Inverse Trigonometry

Warmup - Find the exact value of the expression.

$a.\ \sin\left(2\sin^{-1}\frac{1}{2}\right)$ $\frac{\sqrt{3}}{2}$

$b.\ \cos\left(2\sin^{-1}\frac{3}{5}\right)$ $\frac{7}{25}$

$c.\ \tan\left[2\cos^{-1}\left(-\frac{3}{5}\right)\right]$ $\frac{24}{7}$

5.1 - Trigonometric Identities

Simplify the expression

$a.\ \dfrac{\cos\theta}{1-\tan\theta}+\dfrac{\sin\theta}{1-\cot\theta}$ $\sin\theta+\cos\theta$

$b.\ \tan\theta+\dfrac{\cos\theta}{1+\sin\theta}$ $\sec\theta$

5.3 - Double-Angle Identities

Establish the identity.

$$\tan\frac{\theta}{2} + \cot\theta = \csc\theta$$

$$\tan(3\theta) = \frac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$$

5.3 - Double-Angle Identities

Solve the equation on $0 \leq \theta < 2\pi$.

$$\cos(2\theta) = \cos\theta$$

$$0, \frac{2\pi}{3}, \frac{4\pi}{3}$$

5.3 - Double-Angle Identities

Find $\cos(2x + y)$ for $0 \le x \le 90°$ and $0 \le y \le 90°$ when

$\tan x = \frac{4}{3}$ and $\sin y = \frac{7}{25}$.

$\cos(2x + y) = -\frac{336}{625}$

6.1 - Inverse Trigonometric Functions

Find the exact value of the expression.

$a.\ \sin\left(\sin^{-1}\frac{\sqrt{3}}{2}+\cos^{-1}1\right)$

$\frac{\sqrt{3}}{2}$

$b.\ \cos\left(\tan^{-1}\frac{4}{3}+\cos^{-1}\frac{12}{13}\right)$

$\frac{16}{65}$

7.2 - Law of Cosines

Find the missing angles and sides.

$a = 12, c = 15, B = 47^\circ$

$b \approx 11.11$

$A \approx 52.17^\circ$

$C \approx 80.83^\circ$

7.3 - Area of a Triangle

a. Find the area of the triangle $a = 4.1\ in$, $c = 7.4\ in$, and $B = 56°$.

$A = 12.58\ in^2$

b. Find the area of the triangle $a = 5\ m$, $b = 9\ m$, and $c = 11\ m$.

$A = 22.19\ m^2$