

# Re: trig. formula Question

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- *From:* [rob@xxxxxxxxxxxxxxxx](mailto:rob@xxxxxxxxxxxxxxxx) (Rob Johnson)
  - *Date:* Thu, 12 Jan 2006 00:13:33 GMT
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In article <dq43qd\$2k0\$1@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, Dave Seaman <dseaman@xxxxxxxxxxxx> wrote:  
 >On 11 Jan 2006 14:45:07 -0800, incon wrote:  
 >> HI I have looked everywhere I can and I cannot find the formula for the  
 >> trigonomic functions  
 >> Cosine  
 >> Sine  
 >> Tangent  
 >> Inverted Cosine  
 >> Inverted Sine  
 >> Inverted Tangent  
 >> I can do these on a calculator any day but I couldn't do them with out  
 >> one.  
 >> I figured you guys would know seeing as seems you all are a bunch of  
 >> math guros.  
 >> Thanks  
 >  
 >The "formulas" are transcendental and may not be of much help to you, but:  
 >  
 >sin(x) = (e^(i\*x) - e^(-i\*x)) / (2\*i) = x - x^3/3! + x^5/5! - x^7/7! + ...  
 >cos(x) = (e^(i\*x) + e^(-i\*x)) / 2 = 1 - x^2/2! + x^4/4! - x^6/6! + ...  
 >tan(x) = sin(x) / cos(x)  
 >  
 >and the other 3 are just the inverses of those.

A simple series for atan that converges for |x| <= 1 is

$$\text{atan}(x) = x - x^3/3 + x^5/5 - x^7/7 + \dots$$

convergence for all x can be achieved with

$$x$$

$$\text{atan}(x) = 2 \text{atan}\left(\frac{x}{1 + \sqrt{1+x^2}}\right)$$

We can get asin and acos using the following:

$$x$$

$$\text{asin}(x) = 2 \text{atan}\left(\frac{x}{1 + \sqrt{1-x^2}}\right)$$

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$$1 + \sqrt{1-x^2}$$

x

$$\arccos(x) = \frac{\pi}{2} - 2 \operatorname{atan}\left(\frac{x}{1 + \sqrt{1-x^2}}\right)$$

$$1 + \sqrt{1-x^2}$$

Rob Johnson <rob@xxxxxxxxxxxxxxxx>

take out the trash before replying

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• **References:**

◆ **[trig. formula Question](#)**

◇ From: incon

◆ **[Re: trig. formula Question](#)**

◇ From: Dave Seaman

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