

HOW TO FIND A TRIGONOMETRIC RATIO

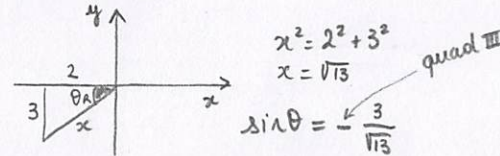
If you know the coordinates of a point

Make a drawing and...

If You know another ratio

Ex: Find $\sin\theta$ if $\cos\theta = -\frac{2}{3}$ and θ is in quadrant III

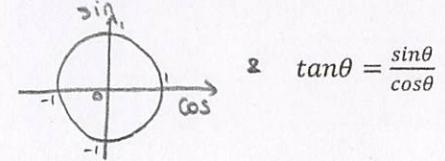
1. Make a drawing of a right triangle using the reference angle.



2. Use Pythagorean Theorem to find the missing side.
3. Find the ratio using SOHCAHTOA

If you know θ

- If θ is a special angle:
 $(0; \frac{\pi}{2}; \frac{\pi}{3}; \frac{\pi}{4}; \frac{\pi}{6}; \pi)$ or their multiples...
 Use the unit circle to find the ratio

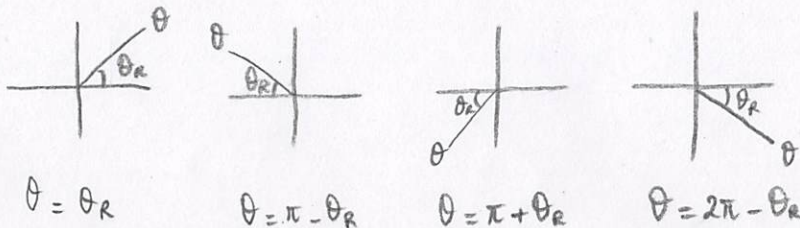


★ $\csc\theta$: find $\sin\theta$ and flip the result!

- If θ is any other angle:
 Use your calculator in the appropriate mode!

Reminders:

* Reference angles:



* $\cos\theta = \pm \cos\theta_R$ depending on the quadrant.
 reference angle.
 $= \cos\alpha$ any coterminal angle

* Rq: $\frac{\sqrt{3}}{2} = \frac{3}{2\sqrt{3}}$; $\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$; $\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$; ...

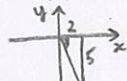
HOW TO FIND θ

If you know the value of a ratio

If you know the coordinates of a point :

Make a drawing of a right triangle using the reference angle, and use $\tan\theta_R$.

ex: $A(2; -5)$



$\tan\theta_R = \frac{5}{2}$

SOLVING BASIC TRIGONOMETRIC EQUATIONS

1. Make a drawing (what are the possible quadrants?) *(depending on the sign of the ratio)*
2. Find the reference angle
3. Determine all the "real" angles in the domain *in standard position*

Other trig equations : Collect like terms, solve like a quadratic in order to get basic trig eq. to solve...

No Calculator needed : Special values

vs.

Calculator needed: random values

You find the reference angle with the unit circle.

You find the reference angle with your calculator (ex: \tan^{-1}).

⚠ To find the reference angle, don't pay attention to the sign!

Equations with cos and sin

Special values:

$0; \pm\frac{1}{2}; \pm\frac{1}{\sqrt{2}}; \pm\frac{\sqrt{3}}{2}; \pm 1$

Exemple: $\cos\theta = -\frac{1}{\sqrt{2}}, 0 \leq \theta < 2\pi$




$\theta_R = \frac{\pi}{4}$

$\theta = \frac{3\pi}{4}$ or $\frac{5\pi}{4}$

Equations with tan

Special values: $0; \pm\sqrt{3}; \pm\frac{1}{\sqrt{3}}; \pm 1$

Exemple: $\tan\theta = -\frac{1}{\sqrt{3}}, -\pi \leq \theta \leq \pi$



$\theta_R = \frac{\pi}{6}$


$\theta = -\frac{\pi}{6}$ or $\frac{5\pi}{6}$

NB: seuls types de « couples » de sin et cos connus : $\left\{\frac{1}{2}; \frac{\sqrt{3}}{2}\right\}$ et $\left\{\frac{1}{\sqrt{2}}; \frac{1}{\sqrt{2}}\right\}$

useful to find θ_R w $\tan\theta = \frac{\sin\theta}{\cos\theta}$

Equations with cos, sin and tan

Exemple: $\cos\theta = \frac{1}{4}, -180^\circ \leq \theta < 360^\circ$



$\theta_R \approx 75,5^\circ \Rightarrow \theta = 75,5^\circ; -75,5^\circ$ or $284,5^\circ$

Other:

- Equations with csc, sec and cot ex: $\csc\theta = 2 \rightarrow \sin\theta = \frac{1}{2}$
- Don't forget to look at the restrictions!
Radians vs degrees; One point might represent several angles...