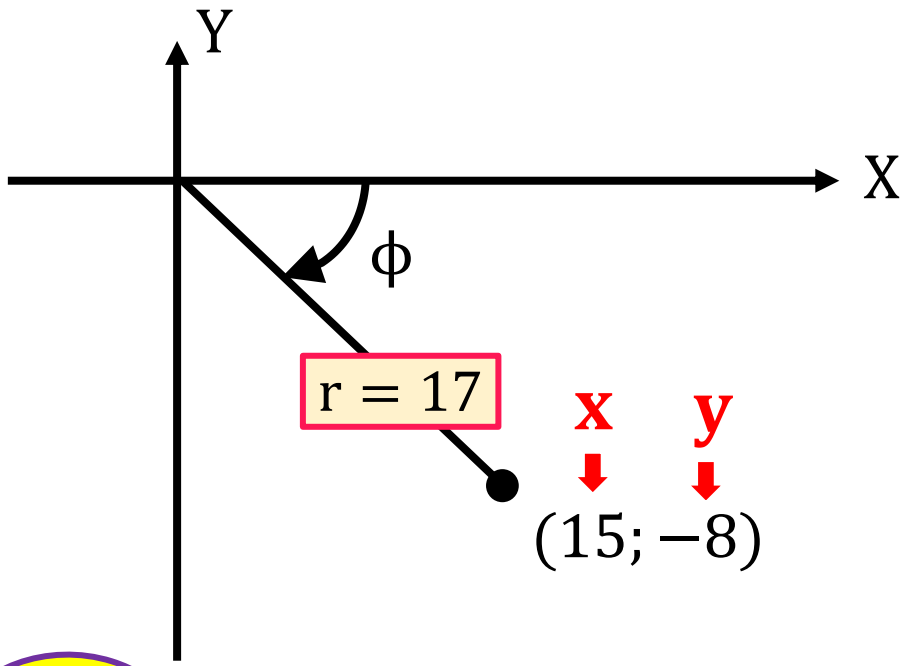
$$r^2 = (-7)^2 + (24)^2$$
$$r^2 = 49 + 576$$
$$r = \sqrt{625}$$
$$\Rightarrow r = 25$$

Piden:

$$L = \sec\alpha + \tan\alpha$$
$$L = \left(\frac{25}{-7}\right) + \left(\frac{24}{-7}\right)$$
$$L = \frac{49}{-7}$$
$$\therefore L = -7$$

HELICOPRACTICE 4

Del gráfico, efectúe: $K = 17(\operatorname{sen}\phi + \cos\phi)$



Resolución:

Calculando el radio vector: $r^2 = x^2 + y^2$

$r^2 = (15)^2 + (-8)^2$

$r^2 = 225 + 64$

$r = \sqrt{289}$

$\Rightarrow r = 17$

Piden:

$$K = 17(\operatorname{sen}\phi + \cos\phi)$$

$$K = 17 \cdot \left(\frac{-8}{17} + \frac{15}{17}\right)$$

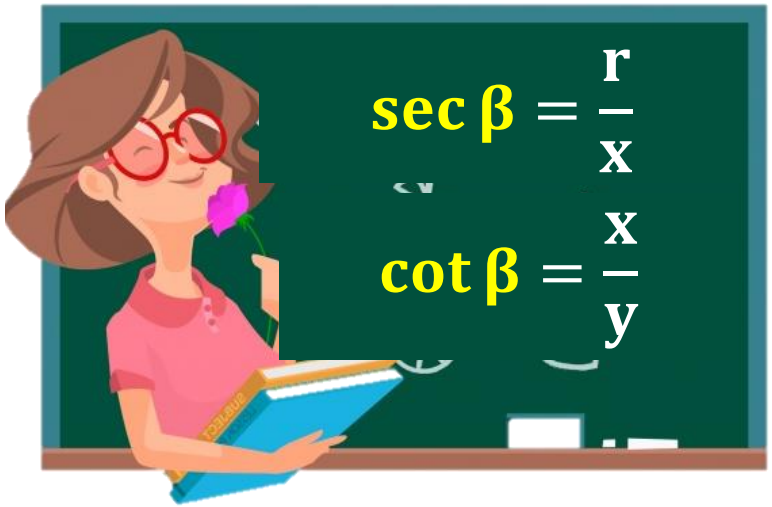
$$K = \cancel{17} \cdot \left(\frac{7}{\cancel{17}}\right)$$

$\therefore E = 7$

HELICOPRACTICE 5

Si el punto Q(-3;-1) pertenece al lado final de un ángulo en posición normal β; efectúe:

$$E = \sqrt{10}\sec\beta \cdot \cot\beta$$



Resolución:

x y

Del dato: $Q(-3;-1)$

Calculando el radio vector: $r^2 = x^2 + y^2$

$$r^2 = (-3)^2 + (-1)^2$$
$$r^2 = 9 + 1$$
$$r^2 = 10$$
$$\Rightarrow r = \sqrt{10}$$

Piden:

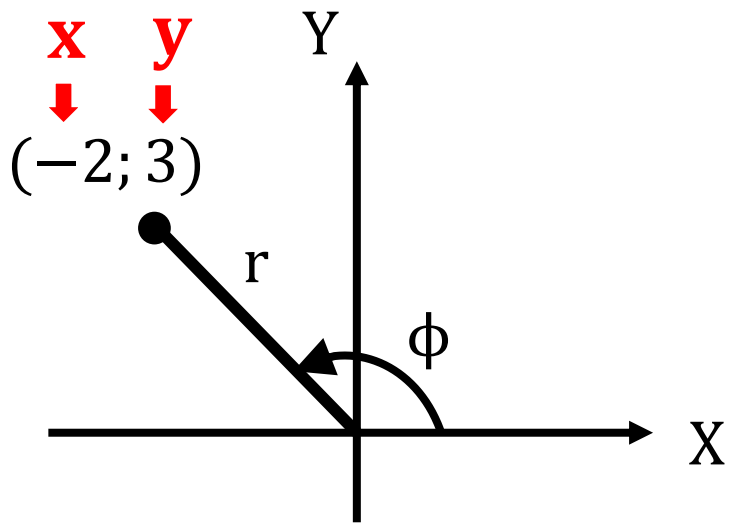
$$E = \sqrt{10}\sec\beta \cdot \cot\beta$$

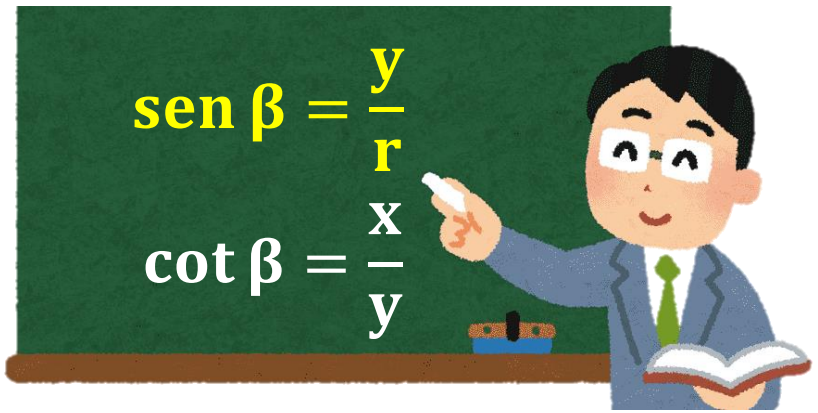
$$E = \sqrt{10} \cdot \left(\frac{\sqrt{10}}{-3}\right) \cdot \left(\frac{-3}{-1}\right)$$

$$\therefore E = -10$$

HELICOPRACTICE 6

Del gráfico, efectúe: $A = \sqrt{13}\,\text{sen}\,\phi + 6\cot\phi$





Resolución:

Calculando el radio vector: $r^2 = x^2 + y^2$

$$r^2 = (-2)^2 + (3)^2$$

$$r^2 = 4 + 9 \Rightarrow r = \sqrt{13}$$

Piden:

$$A = \sqrt{13}\,\text{sen}\,\phi + 6\cot\phi$$

$$A = \cancel{\sqrt{13}} \cdot \left(\frac{3}{\cancel{\sqrt{13}}}\right) + \cancel{6}^{2} \cdot \left(\frac{-2}{\cancel{3}_{1}}\right)$$

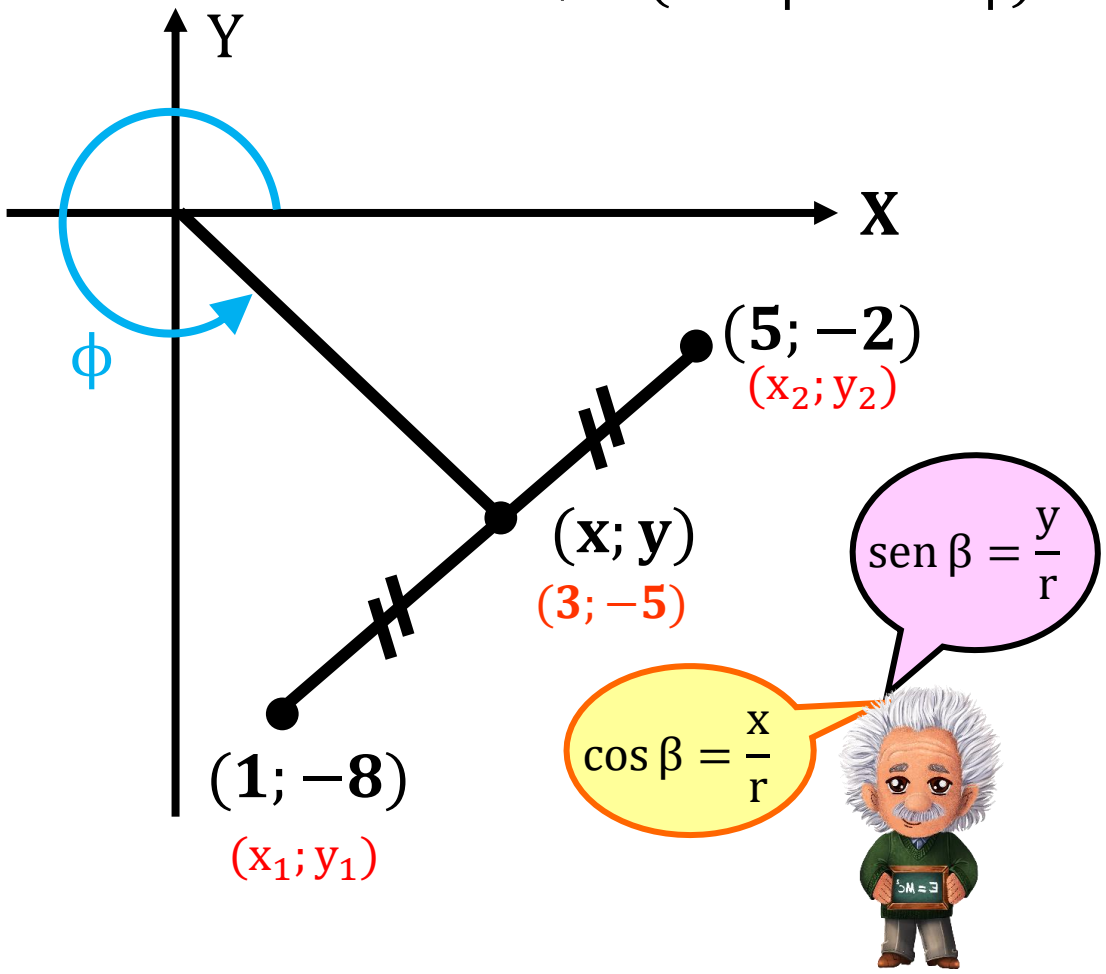
$$A = 3 - 4$$

$$\therefore A = -1$$

HELICOPRACTICE 7

Del gráfico, efectúe:

$$E = \sqrt{34}(\operatorname{sen}\phi + \cos\phi)$$



Resolución:

Calculando las coordenadas del punto medio:

$$x = \frac{1+5}{2} \qquad x = \frac{-8+(-2)}{2}$$

$$x = 3 \qquad y = -5$$

Calculando el radio vector: $r^2 = x^2 + y^2$

$$r^2 = (3)^2 + (-5)^2$$

$$r^2 = 9 + 25$$

$$r^2 = 34$$

$$r = \sqrt{34}$$

Piden:

$$E = \sqrt{34} \cdot \left(\frac{-5}{\sqrt{34}} + \frac{3}{\sqrt{34}}\right)$$

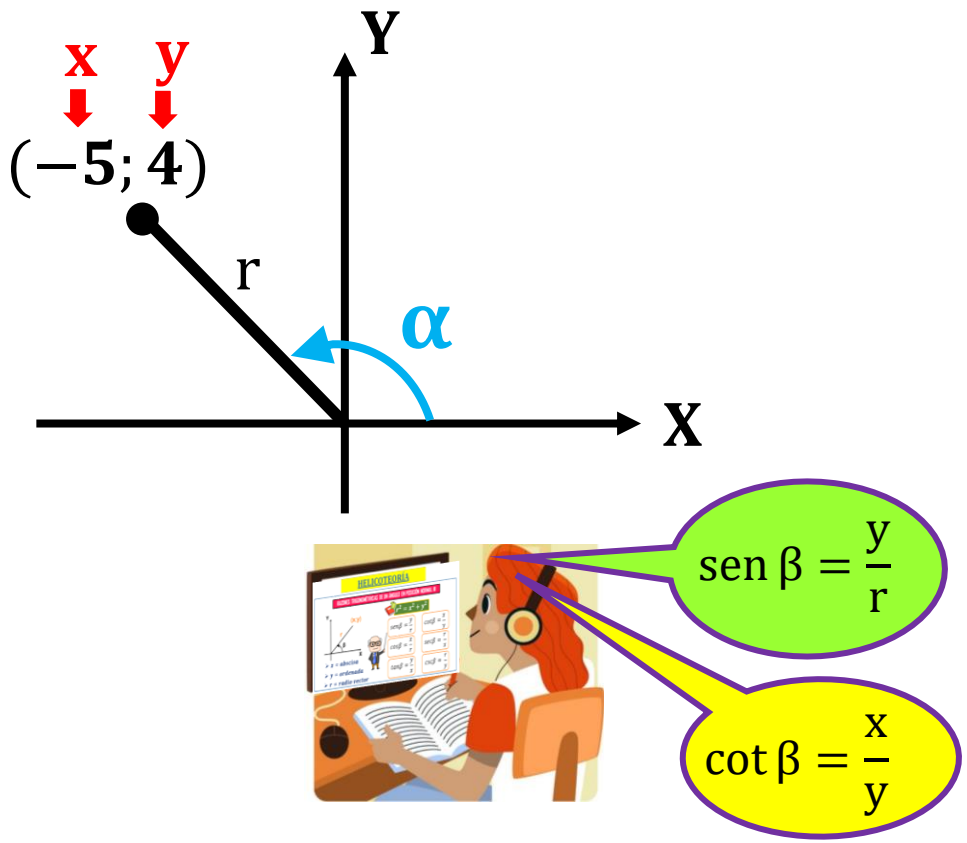
$$E = \cancel{\sqrt{34}} \cdot \left(\frac{-2}{\cancel{\sqrt{34}}}\right)$$

$$\therefore E = -2$$

HELICOPRACTICE 8

Sebastián ha rendido su examen de trigonometría obteniendo una calificación A. Para obtener dicha calificación tendrás que resolver lo siguiente:

$$A = \sqrt{41}\,\text{sen}\,\alpha - 8\cot\alpha$$



Resolución:

Calculando el radio vector: $r^2 = x^2 + y^2$

$$r^2 = (-5)^2 + (4)^2$$
$$r^2 = 25 + 16$$
$$r^2 = 41$$
$$\Rightarrow r = \sqrt{41}$$

Piden:

$$A = \sqrt{41}\,\text{sen}\,\alpha - 8\cot\alpha$$

$$A = \cancel{\sqrt{41}} \cdot \left(\frac{4}{\cancel{\sqrt{41}}}\right) - \cancel{8}^{2} \cdot \left(\frac{-5}{\cancel{4}_{1}}\right)$$

$$A = 4 + 10$$

$$\therefore A = 14$$