EQUIVALENT TRIGONOMETRIC EXPRESSIONS
ASSIGNED WORK

1) Express each of the following as a trigonometric function of the angle x.

a) $\cos(-x)$ b) $\sin\left(\frac{3\pi}{2}+x\right)$ c) $\tan\left(\frac{\pi}{2}-x\right)$ d) $\tan(-x)$ e) $\sin(\pi+x)$

f) $\cos\left(\frac{\pi}{2}+x\right)$ g) $\cos\left(\frac{3\pi}{2}-x\right)$ h) $\sin(2\pi-x)$ i) $\tan(\pi-x)$

2) Simplify.

a) $\cos x+\cos(\pi-x)-\cos(\pi+x)-\cos(-x)$

b) $\tan x+\tan(\pi-x)+\cot\left(\frac{\pi}{2}-x\right)-\tan(2\pi-x)$

c) $\sin(\pi+x)+\cos\left(\frac{\pi}{2}-x\right)+\tan\left(\frac{\pi}{2}+x\right)+\tan\left(\frac{3\pi}{2}-x\right)$

d) $\sin\left(\frac{\pi}{2}+x\right)-\cos\left(\frac{3\pi}{2}-x\right)+\sin\left(\frac{3\pi}{2}-x\right)$

e) $\sin\left(\frac{\pi}{2}-x\right)+\sin(\pi-x)+\sin\left(\frac{3\pi}{2}-x\right)+\sin(2\pi-x)$

3) Find the cosecant, secant and cotangent of each of the following. Express your answers in terms of cosecant, secant or cotangent of x.

a) $\pi-x$ b) $\frac{\pi}{2}+x$ c) $\pi+x$ d) $\frac{3\pi}{2}+x$

4) Simplify.

a) $\sin(x-\pi)$ b) $\cos\left(x-\frac{\pi}{2}\right)$ c) $\tan(-x-\pi)$

5) Simplify.

a) $\dfrac{\cos(\pi+x)\cos\left(\frac{\pi}{2}+x\right)}{\cos(\pi-x)}-\dfrac{\sin\left(\frac{3\pi}{2}-x\right)}{\sec(\pi+x)}$

b) $\dfrac{\sin\left(x-\frac{\pi}{2}\right)}{\cos(\pi-x)}+\dfrac{\tan\left(x-\frac{3\pi}{2}\right)}{-\tan(\pi+x)}$

Answers

1) a) $\cos x$ b) $-\cos x$ c) $\cot x$ d) $-\tan x$ e) $-\sin x$ f) $-\sin x$

g) $-\sin x$ h) $-\sin x$ i) $-\tan x$

2) a) 0 b) $2\tan x$ c) 0 d) $\sin x$ e) 0

3) a) $\csc x$, $-\sec x$, $-\cot x$

b) $\sec x$, $-\csc x$, $-\dfrac{1}{\cot x}$

c) $-\csc x$, $-\sec x$, $\cot x$

d) $-\sec x$, $\csc x$, $-\dfrac{1}{\cot x}$

4) a) $-\sin x$ b) $\sin x$ c) $-\tan x$

5) a) $-\sin x - \cos^2 x$ b) $\csc^2 x$