α	Cuadrante	$\cos\alpha$	$\sin\alpha$	$\tan\alpha$
0		1	0	0
$\frac{\pi}{6}$	I	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{3}$
$\frac{\pi}{4}$	I	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
$\frac{\pi}{3}$	I	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\sqrt{3}$
$\frac{\pi}{2}$		0	1	No existe
$\frac{2\pi}{3}$	II	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\sqrt{3}$
$\frac{3\pi}{4}$	II	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1
$\frac{5\pi}{6}$	II	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$
π		-1	0	0
$\frac{7\pi}{6}$	III	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{3}$
$\frac{5\pi}{4}$	III	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1
$\frac{4\pi}{3}$	III	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\sqrt{3}$
$\frac{3\pi}{2}$		0	-1	No existe
$\frac{5\pi}{3}$	IV	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\sqrt{3}$
$\frac{7\pi}{4}$	IV	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1
$\frac{11\pi}{6}$	IV	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$
2π		1	0	0

1. **Identidades básicas de las funciones trigonométricas**

   a) $\tan x = \frac{\sin x}{\cos x}$, $\cot x = \frac{1}{\tan x}$, $\sec x = \frac{1}{\cos x}$, $\csc x = \frac{1}{\sin x}$

   b) $(\sin x)^2 + (\cos x)^2 = \sin^2 x + \cos^2 x = 1$

   c) $1 + \tan^2 x = \sec^2 x$, $1 + \operatorname{ctg}^2 x = \csc^2 x$

2. **Signos de las funciones trigonométricas**.

   Cuadrante I: Todas la FT son positivas. *Cuadrante II*: *sin* y *csc* positivas, el resto negativas. *Cuadrante III*: *tan* y *ctg* positivas, el resto negativas. *Cuadrante IV*: *cos* y *sec* positivas, el resto negativas.

3. **Fórmulas de Reducción**. Usaremos FT para designar cualquiera de las 6 funciones trigonométricas y coFT su respectiva cofunción (la cofunción del *sin* es *cos*, de la *tan* es *ctg* y de la *sec* es la *csc*). $0 < \alpha < \frac{\pi}{2}$.

   a) $\text{FT}(\frac{\pi}{2} \pm \alpha) = \pm\text{coFT}(\alpha)$ b) $\text{FT}(\frac{3\pi}{2} \pm \alpha) = \pm\text{coFT}(\alpha)$
   c) $\text{FT}(\pi \pm \alpha) = \pm\text{FT}(\alpha)$ d) $\text{FT}(2\pi \pm \alpha) = \pm\text{FT}(\alpha)$

   Observación: El signo depende del cuadrante donde este situado $\frac{\pi}{2} \pm \alpha$, $\frac{3\pi}{2} \pm \alpha$, $\pi \pm \alpha$

4. **Fórmulas para funciones trigonoméricas para** $\alpha \pm \beta$

   a) $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$ b) $\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$
   c) $\tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}$ d) $\sin 2\alpha = 2\sin\alpha\cos\alpha$
   e) $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$ f) $\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$

5. **Fórmulas para** $\alpha/2$**.**

   a) $\sin^2\frac{\alpha}{2} = \frac{1-\cos\alpha}{2}$ b) $\cos^2\frac{\alpha}{2} = \frac{1+\cos\alpha}{2}$ c) $\tan\frac{\alpha}{2} = \frac{1-\cos\alpha}{\sin\alpha} = \frac{\sin\alpha}{1+\cos\alpha}$

6. **Productos de** sin **y** cos

   a) $\sin\alpha \cdot \cos\beta = \frac{1}{2}\sin(\alpha-\beta) + \frac{1}{2}\sin(\alpha+\beta)$

   b) $\cos\alpha \cdot \cos\beta = \frac{1}{2}\cos(\alpha-\beta) + \frac{1}{2}\cos(\alpha+\beta)$

   c) $\sin\alpha \cdot \sin\beta = \frac{1}{2}\cos(\alpha-\beta) - \frac{1}{2}\cos(\alpha+\beta)$

7. **Suma y Diferencia de** sin **y** cos

   a) $\sin\alpha + \sin\beta = 2\sin\frac{\alpha+\beta}{2} \cdot \cos\frac{\alpha-\beta}{2}$ *b*) $\sin\alpha - \sin\beta = 2\cos\frac{\alpha+\beta}{2} \cdot \sin\frac{\alpha-\beta}{2}$

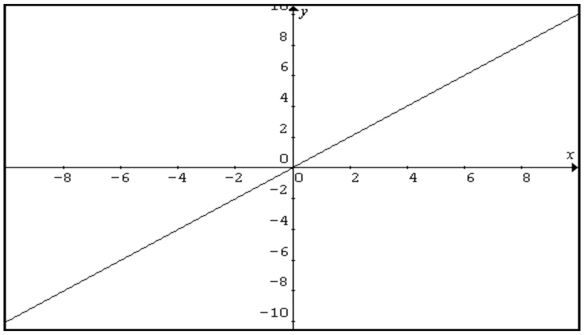
   c) $\cos\alpha + \cos\beta = 2\cos\frac{\alpha+\beta}{2} \cdot \cos\frac{\alpha-\beta}{2}$ *d*) $\cos\alpha - \cos\beta = -2\sin\frac{\alpha+\beta}{2} \cdot \sin\frac{\alpha-\beta}{2}$

8. **Teoremas de seno y del coseno**. En un triángulo cualquiera de ángulos interiores α, β y γ y lados opuestos a, b y c, respectivamente, se tiene que:

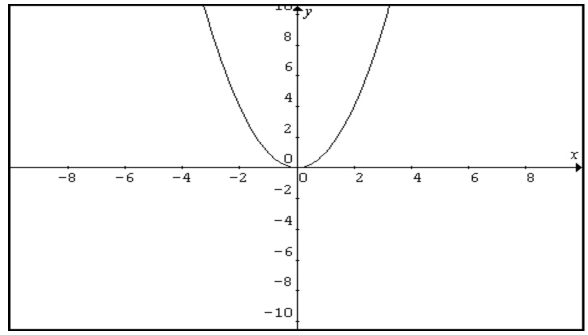
   a) **Teorema del seno**: $\dfrac{\sin\alpha}{a} = \dfrac{\sin\beta}{b} = \dfrac{\sin\gamma}{c}$

   b) **Teorema de los cosenos**:

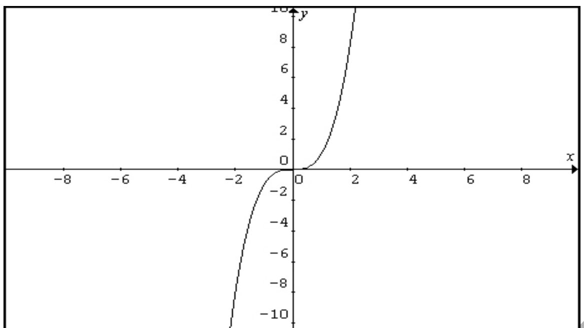
   i) $c^2 = a^2 + b^2 - 2ab\cos\gamma$ *ii*) $b^2 = a^2 + c^2 - 2ac\cos\beta$ *iii*) $a^2 = b^2 + c^2 - 2bc\cos\alpha$



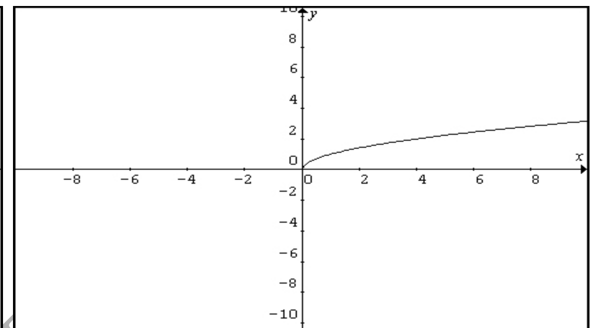
$y = f(x) = x$



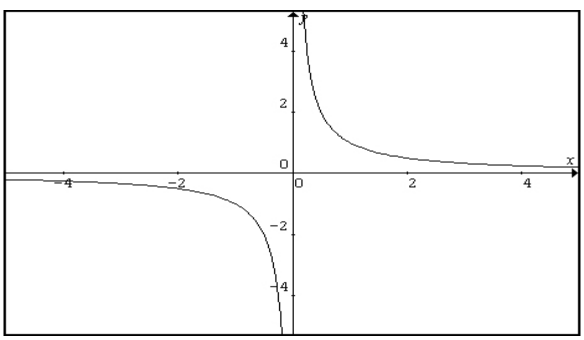
$y = f(x) = x^2$



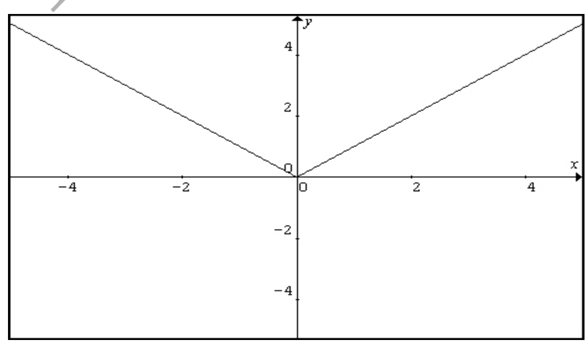
$y = f(x) = x^3$



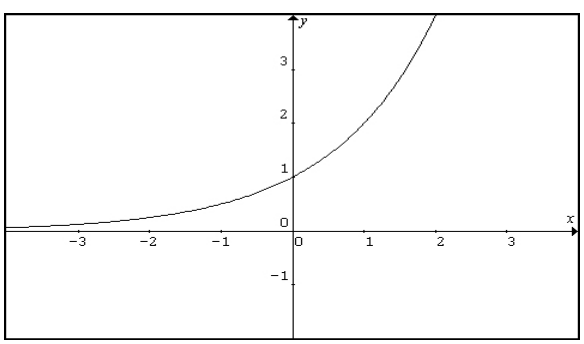
$y = f(x) = \sqrt{x}$



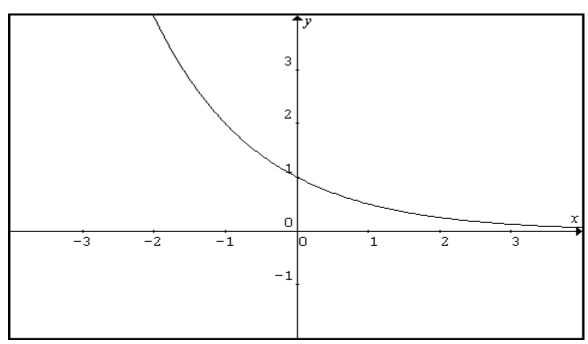
$y = f(x) = 1/x$



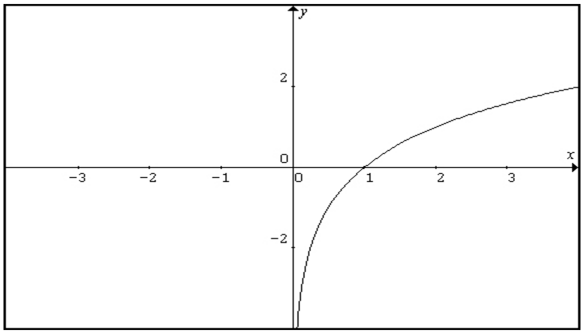
$y = f(x) = |x|$



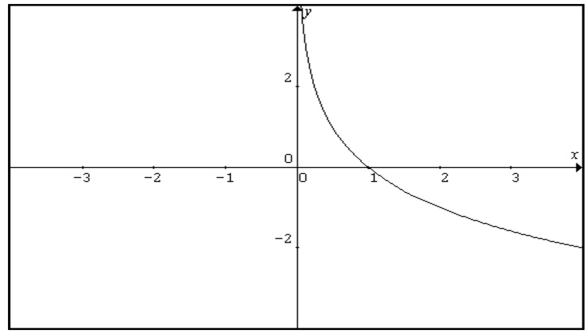
$y = f(x) = a^x, a > 1$



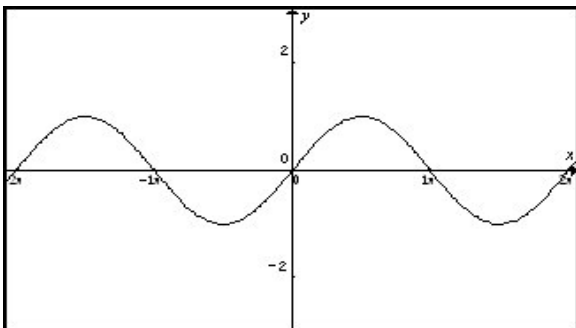
$y = f(x) = a^x, 0 < a < 1$



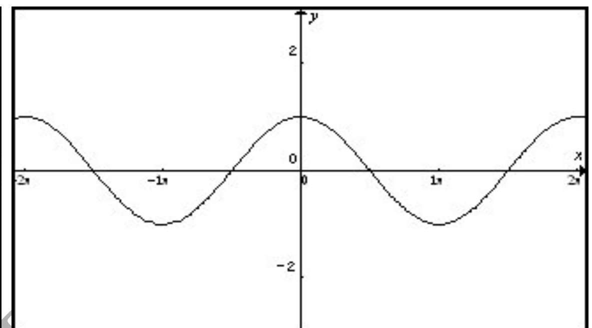
$y = f(x) = \log_a x, a > 1$



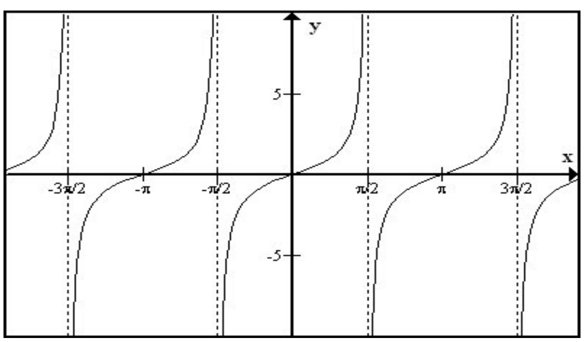
$y = f(x) = \log_a x, 0 < a < 1$



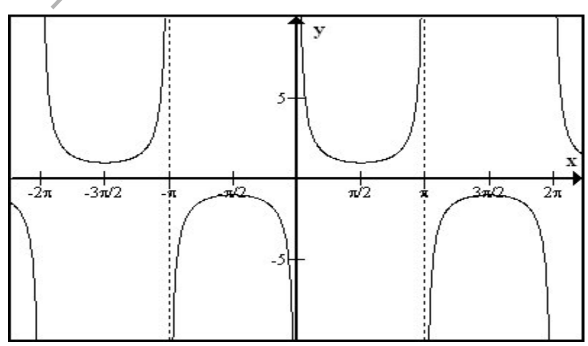
$y = f(x) = \sin x$



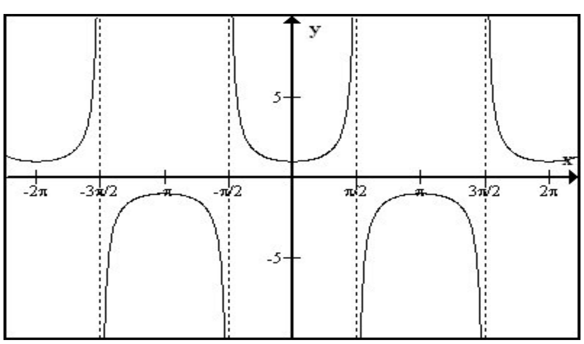
$y = f(x) = \cos x$



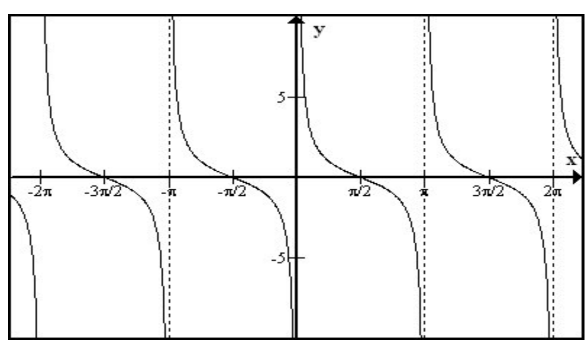
$y = f(x) = \tan x$



$y = f(x) = \csc x$



$y = f(x) = \sec x$



$y = f(x) = \cot x$