**Answer on Question#39018 – Math – Trigonometry**

If TanA=ptanB then prove that Sin(A+B)=(p+1)(sin(A-B))/(p-1)

**Solution:**

Initial condition:

$$\tan A = p \cdot \tan B$$

We can write the tangent as $\tan\alpha = \frac{\sin\alpha}{\cos\alpha}$:

$$\frac{\sin A}{\cos A} = p \cdot \frac{\sin B}{\cos B}$$

$$p\cos A \cdot \sin B = \sin A \cdot \cos B \quad (1)$$

Sine of the sum and difference:

$$\sin(A + B) = \sin A \cdot \cos B + \cos A \cdot \sin B \qquad (2)$$

$$\sin(A - B) = \sin A \cdot \cos B - \cos A \cdot \sin B \qquad (3)$$

(1)in (2)and(3):

$$\sin(A + B) = p\cos A \cdot \sin B + \cos A \cdot \sin B = \cos A \cdot \sin B\,(p + 1) \qquad (4)$$

$$\sin(A - B) = p\cos A \cdot \sin B - \cos A \cdot \sin B = \cos A \cdot \sin B\,(p - 1) \qquad (5)$$

From (5):

$$\cos A \cdot \sin B = \frac{\sin(A - B)}{p - 1} \qquad (6)$$

(6)in(4):

$$\sin(A + B) = \cos A \cdot \sin B\,(p + 1) = \frac{(p + 1)(\sin(A - B))}{p - 1}$$