

Answer on Question #44561 – Math – Trigonometry

why $\sin(a+b)$ is not equal to $\sin a + \sin b$

Solution:

We know that no sine (or cosine) can be more than 1, because the ratio has the hypotenuse as its denominator. The maximum value of the numerator is equal to the denominator. A sine or cosine can never be greater than 1, so a value of $\sin(a + b) = \sin a + \sin b$ must be wrong.

For example:

$$\sin 30^\circ = 0.5$$

$$\sin 45^\circ = 0.7$$

$$\sin(30^\circ + 45^\circ) \neq 0.5 + 0.7 = 1.2$$

Sine of an angle is never greater than 1.

Instead, we must expand such expressions using the formula below.
The following trigonometric relationship is important :

$$\sin(a + b) = \sin a \cdot \cos b + \cos a \cdot \sin b$$

