Trigonometry – Questions

Q1) State the exact values of the following.

a) $Sin\ 30°$ b) $Cos\ 45°$ c) $Tan\ 60°$

Q2) Determine the exact values of the following.

a) $Sin\ 225°$ b) $Cos\ 225°$ c) $Tan\ 225°$

Q3) What is the radian equivalent of the following angles given in degrees?

Write your answer as a multiple of π.

a) 180° b) 360° c) 90° d) 30°

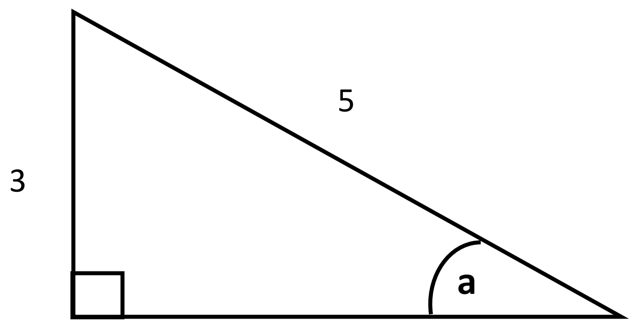
Q4) What is the radian equivalent of the following angles given in degrees?

a) 10° b) 40° c) 305° d) 24°

Q5) Express $\sqrt{3}sinx - \cos x$ in the form $ksin(x-a),\ k > 0\ , 0 \leq a \leq 360°$.

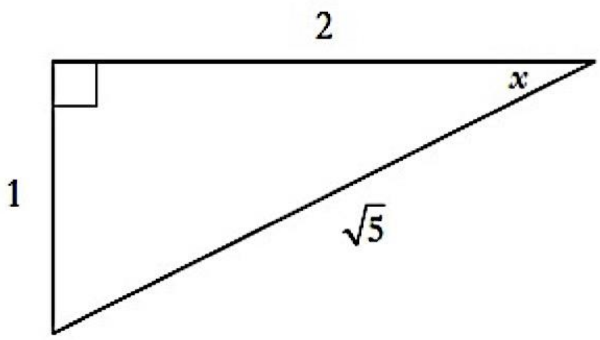
Q6) Express $5\cos x - 2\sin x$ in the form $k\cos(x+a)$, where $k > 0$ and $0 < a < 2\pi$.

Q7) The diagram shows a right-angled triangle.



What is the value of a) $Sin\ 2a$ b) $Cos\ 2a$

Q8) The diagram shows a right-angled triangle.



Find the value of $Sin\ 2x$

Q9) Show that $sin\ 2x\ tan\ x = 1 - cos\ 2x$

Q10) Show that $\frac{\sin 2x}{2\cos x} - \sin x\ cos^2 x = sin^3 x$

Trigonometry – Solutions

Q1) a) $Sin\ 30° = \frac{1}{2}$

b) $Cos\ 45° = \frac{1}{\sqrt{2}}$

c) $Tan\ 60° = \frac{\sqrt{3}}{1}$

Q2) a $-\frac{1}{\sqrt{2}}$

b) $\frac{1}{\sqrt{2}}$

c) 1

Q3) a) $180° = \pi$ radians

b) $360° = 2\pi$ radians

c) $90° = \frac{\pi}{2}$ radians

d) $30° = \frac{\pi}{6}$ radians

Q4) a) $10° = 0.17$ radians

b) $40° = 0.7$ radians

c) $305° = 5.3$ radians

d) $24° = 0.42$ radians

Q5) $\sqrt{3}sinx - \cos x = 2sin(x - 30)°$

Q6) $5 \cos \mathrm{x} - 2 \sin \mathrm{x} = \sqrt{29}\cos(\mathrm{x} + 0.4)$

Q7) a) $\frac{24}{25}$

b) $\frac{7}{25}$

Q8) $\frac{4}{5}$

Q9) $sin\ 2x\ tan\ x = 2 \sin x \cos x \tan x$

Insert $[\tan x = \frac{\sin x}{\cos x}]$ to give

$sin\ 2x\ tan\ x = 2 \sin x \cos x \frac{\sin x}{\cos x}$

$= 2sin^2x$

$[\cos 2x = 1 - 2sin^2x \ldots$ rearranging gives $2sin^2x = 1 - \cos 2x]$

So, $sin\ 2x\ tan\ x = 1 - \cos 2x$

Q10) $\frac{\sin 2x}{2\cos x} - \sin x\, cos^2 x = \frac{2\sin x \cos x}{2\cos x} - \sin x\, cos^2 x$

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

$= \sin x(1 - cos^2 x)$

$[sin^2 x + cos^2 x = 1 \ldots \text{rearranging gives } sin^2 x = 1 - cos^2 x]$

$= \sin x\, (sin^2 x)$

$= sin^3 x$