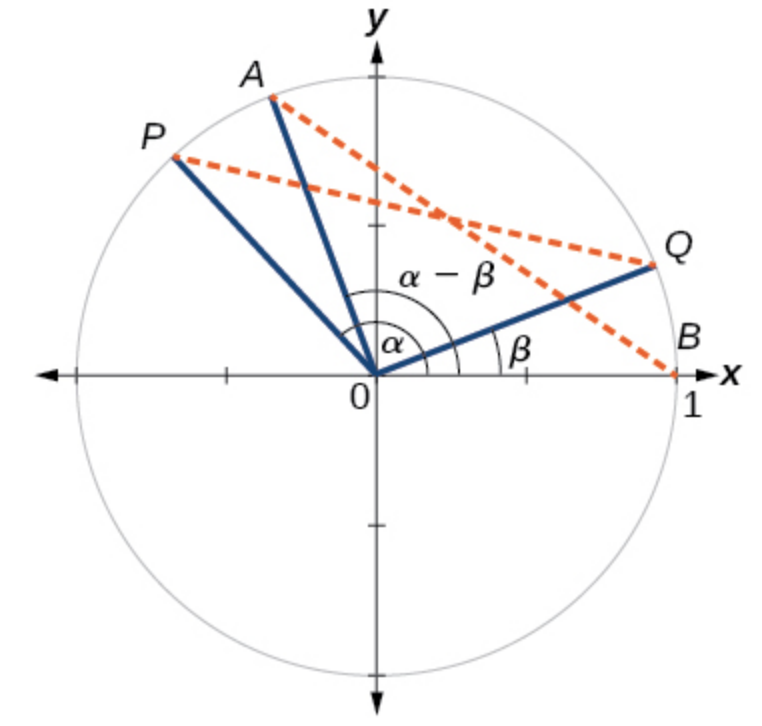
**9.2 - Sum and Difference Identities**

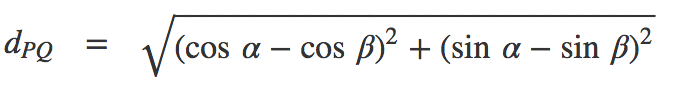
**Proof of the Difference Formula for Cosines**

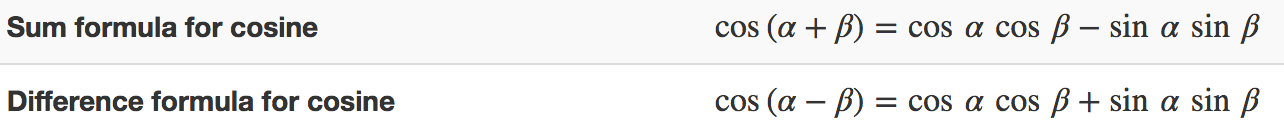
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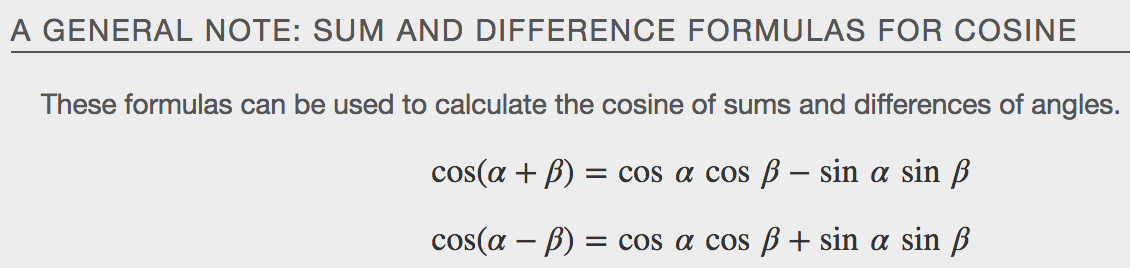
Point *P* is at an angle *α* from the positive *x-*axis with coordinates (cos*α*, sin*α*) and point *Q* is at an angle of *β* from the positive *x-*axis with coordinates(cos*β*,sin*β*).Note the measure of angle *POQ* is *α*−*β*.

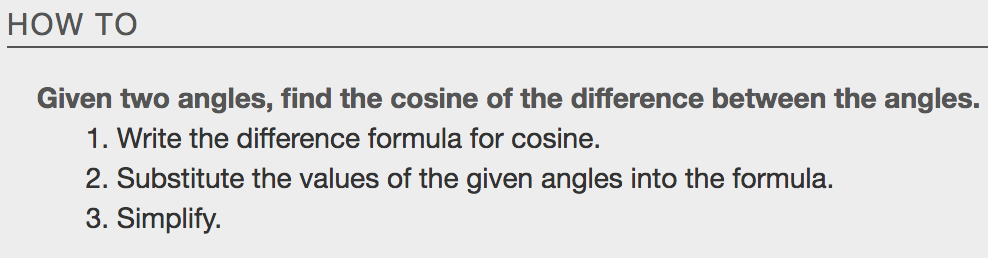
Label two more points: *A* at an angle of (*α*−*β*) from the positive *x-*axis with coordinates(cos(*α*−*β*), sin(*α*−*β*)); and point *B* with coordinates(1,0).Triangle *POQ* is a rotation of triangle *AOB* and thus the distance from *P* to *Q* is the same as the distance from *A* to *B*.

We can find the distance from *P* to *Q* using the distance formula.

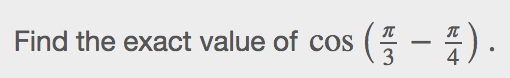
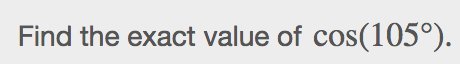


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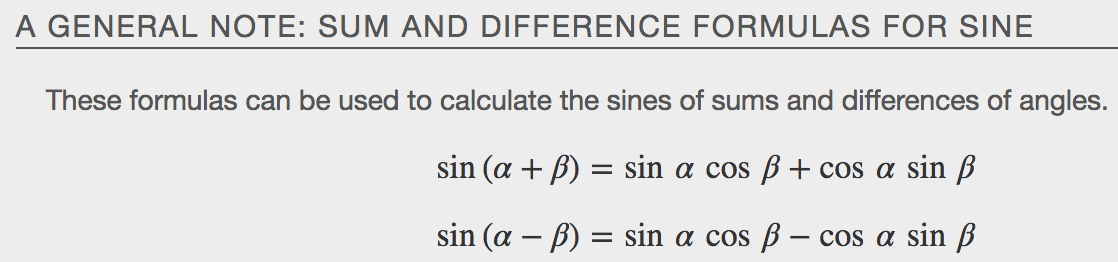
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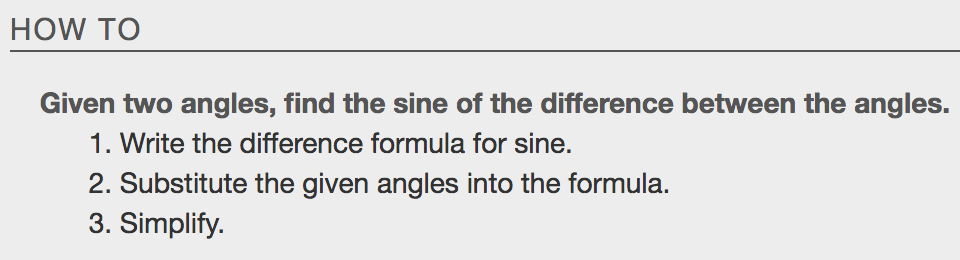
****

**Example**

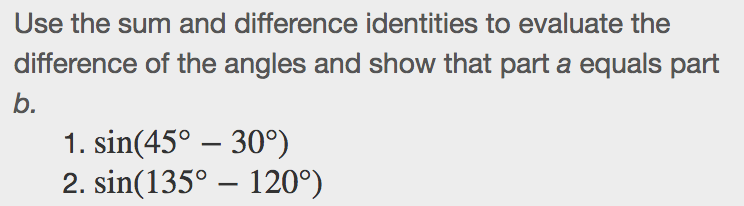
** **

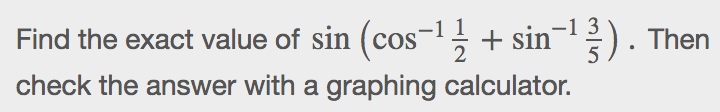
**Using the Sum and Difference Formulas for Sine**

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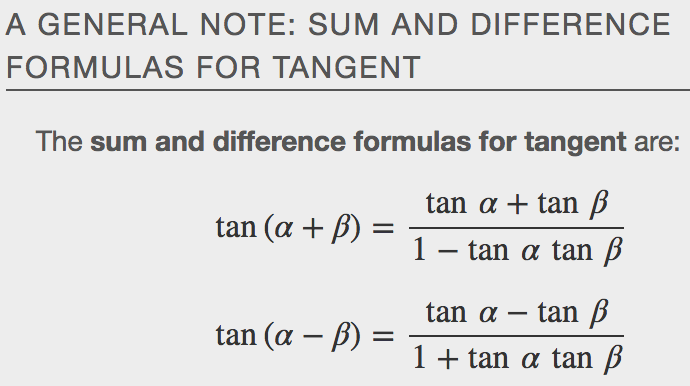
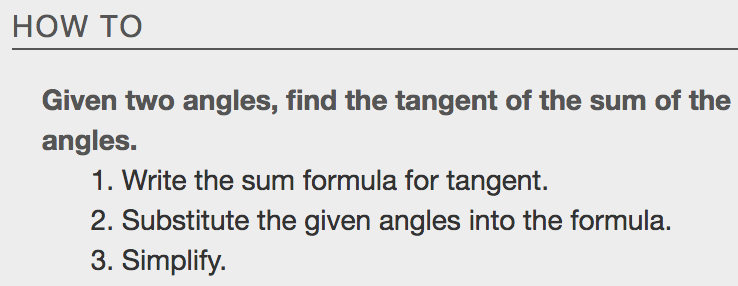
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**Examples**

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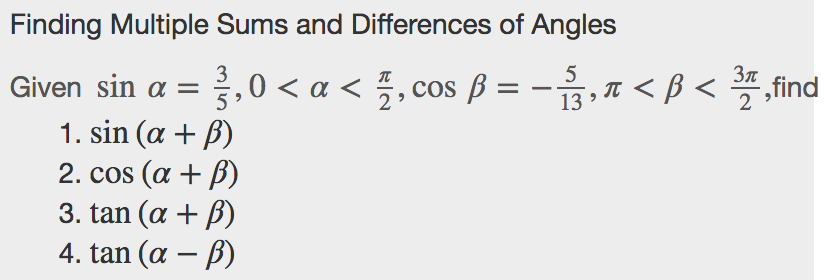
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**Using the Sum and Difference Formulas for Tangent**

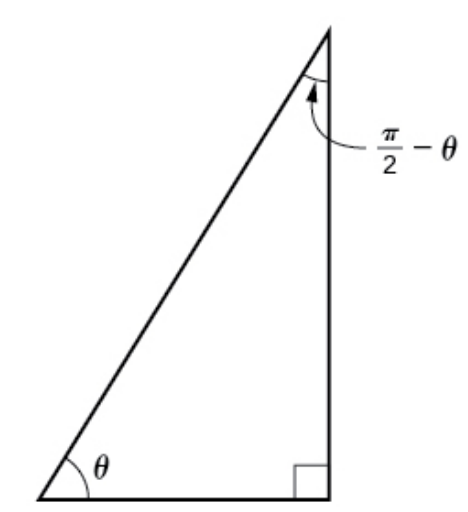
** **

**Examples**

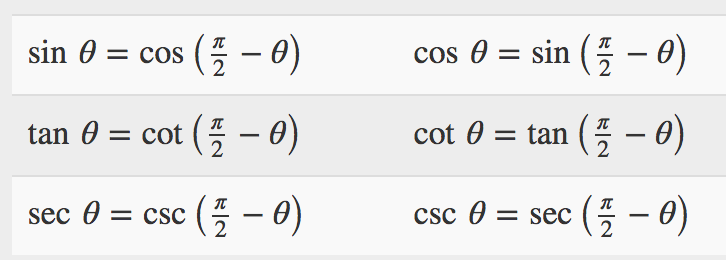
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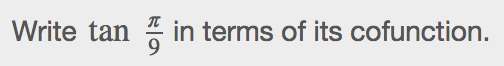
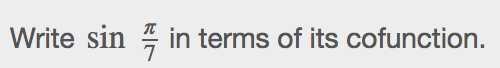
**Using the Sum and Difference Formulas for Cofunctions**

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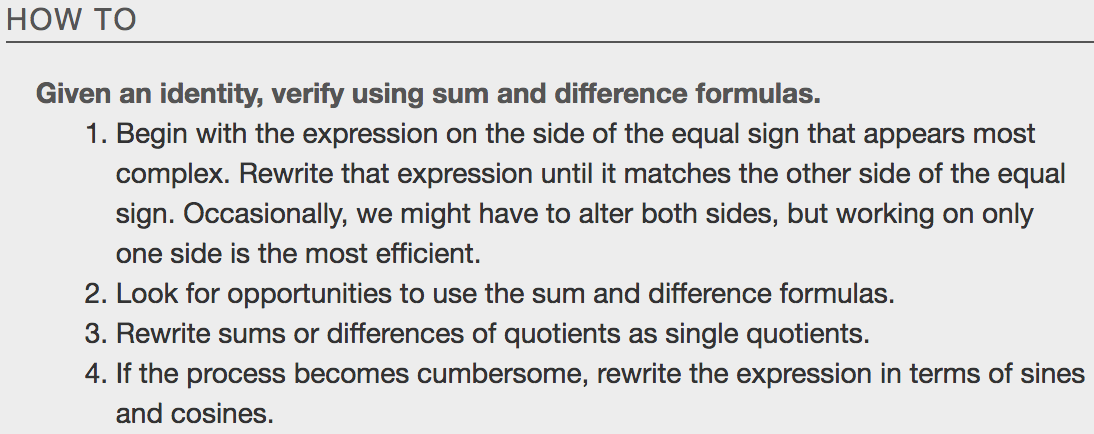




**Examples**

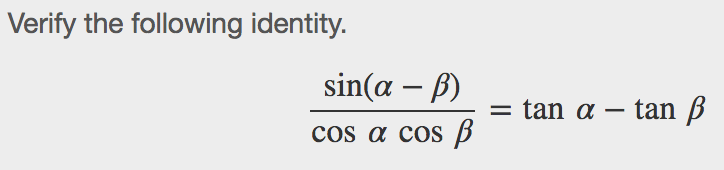
** **

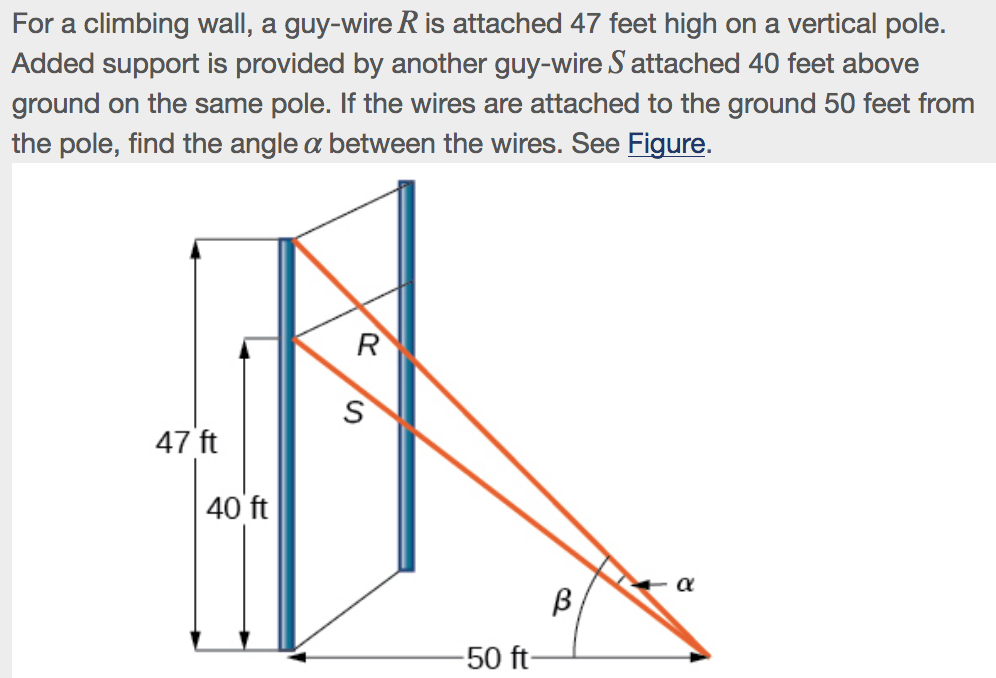
**Using the Sum and Difference Formulas to Verify Identities**

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**Example**

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