## Answer on Question \#44425 - Math - Trigonometry <br> Problem

If the ratio of three sides of a triangle is $a: b: c=7: 8: 9$ then show that $\cos A: \cos B: \cos C=14: 11: 16$

## Solution

Use cosine theorem for side $a, b$ and $c$ in same order

$$
\begin{aligned}
& a^{2}=b^{2}+c^{2}-b * c * \cos A \\
& b^{2}=a^{2}+c^{2}-a * c * \cos B \\
& c^{2}=b^{2}+a^{2}-b * a * \cos C
\end{aligned}
$$

Putting values:

$$
\begin{gathered}
49=64+81-144 \cos A \\
-96=-144 \cos A \\
\cos A=\frac{96}{144}=\frac{2}{3}
\end{gathered}
$$

Do in same way with other equations we get

$$
\cos B=\frac{66}{126}=\frac{11}{21}
$$

And

$$
\cos C=\frac{32}{112}=\frac{2}{7}
$$

So, there is ratio

$$
\cos A: \cos B: \cos C=\frac{2}{3}: \frac{11}{21}: \frac{2}{7}
$$

Multiply it with 21 we get

$$
\cos A: \cos B: \cos C=14: 11: 6
$$

P.S. There is a mistake in problem condition

