

Precalculus - Inverse Trigonometric Functions and Equations - Test Answer Key

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

Worked solutions and scoring notes for the 9-question inverse trig test. Use the scoring line under each solution to award partial credit.

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

Question 1 - Exact inverse values [2 pts]

$$\sin\left(-\frac{\pi}{6}\right) = -\frac{1}{2}. \cos\frac{\pi}{2} = 0.$$

$$-\frac{\pi}{6} \text{ and } \frac{\pi}{2}$$

Scoring: 1 point each.

Question 2 - More inverse values [2 pts]

$$\tan\left(-\frac{\pi}{4}\right) = -1. \sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}.$$

$$-\frac{\pi}{4} \text{ and } \frac{\pi}{3}$$

Scoring: 1 point each.

Question 3 - Compositions [2 pts]

$$\sin\frac{5\pi}{6} = \frac{1}{2} \text{ and } \arcsin\frac{1}{2} = \frac{\pi}{6} \text{ (not } \frac{5\pi}{6}). \cos(\arccos 0.25) = 0.25.$$

$$\frac{\pi}{6} \text{ and } 0.25$$

Scoring: 1 point each.

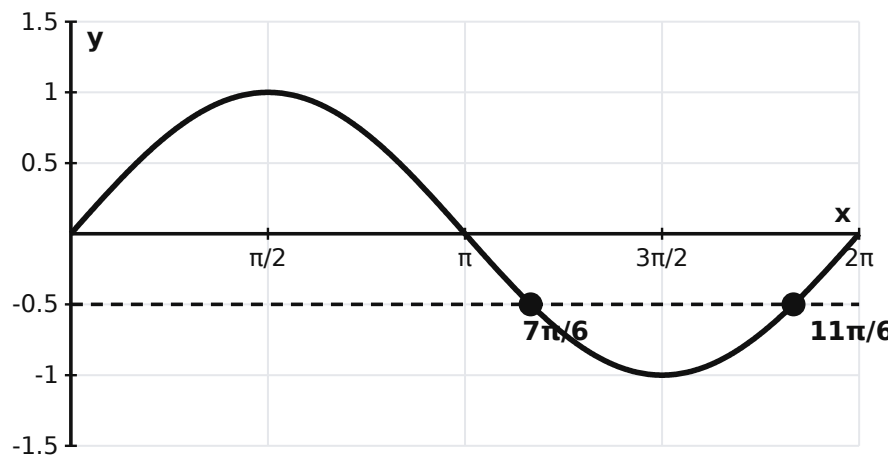
Question 4 - Triangle method [2 pts]

$$\text{Sides 5, 12, 13 give } \cos = \frac{12}{13}. \text{ Sides 4, 3, 5 give } \sin = \frac{3}{5}.$$

$$\frac{12}{13} \text{ and } \frac{3}{5}$$

Scoring: 1 point each.

Question 5 - Solve from a graph [3 pts]



Intersections at $7\pi/6$ and $11\pi/6$.

(a) About 3.7 and 5.8. (b) $\frac{\pi}{6}$. (c) Sine is negative in quadrants III and IV: $\pi + \frac{\pi}{6}$ and $2\pi - \frac{\pi}{6}$.

$$3.7, 5.8; \frac{\pi}{6}; x = \frac{7\pi}{6}, \frac{11\pi}{6}$$

Scoring: 1 point for each part.

Question 6 - Solve a cosine equation [2 pts]

$\cos x = \frac{\sqrt{3}}{2}$. Reference angle $\frac{\pi}{6}$; cosine is positive in quadrants I and IV.

$$x = \frac{\pi}{6}, \frac{11\pi}{6}$$

Scoring: 1 point for each solution.

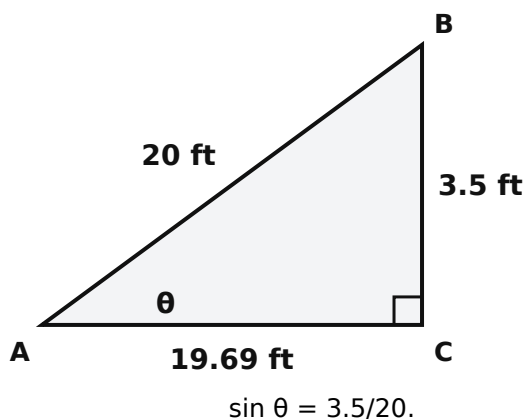
Question 7 - General solution [2 pts]

$\tan \frac{\pi}{3} = \sqrt{3}$, and tangent has period π .

$$x = \frac{\pi}{3} + \pi k$$

Scoring: 1 point for the angle, 1 point for the period.

Question 8 - Ramp angle [3 pts]



(a) $\theta = \arcsin \frac{3.5}{20} \approx 10.08^\circ$. (b) $\arctan \frac{1}{12} \approx 4.76^\circ$. (c) $10.08 > 4.76$.

10.08° ; 4.76° ; **yes, it is steeper**

Scoring: 1 point for each part.

Question 9 - Quadratic in sine [2 pts]

$$(2\sin x - 1)(\sin x - 1) = 0. \quad \sin x = \frac{1}{2}: \frac{\pi}{6}, \frac{5\pi}{6}. \quad \sin x = 1: \frac{\pi}{2}.$$

$$x = \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}$$

Scoring: 1 point for factoring, 1 point for all three solutions.

Total
20 points