

$$a = 4$$

$$b = 3x$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)(a-b) = a^2 - b^2$$

Desarrolla los siguientes productos notables

$$(x+5)^2 = x^2 + 2 \cdot 5x + 5^2 = x^2 + 10x + 25$$

$$(2x-4)^2 = (2x)^2 - 2 \cdot 4 \cdot 2x + 4^2 = 4x^2 - 16x + 16$$

$$(4+3x)(4-3x) = 4^2 - (3x)^2 = 16 - 9x^2$$

Resuelve las siguientes ecuaciones de 1er grado:

$$47 - 3x = 5 + 11x \rightarrow -11x - 3x = 5 - 47 \rightarrow +14x = +42 \rightarrow x = \frac{42}{14} = 3$$

$$x = 3$$

$$2x - 1 = 3(2x - 15) \rightarrow 2x - 1 = 6x - 45 \rightarrow 2x - 6x = -45 + 1 \rightarrow$$

$$\rightarrow -4x = -44 \rightarrow x = \frac{-44}{-4} = 11$$

$$x = 11$$

$$x - 8 = \frac{x}{2} - \frac{x-6}{3} \rightarrow \frac{6(x-8)}{6} = \frac{3x}{6} - \frac{2(x-6)}{6} \rightarrow 6(x-8) = 3x - 2(x-6) \rightarrow$$

$$\rightarrow 6x - 48 = 3x - 2x + 12 \rightarrow 6x - 3x + 2x = 12 + 48$$

$$5x = 60$$

$$x = \frac{60}{5} = 12$$

$$x = 12$$

Resuelve las siguientes ecuaciones de 2o y 3er grado:

$$6x^2 - 6 = 5x \rightarrow 6x^2 - 5x - 6 = 0$$

$$\frac{+5 \pm \sqrt{25 + 4 \cdot 6 \cdot 6}}{12} = \frac{5 \pm \sqrt{169}}{12} = \frac{5 \pm 13}{12}$$

$$x_1 = \frac{18}{12} = \frac{3}{2}$$

$$x_2 = -\frac{2}{3}$$

$$ax^2 + bx + c = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = 6$$

$$b = -5$$

$$c = -6$$

$$(x-3)(x-2) + \frac{x(x-3)}{2} = (x-2)^2$$

$$\cancel{x^2} - 2x - 3x + 6 + \frac{x^2 - 3x}{2} = \cancel{x^2} - 4x + 4$$

$$-5x + 6 + \frac{x^2 - 3x}{2} = -4x + 4$$

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

$$x^2 - 3x = 2(x-2)$$

$$x^2 - 3x = 2x - 4$$

$$x^2 - 3x - 2x + 4 = 0$$

$$x^2 - 5x + 4 = 0$$

$$a = 1$$

$$b = -5$$

$$c = 4$$

$$\frac{5 \pm \sqrt{25 - 16}}{2}$$

$$\frac{5 \pm \sqrt{9}}{2} = \begin{cases} x_1 = 1 \\ x_2 = 4 \end{cases}$$

$$\frac{(x-3)^2}{2} + \frac{(x+1)(x-1)}{3} = \frac{4x^2 - 19x + 31}{6}$$

$$\frac{3(x^2 - 6x + 9)}{\cancel{3 \cdot 2}} + \frac{2(x^2 - 1)}{\cancel{3 \cdot 2}} = \frac{4x^2 - 19x + 31}{\cancel{6}}$$

$$3x^2 - 18x + 27 + 2x^2 - 2 = 4x^2 - 19x + 31$$

$$5x^2 - 18x + 25 = 4x^2 - 19x + 31$$

$$x^2 + x - 6 = 0 \rightarrow \begin{cases} a = 1 \\ b = 1 \\ c = -6 \end{cases}$$

$$\frac{-1 \pm \sqrt{1 + 24}}{2}$$

$$\begin{cases} x_1 = \frac{-1 + 5}{2} = 2 \\ x_2 = \frac{-1 - 5}{2} = -2 \end{cases}$$

$$\frac{(x+2)^2}{9} = \frac{7}{9} - \frac{(x+3)(x-3)}{5}$$

$$\frac{x^2+4x+4}{9} = \frac{7}{9} - \frac{x^2-3^2}{5}$$

$$\frac{x^2+4x+4-7}{9} = -\frac{(x^2-9)}{5}$$

$$5(x^2+4x-3) = -9(x^2-9)$$

$$5(x^2+4x-3) = -9(x^2-9)$$

$$5x^2+20x-15 = -9x^2+81$$

$$14x^2+20x-96=0$$

$$7x^2+10x-48=0$$

$$\begin{aligned} a &= 7 \\ b &= 10 \\ c &= -48 \end{aligned}$$

$$\frac{-10 \pm \sqrt{1444}}{14}$$

$$\frac{-10 \pm 38}{14} = \begin{aligned} x_1 &= 2 \\ x_2 &= \frac{-48}{14} \end{aligned}$$

$$x^3 - 3x + 2 = 0$$

Ruffini

$$\begin{aligned} a &= 1 \\ b &= 1 \\ c &= -2 \end{aligned}$$

$$\frac{-1 \pm \sqrt{9}}{2}$$

$$\begin{aligned} x_1 &= 1 \\ x_2 &= 2 \end{aligned}$$

	x^3	x^2	x	$\swarrow$
	1	0	-3	2
1	↓	1	1	-2
	1	1	-2	0

$$\longrightarrow 1x^2+1x-2=0$$

$$2x^3 - 5x^2 - 9x + 18 = 0$$

	x^3	x^2	x	$\swarrow$
	2	-5	-9	18
3	↓	6	3	-18
	2x ²	1x	-6	0
	↓	-4	6	
-2	↓	-4	6	
	2x	-3	0	

$$\longrightarrow 2x-3=0 \longrightarrow 2x=3 \longrightarrow x_3 = \frac{3}{2}$$

$$x_1 = 3$$

$$x_2 = -2$$

$$x_3 = \frac{3}{2}$$

Resuelve los siguientes sistemas de ecuaciones:

$$\begin{cases} x + 2y = 1 \\ x - y = -5 \end{cases} \rightarrow x = 1 - 2y$$

$$\rightarrow x = 1 - 2 \cdot 2 \rightarrow x = -3$$

$$\rightarrow 1 - 2y - y = -5 \rightarrow 1 - 3y = -5 \rightarrow -3y = -6$$

$$y = \frac{-6}{-3} = 2$$

$y = 2$
 $x = -3$

$$\begin{cases} x - y = 2 \\ -x + y = 1 \end{cases}$$

$$+ \begin{array}{r} x - y = 2 \\ -x + y = 1 \\ \hline \end{array} \rightarrow 0 = 3$$

$\nexists$ sol

$$\begin{cases} 2x + 3y = 1 \\ 3x + 2y = 4 \end{cases} \xrightarrow{\times 3} \begin{cases} 6x + 9y = 3 \\ 6x + 4y = 8 \end{cases}$$

$y = -1$
 $x = 2$

$$\begin{array}{r} 6x + 9y = 3 \\ -6x + 4y = 8 \\ \hline \end{array} \rightarrow 5y = -5 \rightarrow y = \frac{-5}{5} \rightarrow y = -1$$

$$6x + 9y = 3 \rightarrow 6x - 9 = 3$$

$$6x = 12$$

$$x = \frac{12}{6} = 2$$

Resuelve los siguientes problemas:

La diferencia entre dos números es 3. La mitad del mas grande más el triple del más pequeño es 12. Cuales son esos números?

Restar

$$\begin{aligned} x - y &= 3 \\ \frac{x}{2} + 3y &= 12 \end{aligned} \quad \left. \begin{array}{l} \rightarrow x = 3 + y \\ \rightarrow x = 3 + 3 = 6 \end{array} \right\}$$

$x \rightarrow$ nº grande
 $y \rightarrow$ nº pequeño

$$\frac{3+y}{2} + 3y = 12 \rightarrow \frac{3+y}{2} = 12 - 3y$$

$$3+y = 24 - 6y$$

$$7y = 21$$

$$y = \frac{21}{7} = 3$$

$y = 3$
 $x = 6$

El perímetro de un rectángulo mide 16 cm. Cuales son sus dimensiones si la base es 2 cm mas grande que la altura.

$$\begin{aligned} 2x + 2y &= 16 \\ x &= y + 2 \end{aligned}$$

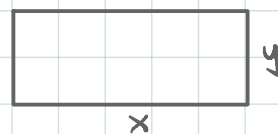
$$x = 3 + 2 = 5$$

$$2(y+2) + 2y = 16$$

$$2y + 4 + 2y = 16$$

$$4y = 12$$

$$y = \frac{12}{4} = 3$$



$$y = 3$$

$$x = 5$$

R: base = 5cm
altura = 3cm

Resuelve las siguientes inecuaciones:

$$2x^2 - 3x + 1 > 0$$

$$2x^2 - 3x + 1 = 0 \quad \begin{cases} a=2 \\ b=-3 \\ c=1 \end{cases}$$

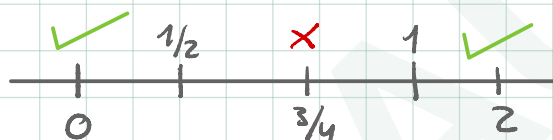
$$\frac{3 \pm \sqrt{9-8}}{4} \quad \begin{cases} x=1 \\ x=\frac{1}{2} \end{cases}$$

$$R: (-\infty, \frac{1}{2}) \cup (1, +\infty)$$

$$x=0 \quad 2 \cdot 0 - 3 \cdot 0 + 1 > 0$$

$$x=\frac{3}{4} \quad \ominus \quad \times$$

$$x=2 \quad \oplus \quad \checkmark$$



$$(2x+5)(2x-5) \leq 11$$

$$(2x)^2 - 5^2 \leq 11 \rightarrow 4x^2 - 25 \leq 11$$

$$4x^2 - 25 - 11 = 0 \rightarrow 4x^2 - 36 = 0$$

$$4x^2 = 36$$

$$x^2 = \frac{36}{4} \rightarrow x = \pm \sqrt{9} \quad \begin{cases} x=3 \\ x=-3 \end{cases}$$

$$R: [-3, 3]$$

$$x=-4$$

$$(-3)(-13) \leq 11$$

$$\ominus \quad 39 \leq 11$$

$$x=4$$

$$13 \cdot 3 \leq 11$$

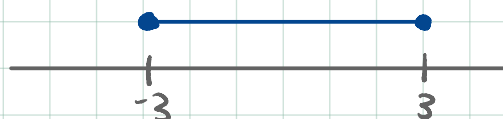
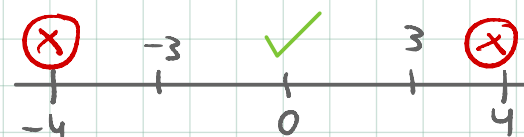
$$39 \leq 11$$

$$\ominus \quad \times$$

$$x=0$$

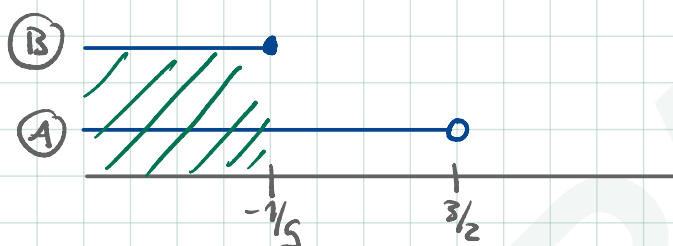
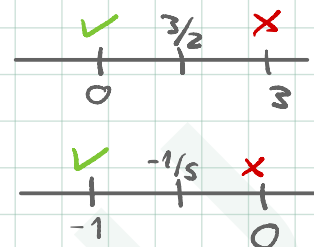
$$5 \cdot (-5) \leq 11$$

$$\oplus \quad -25 \leq 11$$



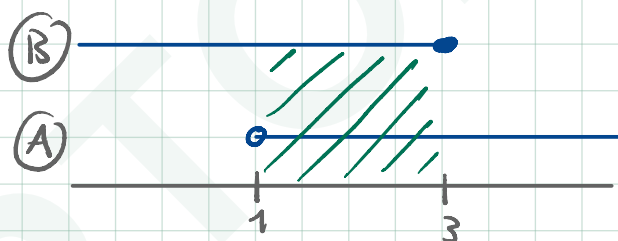
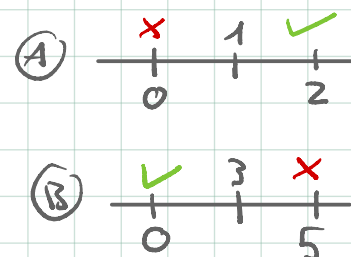
Resuelve los siguientes sistemas de inecuaciones:

$$\begin{cases} \textcircled{A} 2x - 3 < 0 \\ \textcircled{B} 5x + 1 \leq 0 \end{cases} \rightarrow \begin{aligned} &2x - 3 = 0 \rightarrow x = \frac{3}{2} \\ &5x + 1 = 0 \rightarrow x = -\frac{1}{5} \end{aligned}$$



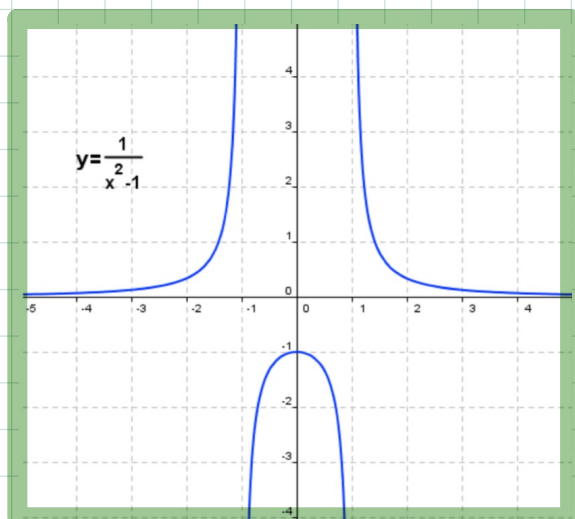
$$R: (-\infty, -\frac{1}{5}]$$

$$\begin{cases} \textcircled{A} 2x - 3 > x - 2 \\ \textcircled{B} 3x - 7 < x - 1 \end{cases} \rightarrow \begin{aligned} &x = 1 \\ &2x = 6 \rightarrow x = \frac{6}{2} = 3 \end{aligned}$$



$$R: (1, 3]$$

Escribe el dominio, recorrido, crecimiento y decrecimiento de las siguientes gráficas de funciones:

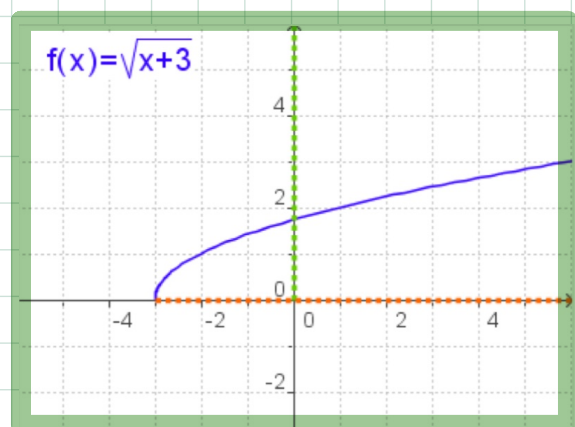


Dominio: $(-\infty, -1) \cup (-1, 1) \cup (1, \infty) \equiv \mathbb{R} - \{-1, 1\}$

Recorrido: $(-\infty, -1] \cup (0, +\infty)$

Crecimiento: $(-\infty, -1) \cup (-1, 0)$

Decrecimiento: $(0, 1) \cup (1, +\infty)$

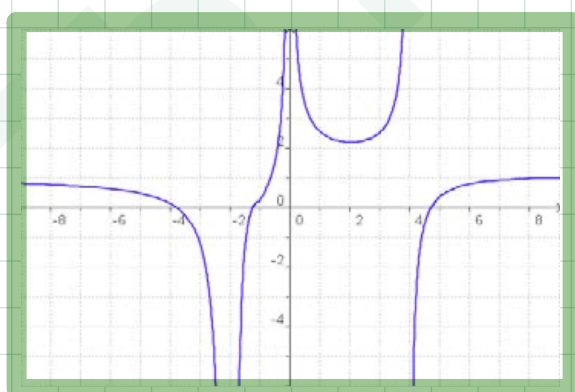


Dominio: $[-3, +\infty)$

Recorrido: $[0, +\infty)$

Crecimiento: $(-3, +\infty)$

Decrecimiento: $\emptyset$



Dominio: $\mathbb{R} - \{-2, 0, 4\}$
 $(-\infty, -2) \cup (-2, 0) \cup (0, 4) \cup (4, +\infty)$

Recorrido: $\mathbb{R}$

Crecimiento: $(-2, 0) \cup (2, 4) \cup (4, +\infty)$

Decrecimiento: $(-\infty, -2) \cup (0, 2)$

Escribe el dominio de las siguientes funciones:

$$f(x) = x^2 - 5x + 2 \longrightarrow \text{Pol} \longrightarrow \text{Dom } \mathbb{R}$$

$$g(x) = \frac{2x^2 - 3}{x + 2} \longrightarrow x + 2 = 0 \longrightarrow x = -2 \longrightarrow \text{Dom } \mathbb{R} - \{-2\}$$

$$h(x) = \frac{2x - 5}{x^2 - 5x + 6} \longrightarrow x^2 - 5x + 6 = 0 \quad \begin{cases} a = 1 \\ b = -5 \\ c = 6 \end{cases} \quad \frac{5 \pm \sqrt{25 - 24}}{2} \begin{cases} \frac{5+1}{2} = 3 \\ \frac{5-1}{2} = 2 \end{cases}$$

Dom $\mathbb{R} - \{2, 3\}$

$$i(x) = \ln(x - 2) \longrightarrow \begin{aligned} x - 2 &> 0 \\ x - 2 &= 0 \\ x &= 2 \end{aligned}$$

Dom = $(2, +\infty)$

$$j(x) = \sqrt{x^2 - 1} \longrightarrow \begin{aligned} x^2 - 1 &\geq 0 \\ x^2 - 1 &= 0 \\ x^2 &= 1 \\ x &= \pm \sqrt{1} \end{aligned} \begin{cases} -1 \\ 1 \end{cases}$$

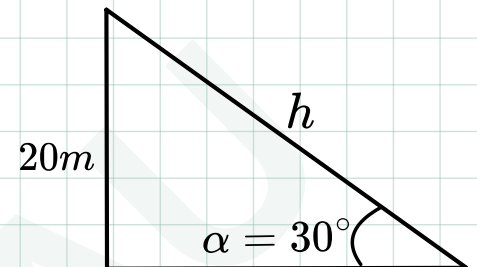
Dom = $(-\infty, -2] \cup [2, +\infty)$

Se desea sujetar un poste de 20 metros de altura con un cable que parte de la parte superior del mismo hasta el suelo de modo que forme un ángulo de 30° .

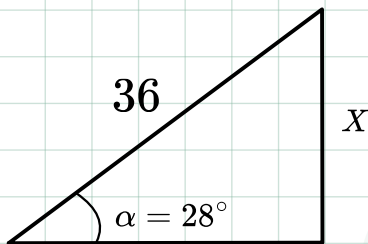
Calcular el precio del cable si cada metro cuesta 12\$.

$$\sin 30 = \frac{20}{h} \rightarrow h = \frac{20}{\sin 30} = 40m$$

$$40m \cdot 12\$ = 480\$$$



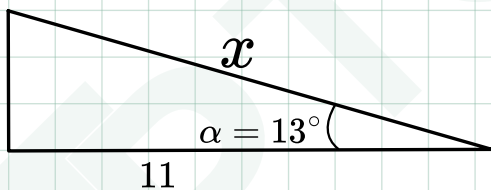
Calcula el valor de x de cada figura utilizando razones trigonométricas:



$$\sin 28 = \frac{x}{36}$$

$$x = 36 \cdot \sin 28 = 16,9$$

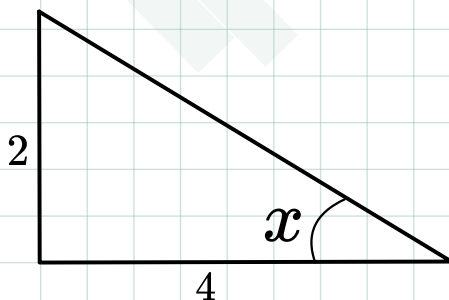
$$x = 16,9$$



$$\cos 13 = \frac{11}{x}$$

$$x = \frac{11}{\cos 13} = 11,289$$

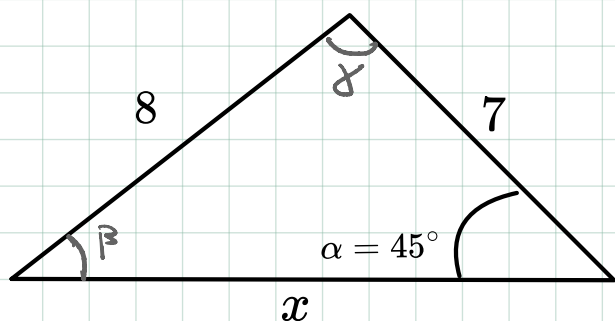
$$x = 11,289$$



$$\tan x = \frac{2}{4}$$

$$x = \arctan\left(\frac{2}{4}\right) = 26,56^\circ$$

$$x = 26,56^\circ$$



1º Seno

$$\frac{\sin 45}{8} = \frac{\sin \beta}{7}$$

$$\sin \beta = \frac{7 \sin 45}{8} \quad \beta = \arcsin\left(\frac{7 \sin 45}{8}\right)$$

$$\beta = 38,22^\circ$$

$$\gamma = 180 - 45 - 38,22$$

$$\gamma = 96,78^\circ$$

$$\frac{x}{\sin 96,78} = \frac{8}{\sin 45}$$

$$x = \frac{8 \sin 96,78}{\sin 45} = 11,234$$

$$x = 11,234$$

Dados los vectores $\vec{v} = (3, 4)$ y $\vec{u} = (1, 2)$, calcula:

a) Su producto escalar $\rightarrow (3, 4) \cdot (1, 2) = 3 \cdot 1 + 4 \cdot 2 = 11$

b) Su módulo

c) El ángulo que forman

$$b) \quad \vec{v} = (v_x, v_y) \rightarrow |\vec{v}| = \sqrt{v_x^2 + v_y^2}$$

$$|\vec{v}| = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5$$

$$|\vec{u}| = \sqrt{1^2 + 2^2} = \sqrt{5}$$

$$c) \quad \vec{v} \cdot \vec{u} = |\vec{v}| \cdot |\vec{u}| \cdot \cos \alpha$$

$$\cos \alpha = \frac{\vec{v} \cdot \vec{u}}{|\vec{v}| |\vec{u}|} \rightarrow \alpha = \arccos\left(\frac{11}{5\sqrt{5}}\right) \rightarrow \alpha = 10,3^\circ$$

Dadas las ecuaciones paramétricas de la recta r:

$$\left. \begin{array}{l} x = -3 + 2k \\ y = 1 - 3k \end{array} \right\} \quad r \quad \left\{ \begin{array}{l} P = (-3, 1) \\ \vec{V} = (2, -3) \end{array} \right.$$

Calcula:

- Las ecuaciones continua y general.
- La ecuación de la recta paralela a r que pasa por el punto (-2, 1)
- La ecuación de la recta perpendicular a r que pasa por el punto (4, -5)

a) continua $\rightarrow \frac{x+3}{2} = \frac{y-1}{-3}$

general $\rightarrow -3(x+3) = 2(y-1)$

$$-3x - 9 = 2y - 2$$

$$-3x - 2y - 7 = 0$$

$P(P_x, P_y) \quad \vec{V}(V_x, V_y)$

continua $\frac{x-P_x}{V_x} = \frac{y-P_y}{V_y}$

general $Ax + By + C = 0$

b) $s \left\{ \begin{array}{l} P = (-2, 1) \\ \vec{V} = (2, -3) \end{array} \right. \rightarrow (x, y) = (-2, 1) + k(2, -3) : s$

c) $t \left\{ \begin{array}{l} P = (4, -5) \\ \vec{V} = (3, 2) \end{array} \right. \rightarrow (x, y) = (4, -5) + \lambda(3, 2) : t$

Determina la ecuación explícita de la recta que pasa por los puntos $P=(2,2)$ i $Q=(5,11)$.

$$\vec{V} = \overrightarrow{PQ} = (5,11) - (2,2) = (3,9)$$

$$r \begin{cases} P(2,2) \\ \vec{V} = (3,9) \end{cases}$$

Continua $\longrightarrow \frac{x-2}{3} = \frac{y-2}{9}$

$$9(x-2) = 3(y-2)$$

$$9x - 18 = 3y - 6$$

$$9x - 12 = 3y$$

$$y = \frac{9x - 12}{3} \longrightarrow y = 3x - 4$$