

**FUNDAMENTOS MATEMÁTICOS DE LA INGENIERÍA**  
**INGENIERO TÉCNICO INDUSTRIAL**  
**ESPECIALIDAD MECÁNICA**  
**Prácticas**  
**Conceptos Matemáticos**

- Número e:  $e = \lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x = 2.71828182845905\dots$

- Logaritmos: si  $a$  y  $b$  son  $>0$

$$\log_a b = c \Leftrightarrow a^c = b$$

Ejemplos:

$$\log_2 8 = 3 \text{ ya que } 2^3 = 8$$

$$\log_{10} 100 = 2 \text{ ya que } 10^2 = 100$$

- Tipos de logaritmos más usados:
  - Si  $a = 10$ : logaritmo decimal

$$\log_{10} x$$

- Si  $a = e$ : logaritmo neperiano

$$\log_e x = \ln x$$

- Propiedades de los logaritmos:

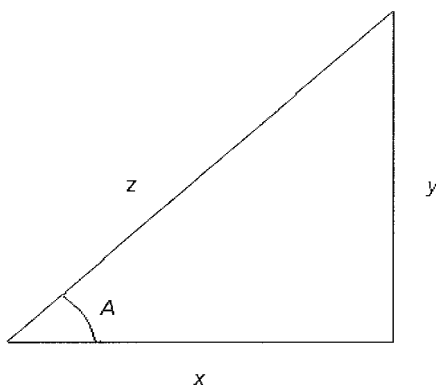
$$\log_a b + \log_a c = \log_a (bc)$$

$$\log_a b - \log_a c = \log_a \left(\frac{b}{c}\right)$$

$$\log_a b^c = c \log_a b$$

$$\log_a b = \frac{\ln b}{\ln a}$$

- Trigonometría:



$$\sin A = y/z$$

$$\cos A = x/z$$

$$\tan A = y/x$$

$$\csc A = 1/\sin A = z/y$$

$$\sec A = 1/\cos A = z/x$$

$$\cot A = 1/\tan A = x/y$$

- Propiedades:

$$\sin(x \pm y) = \sin x \cos y \pm \sin y \cos x$$

$$\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$$

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$$

**¡Importante!**

Las variables  $x, y, z$  son números reales, por lo que siempre trabajaremos en **radianes**

Si nos dan un ángulo  $\alpha$  en grados, tenemos que pasarlo a radianes:

$$x = \frac{\pi}{180} \alpha \text{ rad}$$

- Funciones trigonométricas inversas:

$$\arcsin x = y \Leftrightarrow \sin y = x$$

$$\arccos x = y \Leftrightarrow \cos y = x$$

$$\arctan x = y \Leftrightarrow \tan y = x$$

siempre que

$$x \in [-1, 1]$$

- Otras funciones interesantes:

- Valor absoluto:

$$|x| = x \text{ si } x \geq 0$$

$$|x| = -x \text{ si } x < 0$$

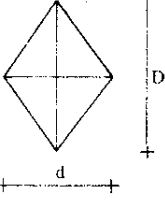
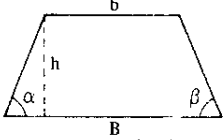
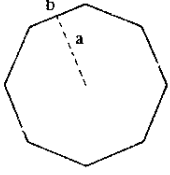
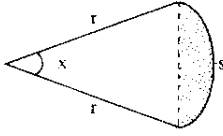
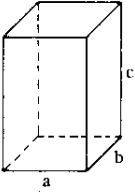
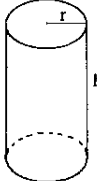
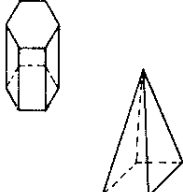
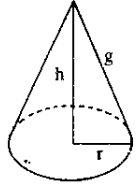
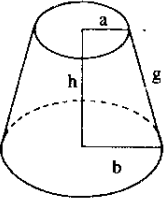
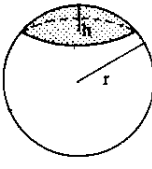
$$\text{Ej: } |3| = 3, \quad |-5.4| = 5.4$$

- Factorial de un número natural:

$$n! = n(n-1)(n-2) \cdots 3 \cdot 2 \cdot 1$$

- Áreas de figuras planas y áreas y volúmenes de sólidos:

### FORMULAS GEOMETRICAS

<p><b>ROMBO</b></p> $A = \frac{D d}{2}$ 	<p><b>TRAPECIO</b></p> $A = \frac{B + b}{2} h$  $\text{Perímetro} = B + b + h \left( \frac{1}{\text{sen } \alpha} + \frac{1}{\text{sen } \beta} \right)$
<p><b>POLIGONO REGULAR DE n LADOS</b></p> $A = \frac{n b a}{2}$ $= \frac{n b^2}{4 \text{tg} (\pi/n)}$ 	<p><b>SECTOR Y SEGMENTO CIRCULAR</b></p> $A_t = \frac{1}{2} r^2 x$ $A_s = \frac{1}{2} r^2 (x - \text{sen } x)$ <p>Longitud de s = rx</p> 
<p><b>PARALELEPIPEDO RECTANGULO</b></p> $A_l = 2 (a + b) c$ $A_t = A_l + 2ab$ $V = \text{área base} \times \text{altura} = abc$ 	<p><b>CILINDRO RECTO</b></p> $A_l = 2 \pi r h$ $A_t = A_l + 2 \pi r^2$ $V = \text{área base} \times \text{altura} = \pi r^2 h$ 
<p><b>PRISMA Y PIRAMIDE</b></p> <p><math>V = \text{área base} \times \text{altura}</math></p>  <p><math>V = \frac{1}{3} \text{área base} \times \text{altura}</math></p>	<p><b>CONO</b></p> $A_l = \pi r g = \pi \sqrt{r^2 + h^2}$ $A_t = A_l + \pi r^2$ $V = \frac{1}{3} \text{área base} \times \text{altura} = \frac{1}{3} \pi r^2 h$ 
<p><b>TRONCO DE CONO</b></p> $A_l = \pi (a + b) \sqrt{h^2 + (b - a)^2}$ $= \pi (a + b) g$ $A_t = A_l + \pi (a^2 + b^2)$ $V = \frac{1}{3} \pi h (a^2 + ab + b^2)$ 	<p><b>ESFERA Y CASQUETE</b></p> $A = 4 \pi r^2$ $V = \frac{4}{3} \pi r^3$ $A_s = 2 \pi r h$ $V_s = \frac{1}{3} \pi h^2 (3r - h)$ 
<p>A = área                      A<sub>l</sub> = área lateral                      A<sub>s</sub> = área zona sombreada  V = volumen                      A<sub>t</sub> = área total                      V<sub>s</sub> = volumen zona sombreada</p>	