

TEOREMAS DE LÍMITES

Nombre completo: _____

1.- $\lim_{n \rightarrow a} K = k$ donde k es un número real (una constante).

Ejemplo: $\lim_{x \rightarrow 3} 2 = 2$

2.- $\lim_{x \rightarrow a} x = a$

Ejemplo: $\lim_{x \rightarrow 3} x = 3$

3.- $\lim_{x \rightarrow a} kx = ka$ donde k es un numero real (constante)

$\lim_{x \rightarrow a} kf(x) = k \lim_{x \rightarrow a} f(x)$

Ejemplo: $\lim_{x \rightarrow 3} 3x = 3(\lim_{x \rightarrow 3} x) = 3(3) = 9$

Ejercicios: Determina los siguientes límites utilizando los teoremas

$$1.- \lim_{x \rightarrow 3} 5 =$$

$$1.- \lim_{x \rightarrow -2} x =$$

$$2.- \lim_{x \rightarrow 5} -2 =$$

$$2.- \lim_{x \rightarrow 18} x =$$

$$3.- \lim_{x \rightarrow 9} \frac{1}{5} =$$

$$3.- \lim_{x \rightarrow 2} x =$$

$$4.- \lim_{x \rightarrow 0} -4 =$$

$$4.- \lim_{x \rightarrow -1/4} x =$$

$$5.- \lim_{x \rightarrow 1} 15 =$$

$$5.- \lim_{x \rightarrow -9} x =$$

$$1.- \lim_{x \rightarrow 2} 7x = \underline{\hspace{2cm}} (\lim_{x \rightarrow 2} \underline{\hspace{2cm}}) = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) =$$

$$2.- \lim_{x \rightarrow -3} -5x = \underline{\hspace{2cm}} (\lim_{x \rightarrow -3} \underline{\hspace{2cm}}) = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) =$$

$$3.- \lim_{x \rightarrow 4} -4x = \underline{\hspace{2cm}} (\lim_{x \rightarrow -4} \underline{\hspace{2cm}}) = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) =$$

$$4.- \lim_{x \rightarrow -2} -8x = \underline{\hspace{2cm}} (\lim_{x \rightarrow -2} \underline{\hspace{2cm}}) = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) =$$

$$5 \lim_{x \rightarrow 5} 6x = \underline{\hspace{2cm}} (\lim_{x \rightarrow 5} \underline{\hspace{2cm}}) = \underline{\hspace{2cm}} (\underline{\hspace{2cm}}) =$$

4.- $\lim_{x \rightarrow a} x^n = a^n$

Ejemplo: $\lim_{x \rightarrow 2} x^3 = 2^3 = 8$

5.- $\lim_{x \rightarrow a} [f(x) \pm g(x)] = \lim_{x \rightarrow a} f(x) \pm \lim_{x \rightarrow a} g(x)$ donde $f(x)$ y $g(x)$ son funciones reales

Ejemplo: $\lim_{x \rightarrow 2} (5x + 1) = \lim_{x \rightarrow 2} (5x) + \lim_{x \rightarrow 2} 1 = 5 \lim_{x \rightarrow 2} (x) + 1 = 5(2) + 1 = 11$

EJERCICIOS

$$\begin{aligned} 1.- \lim_{x \rightarrow 2} (3x^2 - 5x + 1) &= \lim_{x \rightarrow 2} (3x^2) - \lim_{x \rightarrow 2} (5x) + \lim_{x \rightarrow 2} 1 \\ &= 3(2)^2 - 5(2) + 1 \\ &= 12 - 10 + 1 = 3 \end{aligned}$$

$$2.- \lim_{x \rightarrow 5} (3x^3 - 5x^2 - 4x + 2) = \lim_{x \rightarrow 5} (3x^3) - \lim_{x \rightarrow 5} (5x^2) - \lim_{x \rightarrow 5} (4x) + \lim_{x \rightarrow 5} 2$$

$$= 3(\)^3 - 5(\)^2 - 4(\) + \underline{\hspace{2cm}}$$

=

$$3.- \lim_{x \rightarrow -1} (5x^5 + 4x^2 - x) = \lim_{x \rightarrow -1} (5x^5) + \lim_{x \rightarrow -1} (4x^2) - \lim_{x \rightarrow -1} (x)$$

$$= 5(\)^5 + 4(\)^2 - (\) =$$

$$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

$$6.- \lim_{x \rightarrow a} [f(x) + g(x)] = \lim_{x \rightarrow a} f(x) + \lim_{x \rightarrow a} g(x)$$

$$\text{Ejemplo: } \lim_{x \rightarrow 1} (x^2 - 3)(2x + 3) = \lim_{x \rightarrow 1} (x^2 - 3) \cdot \lim_{x \rightarrow 1} (2x + 3) =$$

$$= (1^2 - 3)((2)(1) + 3)$$

$$= (1-3)(2+3)$$

$$= (-2)(5) =$$

$$= -10$$

EJERCICIOS:

$$1.- \lim_{x \rightarrow 2} (x^3 - 8)(4x + 1) = \lim_{x \rightarrow 2} (x^3 - 8) \cdot \lim_{x \rightarrow 2} (4x + 1) =$$

$$= (\underline{\hspace{2cm}}^3 - 8)(4(\underline{\hspace{2cm}}) + 1)$$

$$= (\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$$

=

$$2.- \lim_{x \rightarrow 3} (6x^2 - 1)(6x + 2) = \lim_{x \rightarrow 3} (6x^2 - 1) \cdot \lim_{x \rightarrow 3} (6x + 2) =$$

$$= (6(\underline{\hspace{2cm}})^2 - 1)(6(\underline{\hspace{2cm}}) + 2)$$

$$= (\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$$

$$= \underline{\hspace{2cm}}$$

$$4.- \lim_{x \rightarrow 1} (2x^2 - 3x)^3 = (2(\underline{\hspace{2cm}})^2 - 3(\underline{\hspace{2cm}}))^3$$

$$= (2(\underline{\hspace{2cm}}) - 3(\underline{\hspace{2cm}}))^3$$

$$= (\underline{\hspace{2cm}})^3$$

$$= \underline{\hspace{2cm}}$$

$$5.- \lim_{x \rightarrow 2} (2x^2 + 2)^2 = (2(\underline{\hspace{2cm}})^2 + \underline{\hspace{2cm}})^2$$

$$= (2(\underline{\hspace{2cm}}) + \underline{\hspace{2cm}})^2$$

$$= (\underline{\hspace{2cm}})^2$$

$$= \underline{\hspace{2cm}}$$