

**MATH5630/6630 Dr. Smith, Formula Sheet.**

1.) Some trig formulas:

$$\sin(\alpha) \sin(\beta) = \frac{1}{2}[\cos(\alpha - \beta) - \cos(\alpha + \beta)]$$

$$\cos(\alpha) \cos(\beta) = \frac{1}{2}[\cos(\alpha - \beta) + \cos(\alpha + \beta)]$$

$$\sin(\alpha) \cos(\beta) = \frac{1}{2}[\sin(\alpha - \beta) + \sin(\alpha + \beta)].$$

2.) Divided Difference Table: The rows are number  $k = 0, 1, 2, 3, \dots$  and there is a column of the  $x$  values (column #  $-1$  ?) after which the columns are numbered  $\ell = 0, 1, 2, 3, \dots$

$x_0$	$y_0$					
$x_1$	$y_1$	$a_1$				
$x_2$	$y_2$	$a_2$	$b_2$			
$x_3$	$y_3$	$a_3$	$b_3$	$c_3$		
$x_4$	$y_4$	$a_4$	$b_4$	$c_4$	$d_4$	
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\dots$

where the entries are calculated as follows:

$x_0$	$y_0$					
$x_1$	$y_1$	$\frac{y_1 - y_0}{x_1 - x_0}$				
$x_2$	$y_2$	$\frac{y_2 - y_2}{x_2 - x_1}$	$\frac{a_2 - a_1}{x_2 - x_0}$			
$x_3$	$y_3$	$\frac{y_3 - y_2}{x_3 - x_2}$	$\frac{a_3 - a_2}{x_3 - x_1}$	$\frac{b_3 - b_2}{x_3 - x_0}$		
$x_4$	$y_4$	$\frac{y_4 - y_3}{x_4 - x_3}$	$\frac{a_4 - a_3}{x_4 - x_2}$	$\frac{b_4 - b_3}{x_4 - x_1}$	$\frac{c_4 - c_3}{x_4 - x_0}$	
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\dots$