Review

December-09-13
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The only ones given on test and on exam:

Addition and Subtraction Formulas

$\sin(x+y) = \sin x \cos y + \cos x \sin y$

$\sin(x-y) = \sin x \cos y - \cos x \sin y$

$\cos(x+y) = \cos x \cos y - \sin x \sin y$

$\cos(x-y) = \cos x \cos y + \sin x \sin y$

$\tan(x+y) = \dfrac{\tan x + \tan y}{1 - \tan x \tan y}$

$\tan(x-y) = \dfrac{\tan x - \tan y}{1 + \tan x \tan y}$

Half-Angle Formulas

$\sin^2 x = \dfrac{1-\cos 2x}{2} \qquad \cos^2 x = \dfrac{1+\cos 2x}{2}$

Double Angle Formulas

$\sin 2x = 2 \sin x \cos x$

$\cos 2x = \cos^2 x - \sin^2 x$

$= 2\cos^2 x - 1$

$= 1 - 2\sin^2 x$

$\tan 2x = \dfrac{2 \tan x}{1 - \tan^2 x}$

(1.) State equivalent trig expressions for

$\tan \dfrac{15\pi}{9}$

a) using odd/even symmetry
b) using cofunction id.
c) using similar shape
d) using CAST
e) using shift of period

(f) repeat a)-e) for $\sec\left(\frac{6\pi}{5}\right)$

2. Find the exact values of each of the following. Justify what you use for your answers.

a) $\sin \frac{5\pi}{3}$

b) $\csc \frac{3\pi}{4}$

c) $\sec \frac{7\pi}{2}$

d) $\cos \frac{5\pi}{12}$

e) $\tan \frac{5\pi}{8}$

3. Determine the solutions for each equation where $0 \leq x \leq 2\pi$.

a) $1 + \frac{17}{3} \tan x = -\frac{14}{3}$

b) $\sin x + 2 + \frac{\csc x}{10} = \frac{9}{5} + \sin x$

c) $5 + \pi + 2 \cos x = \pi + 4$

d) $\sqrt{3} + 4 \cot x - 1 = 2\sqrt{3} - 1 + \cot x$

e) $\frac{\sin x + \cos x}{15} = 0$

f) $\frac{1 + 9 \sec x + \pi}{\sec x} = \frac{17}{2} + \frac{\pi}{\sec x}$

4. Determine the solutions for each equation where $0 \leq x \leq 2\pi$ by using a double-angle formula to transform the equation into a linear trigonometric equation, if necessary.

a) $2 \sin x \cos x + \frac{1}{2} = 1$

b) $\cos^2 x - \sin^2 x + \tan^2 x - 3 = \tan^2 x - 2$

5. Use factoring to solve each of the following equations where $0 \leq x \leq 2\pi$.

a) $\tan^2 x - \sqrt{3} \tan x = 0$

b) $\sin^2 x - \frac{1}{4} = 0$

c) $\cos^2 x + 2 \cos x + 1 = 0$

5. Use factoring to solve each of the following equations where $0 \leq x \leq 2\pi$.

a) $\tan^2 x - \sqrt{3}\tan x = 0$

b) $\sin^2 x - \frac{1}{4} = 0$

c) $\cos^2 x + 2\cos x + 1 = 0$

d) $\sec^2 x - \sec x = 2$

e) $\csc^2 x = \frac{4}{3}$

f) $\cot^2 x - 2\sqrt{3}\cot x + 3 = 0$

6. Write each of the following expressions as a single trigonometric function.

a) $\sin 16° \cos 99° - \cos 16° \sin 99°$

b) $\dfrac{\tan\frac{\pi}{18} + \tan\frac{2\pi}{9}}{1 - \tan\frac{\pi}{18}\tan\frac{2\pi}{9}}$

c) $\sin\frac{13\pi}{20}\cos\frac{\pi}{5} + \cos\frac{13\pi}{20}\sin\frac{\pi}{5}$

d) $\cos 88° \cos 9° - \sin 88° \sin 9°$

7. Prove

a) $\sin^3 x + \cos^3 x = (1 - \sin x \cos x)(\sin x + \cos x)$

b) $\dfrac{\cos 2x}{1 + \sin 2x} = \tan\left(\dfrac{\pi}{4} - x\right)$

(c) $\sin 8x = 8\sin x\cos x\cos 2x\cos 4x$

(d) $\sin x = 1 - 2\sin^2\left(\frac{\pi}{4} - \frac{x}{2}\right)$

(e) $\sin(x+y) + \sin(x-y) = 2\sin x\cos y$

(f) $\cos\left(\frac{\pi}{12} - x\right)\sec\frac{\pi}{12} - \sin\left(\frac{\pi}{12} - x\right)\csc\frac{\pi}{12} = 4\sin x$

8. The angle α lies in quadrant II, and angle β lies in quadrant III, if $\tan\alpha = \frac{-2}{7}$ and $\cos\beta = \frac{-1}{3}$, find

a) $\sin\alpha$, $\sin\beta$ and $\cos\alpha$

b) $\sin(\alpha - \beta)$

c) $\tan 2\alpha$

d) $\cos\frac{\beta}{2}$