

FORMULARIO DE ÁLGEBRA

PROPIEDADES ARITMÉTICAS

ASOCIATIVA	$a(bc) = (ab)c$
CONMUTATIVA	$a + b = b + a$ and $ab = ba$
DISTRIBUTIVA	$a(b + c) = ab + ac$

EJEMPLOS OPERACIONES ARITMÉTICAS

$$ab + ac = a(b + c)$$

$$a \left(\frac{b}{c} \right) = \frac{ab}{c}$$

$$\left(\frac{a}{b} \right) = \frac{a}{bc}$$

$$\frac{a}{\left(\frac{b}{c} \right)} = \frac{ac}{b}$$

$$\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$$

$$\frac{a}{b} - \frac{c}{d} = \frac{ad - bc}{bd}$$

$$\frac{a - b}{c - d} = \frac{b - a}{d - c}$$

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

$$\frac{ab + ac}{a} = b + c, a \neq 0$$

$$\left(\frac{a}{b} \right) = \frac{ad}{bc}$$

$$\left(\frac{c}{d} \right) = \frac{bc}{ad}$$

ECUACIÓN CUADRÁTICA

$$ax^2 + bx + c = 0 \rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

PROPIEDADES DE RADICALES

$$\sqrt[n]{a} = a^{\frac{1}{n}}$$

$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a}$$

$$\sqrt[n]{ab} = \sqrt[n]{a} \sqrt[n]{b}$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$\sqrt[n]{a^n} = a, \text{ si } n \text{ es impar}$$

$$\sqrt[n]{a^n} = |a|, \text{ si } n \text{ es par}$$

PROPIEDADES DE LOGARITMOS

$$\text{if } y = \log_b x \rightarrow b^y = x$$

$$\log_b b = 1 \quad \log_b 1 = 0$$

$$\log_b b^x = x$$

$$b^{\log_b x} = x$$

$$\log_a x = \frac{\log_b x}{\log_b a}$$

$$\log_b (x^r) = r \log_b x$$

$$\log_b (xy) = \log_b x + \log_b y$$

$$\log_b \left(\frac{x}{y} \right) = \log_b x - \log_b y$$

LEYES DE EXPONENTES

$$a^n a^m = a^{n+m}$$

$$(a^n)^m = a^{nm}$$

$$(ab)^n = a^n b^n$$

$$a^{-n} = \frac{1}{a^n}$$

$$\left(\frac{a}{b} \right)^{-n} = \left(\frac{b}{a} \right)^n = \frac{b^n}{a^n}$$

$$\frac{a^n}{a^m} = a^{n-m} = \frac{1}{a^{m-n}}$$

$$a^0 = 1, a \neq 0$$

$$\left(\frac{a}{b} \right)^n = \frac{a^n}{b^n}$$

$$\frac{1}{a^{-n}} = a^n$$

$$a^{\frac{n}{m}} = \left(a^{\frac{1}{m}} \right)^n = (a^n)^{\frac{1}{m}}$$

PROPIEDADES DE LAS DESIGUALDADES

Si $a < b \rightarrow a + c < b + c$ y $a - c < b - c$

Si $a < b$ y $c > 0 \rightarrow ac < bc$ y $a/c < b/c$

Si $a < b$ y $c < 0 \rightarrow ac > bc$ y $a/c > b/c$

PROPIEDADES DE LOS NÚMEROS COMPLEJOS

$$i = \sqrt{-1}$$

$$i^2 = -1$$

$$\sqrt{-a} = i\sqrt{a}, \quad a \geq 0$$

$$(a + bi) + (c + di) = a + c + (b + d)i$$

$$(a + bi) - (c + di) = a - c + (b - d)i$$

$$(a + bi)(c + di) = ac - bd + (ad + bc)i$$

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

$$|a + bi| = \sqrt{a^2 + b^2}$$

$$\overline{(a + bi)} = a - bi$$

$$\overline{(a + bi)(a + bi)} = |a + bi|^2$$

$$\frac{1}{(a + bi)} = \frac{(a - bi)}{(a + bi)(a - bi)} = \frac{a - bi}{a^2 + b^2}$$

EJEMPLOS DE FACTOR COMÚN

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

$$x^2 + 2ax + a^2 = (x + a)^2$$

$$x^2 - 2ax + a^2 = (x - a)^2$$

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

$$x^3 + 3ax^2 + 3a^2x + a^3 = (x + a)^3$$

$$x^3 + a^3 = (x + a)(x^2 - ax + a^2)$$

$$x^3 - a^3 = (x - a)(x^2 + ax + a^2)$$

$$x^{2n} - a^{2n} = (x^n - a^n)(x^n + a^n)$$

VALOR ABSOLUTO

$$|a| = \begin{cases} a, & \text{si } a \geq 0 \\ -a, & \text{si } a < 0 \end{cases}$$

$$|a| = |-a|$$

$$|a| \geq 0$$

$$|ab| = |a||b|$$

$$\left| \frac{a}{b} \right| = \frac{|a|}{|b|}$$

$$|a + b| \leq |a| + |b|$$

