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Calculator Lesson 6

Trigonometric and Hyperbolic Functions

The calculator has three keys, SIN, COS, and TAN for the sine, cosine, and tangent respectively. To compute one of these simply put the value of x on the stack or command line and press the desired function. It is important to have the calculator in the correct Angle Measure mode. If the calculator is set to degrees and you press 30 SIN you get .5 as expected, but if the calculator is in radian mode you will get -.988031624093, which is the sine of 30 radians. The Angle Measure mode can be set in the CALCULATOR MODE dialog box by pressing the MODE button. Move the cursor to Angle Measure, press F2-CHOOS, use UA or DA as needed to select the desired mode, then press F6-OK twice. For the vast majority of applications in calculus you will want the calculator in radian mode. Unless otherwise noted, we will use radians for the rest of the examples in this and succeeding lessons.

Notice that there are no keys for cotangent, secant or cosecant, but since these are the reciprocals of the functions for which we do have keys, we can calculate these with the existing trigonometry keys and the 1/X key. For example, to $\sec(\pi/6)$ press LS π 6 \div COS 1/X. You should get 1.15470053838.

The left shift for each of the trigonometric functions are ASIN, ACOS, and ATAN, which are arcsine, arccosine, and arctangent respectively. To find $\arccos\left(\frac{1}{2}\sqrt{2}\right)$ press 2 \sqrt{x} 2 \div LS ACOS and you will get .7853891634, which is $\pi/4$. For the other three inverse trigonometric functions we must again use the 1/X key. For example, to find $\operatorname{arccot}(2.3)$ press 2.3 1/X LS ATAN and you will get .410127340542.

To graph a function such as $\sin(x)$, define EQ: as 'SIN(X)' in the 2D/3D window. To graph $\sec(x)$, define EQ: as 'INV(COS(X))'. To graph $\arctan(x)$ EQ: would be 'ATAN(X)' and for $\operatorname{arccsc}(x)$ EQ: would be 'ASIN(INV(X))'.

For a good review of trigonometry and for more information about using the calculator for doing trigonometry, see the on line text [Complex Numbers and Trigonometry](#). You will find it listed in our [Useful Links](#) page and our [Resources](#) page.

Press LS MTH F4-HYP, and you will find the three hyperbolic function SINH, COSH and TANH, and their inverse functions ASINH, ACOSH and ATANH. All of the hyperbolic functions are accessed in the same way as their related trigonometric functions.

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