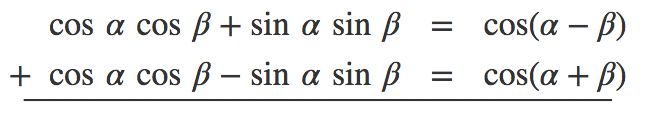
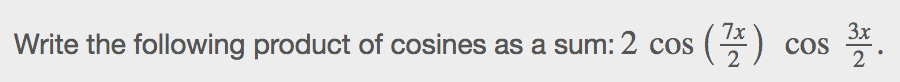
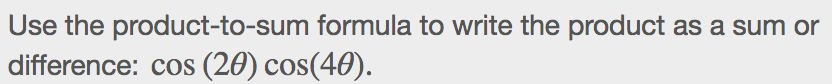
**9.4 – Sum-to-Product and Product-to-Sum**

**Expressing Products as Sums for Cosine**

We can derive the product-to-sum formula from the sum and difference identities for cosine. If we add the two equations, we get:

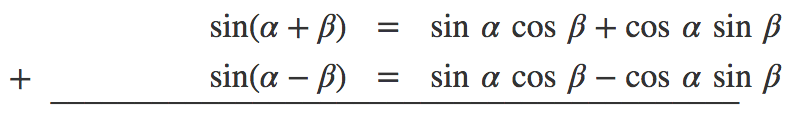
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**Examples**

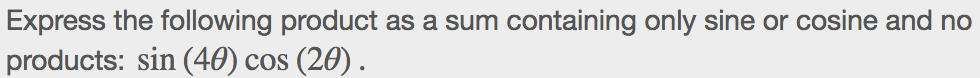
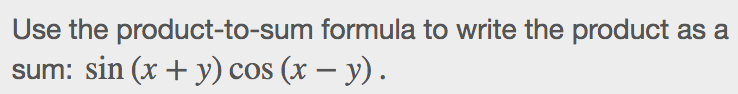
** **

**Expressing the Product of Sine and Cosine as a Sum**

Next, we will derive the product-to-sum formula for sine and cosine from the sum and difference formulas for sine. If we add the sum and difference identities, we get:

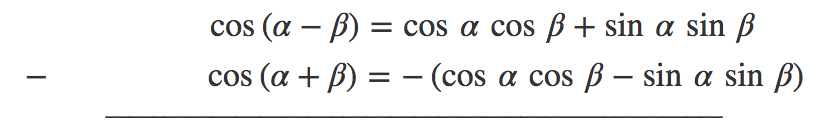
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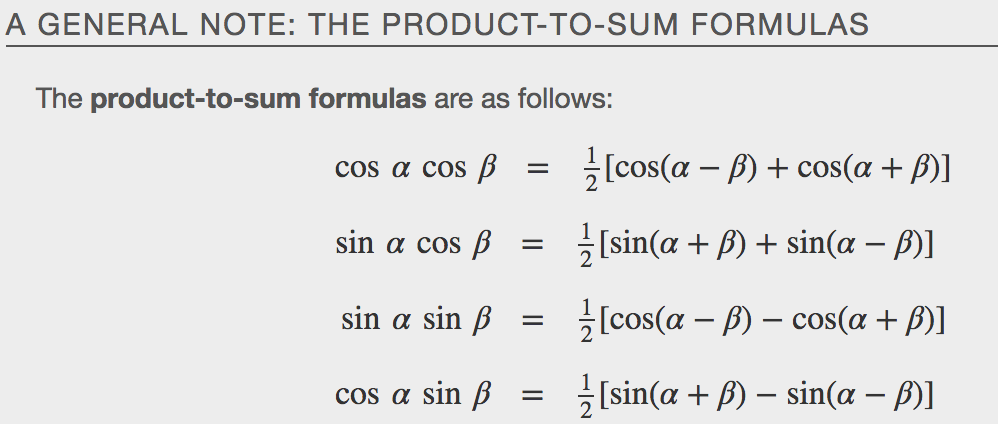
**Examples**

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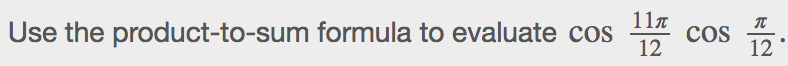
**Expressing Products of Sines in Terms of Cosine**

Expressing the product of sines in terms of cosine is also derived from the sum and difference identities for cosine. In this case, we will first subtract the two cosine formulas:

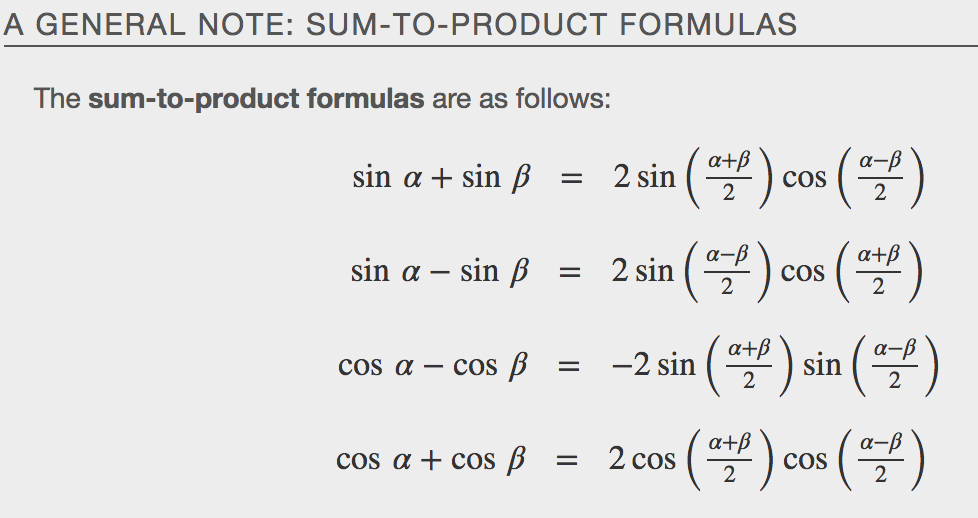
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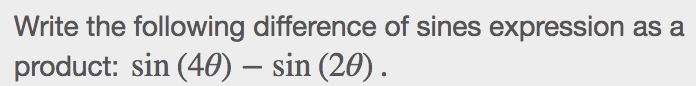
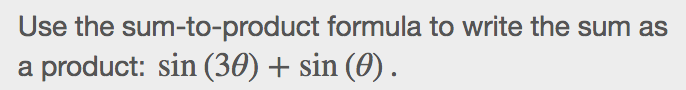
**Examples**

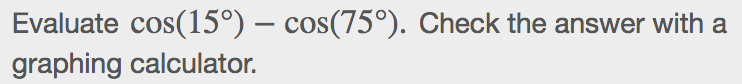
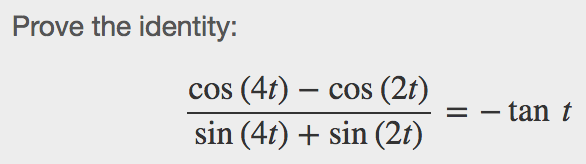
** **

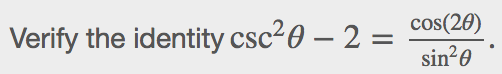
**Expressing Sums as Products**

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**Examples**

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