

Honors Advanced Math

Name _____

Review 2 Answers

- a. A right triangle with angle $\cos^{-1}(\frac{3}{5})$ may have sides of 3, 4, and 5. This gives $\tan(\cos^{-1}(\frac{3}{5})) = \frac{4}{3}$.

b. A right triangle with angle $\cos^{-1}(x)$ may have sides of x , $\sqrt{1-x^2}$, and 1. This gives $\tan(\cos^{-1} x) = \sqrt{1-x^2} / x$.
- $\cos(\frac{\pi}{2} - \theta) = \sin \theta$ because the x -coordinate at angle $\frac{\pi}{2} - \theta$ is the same as the y -coordinate at angle θ .

$\sin(\pi - \theta) = \sin \theta$ because the y -coordinates at the same at angle $\pi - \theta$ and angle θ .

Therefore, $\cos(\frac{\pi}{2} - \theta) = \sin(\pi - \theta)$.
- a. $f(x) = 2.5 \sin(\frac{2\pi}{4}(x-2)) + 2.5$ or $-2.5 \cos(\frac{2\pi}{4}(x-1)) + 2.5$

b. $g(x) = 2.5 \sin(\frac{2\pi}{4}(8x-2)) + 2.5$
- $\angle AOP = \angle POB = \tan^{-1}(\frac{35}{15}) \approx 1.166$. $\angle AOB \approx 2.332$.

Length arc AB $\approx \frac{2.332}{2\pi} \cdot 2\pi 15 \approx 34.977$. Perimeter $\approx 35 + 35 + 34.977 = \underline{104.977 \text{ units}}$.

Area sector AOB $\approx \frac{2.332}{2\pi} \cdot \pi 15^2 \approx 262.329$.

Shaded area = $\Delta AOP + \Delta BOP - \text{sector AOB} = 262.5 + 262.5 - 262.329 \approx \underline{262.671 \text{ sq. units}}$.
- Law of Sines gives $\sin \angle T = \frac{8 \sin 45^\circ}{10} \approx 0.566$; $\angle T \approx 34.45^\circ$ (or 145.55° , but that value is impossible because of the 180° angle sum).

Next, $\angle S \approx 100.55^\circ$. Finally, Law of Cosines using $\angle S$ gives that $RT = 13.903$.
- Law of Cosines on ΔXYZ gives $XZ \approx 7.82$.

Law of Sines on ΔXYZ gives $\angle YZX \approx 78.40^\circ$, then $\angle XZW \approx 31.60^\circ$.

Law of Cosines on ΔXWZ gives $XW \approx 4.15$.

Law of Cosines on ΔXWZ gives $\angle W \approx 99.16^\circ$, then $\angle X \approx 100.84^\circ$.

Area = $\frac{1}{2} \cdot 10 \cdot 8 \cdot \sin(50^\circ) + \frac{1}{2} \cdot 7.82 \cdot 6 \cdot \sin(31.60^\circ) \approx \underline{42.93 \text{ sq. units}}$.
- $3x = \frac{7\pi}{6} + 2n\pi$ or $3x = \frac{11\pi}{6} + 2n\pi$

$x = \frac{7\pi}{18} + \frac{2}{3}n\pi$ or $x = \frac{11\pi}{18} + \frac{2}{3}n\pi$

Solutions in the specified interval: $\{ \frac{7\pi}{18}, \frac{11\pi}{18}, \frac{19\pi}{18}, \frac{23\pi}{18}, \frac{31\pi}{18}, \frac{35\pi}{18} \}$.
- $\sin^2 x - \sin x = 1 - \sin^2 x$

$2 \sin^2 x - \sin x - 1 = 0$

$(2 \sin x + 1)(\sin x - 1) = 0$

$\sin x = -\frac{1}{2}$ or $\sin x = 1$

Solutions in the specified interval: $\{ \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6} \}$.
- $\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta = \frac{4}{5} \cdot \frac{-7}{25} - \frac{3}{5} \cdot \frac{24}{25} = \frac{-100}{125} = \frac{-4}{5}$.