

Precalculus - Inverse Trigonometric Functions and Equations - Worksheet

Common Core F-TF.B.6, F-TF.B.7 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice inverse trigonometric functions and equations (Common Core F-TF.B.6 and F-TF.B.7). You will evaluate $\arcsin$, $\arccos$ and $\arctan$, compose trig functions, and solve equations on an interval and in general.

Precalculus · Common Core State Standards: **F-TF.B.6, F-TF.B.7**

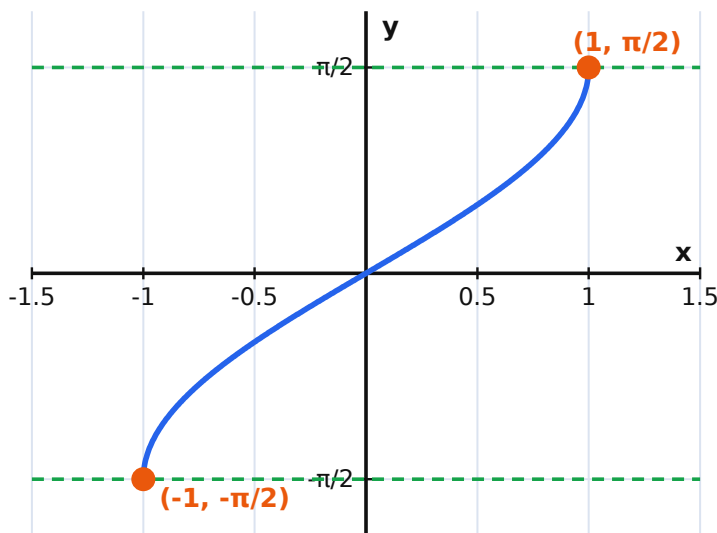
Exercise 1 - Exact values of inverse trig

Evaluate $\arcsin \frac{1}{2}$, $\arccos \frac{\sqrt{3}}{2}$ and $\arctan 1$.

Exercise 2 - Negative inputs

Evaluate $\arcsin\left(-\frac{\sqrt{2}}{2}\right)$, $\arccos\left(-\frac{1}{2}\right)$ and $\arctan(-\sqrt{3})$.

Exercise 3 - Domain and range



Graph of $y = \arcsin x$.

State the domain and range of $y = \arcsin x$ using the graph.

Exercise 4 - Calculator values

Use a calculator in radian mode to find $\arcsin 0.4$ and $\arctan 2.5$ to four decimal places.

Exercise 5 - Inverse properties

Evaluate $\sin(\arcsin 0.3)$, $\cos(\arccos(-0.8))$ and $\arcsin(\sin \frac{\pi}{6})$.

Exercise 6 - Outside the principal range

Evaluate $\arcsin(\sin \frac{7\pi}{6})$ and $\arccos(\cos(-\frac{\pi}{3}))$.

Exercise 7 - Cosine of an arcsine

Find $\cos(\arcsin \frac{3}{5})$.

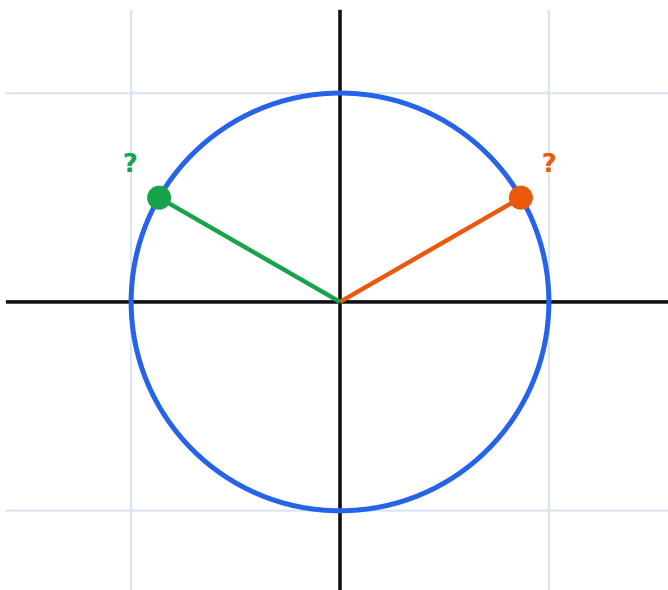
Exercise 8 - Tangent of an arccosine

Find $\tan(\arccos \frac{5}{13})$.

Exercise 9 - Sine of an arctangent

Find $\sin(\arctan \frac{3}{4})$.

Exercise 10 - Solve $\sin x = 1/2$



Two points have y-coordinate $1/2$.

Solve $\sin x = \frac{1}{2}$ for $0 \leq x < 2\pi$.

Exercise 11 - Solve $\cos x$

Solve $\cos x = -\frac{\sqrt{2}}{2}$ for $0 \leq x < 2\pi$.

Exercise 12 - Solve $\tan x$

Solve $\tan x = -\sqrt{3}$ for $0 \leq x < 2\pi$.

Exercise 13 - General solutions

Write all solutions of $\sin x = \frac{\sqrt{3}}{2}$.

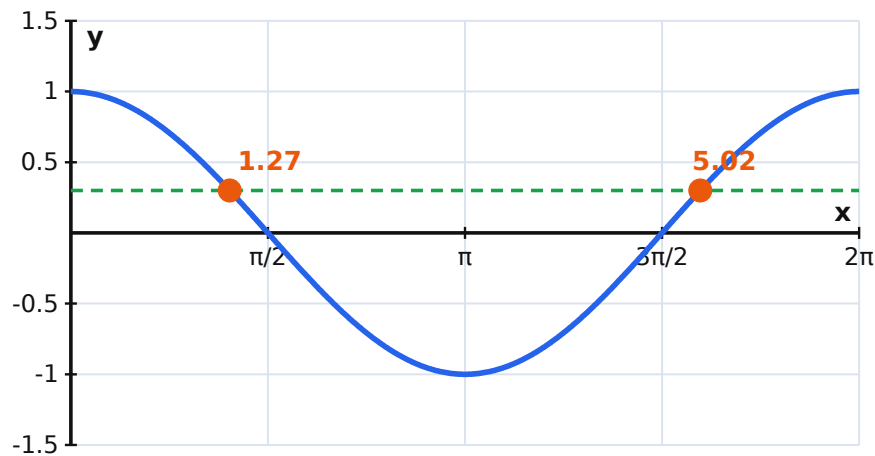
Exercise 14 - Rearrange first

Solve $2\sin x - \sqrt{2} = 0$ for $0 \leq x < 2\pi$.

Exercise 15 - Quadratic in sine

Solve $2\cos^2 x + \cos x - 1 = 0$ for $0 \leq x < 2\pi$.

Exercise 16 - A non-special value



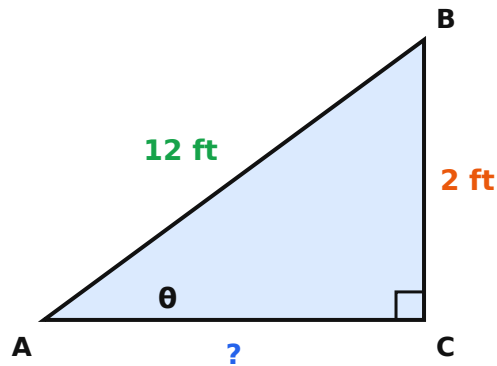
Graph of $\cos x$ and $y = 0.3$.

Solve $\cos x = 0.3$ for $0 \leq x < 2\pi$ to three decimal places.

Exercise 17 - Double angle inside

Solve $\sin 2x = \frac{\sqrt{3}}{2}$ for $0 \leq x < 2\pi$.

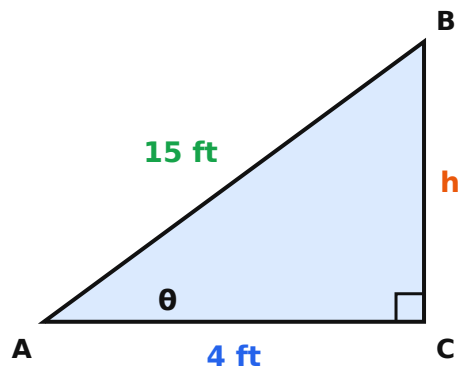
Exercise 18 - Ramp angle



A ramp 12 feet long rises 2 feet.

A loading ramp of length 12 ft rises 2 ft. Find the angle it makes with the ground, to the nearest tenth of a degree.

Exercise 19 - Ladder



A 15-foot ladder with its base 4 feet from the wall.

A 15-ft ladder has its base 4 ft from a wall. Find the angle between the ladder and the ground to the nearest tenth of a degree.

Exercise 20 - Ferris wheel timing

A rider's height is $h(t) = 30 - 25\cos\left(\frac{\pi}{15}t\right)$ ft. Find the first two times in $[0, 30]$ when the height is 40 ft, to the nearest hundredth of a second.