n = the number of trapezoids for the summation
h = the length of x_i - x_{i-1}

Trapezoidal Method

$$\int_0^{0.5} sin(\pi * x)dx$$

The value of $\int_0^{0.5} sin\,(\pi * x)dx$ = 0.318309886

Area under the curve using the Trapezoidal Method of integration

	h	**h/2**	**h/4**	**h/8**	**h/16**	**h/32**	**h/64**
	n = 1	**n = 2**	**n = 4**	**n = 8**	**n = 16**	**n = 32**	**n = 64**
Area	0.25	0.3017767	0.3142087	0.3172866	0.3180542	0.3182459	0.3182939

	h/128	**h/256**	**h/512**				
	n = 128	**n = 256**	**n = 512**				
Area	0.3183059	0.3183089	0.3183096				

Using the trapezoidal method of integration :

The real value of $\int_0^{0.5} sin(\pi * x)$ = 0.318310989 in order for us to use the Trapezoidal Method of integration to get to the seventh decimal place accuracy we had to divide the graph into ten pieces to come close to the result. The area calculated using n = 512 is 0.3183096 compared to the real result which was 0.318310989. The calculated difference is $1.389\,\varepsilon^{-}6$.

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$$\int_{0.5}^{2} e^{(-x^2/2)}dx$$

The value of $\int_{0.5}^{2} e^{(-x^2/2)}dx = 0.71636279$

Area under the curve using the Trapezoidal Method of integration:

	h	h/2	h/4	h/8	h/16	h/32	h/64
	n = 1	**n = 2**	**n = 4**	**n = 8**	**n = 16**	**n = 32**	**n = 64**
Area	0.7633741	0.7250621	0.7184033	0.7168651	0.7164879	0.7163940	0.7163706

	h/128	h/256	h/512	h/1024	h/2048	h/4096	
	n = 128	**n = 256**	**n = 512**	**n = 1024**	**n = 2048**	**n = 4096**	
Area	0.7163647	0.7163632	0.7163629	0.7163628	0.7163628	0.7163627	

For this equation it took n = **4096**, where n is the number of trapezoids used to get to a seven decimal place accuracy. The difference between the real value of the integral and n = **4096** is 0.71636279 - 0.7163627 =0.00000009.

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$$\int_0^1 Sinc(2*\pi*x)dx \text{ ,where } \{Sin(2*\pi*x)/(2*\pi*x) \text{ } if\, x \neq 0\text{ , } 1 \text{ } if\, x = 0 \} = 0.22570583$$

	h	h/2	h/4	h/8	h/16	h/32	h/64
	n = 1	**n = 2**	**n = 4**	**n = 8**	**n = 16**	**n = 32**	**n = 64**
Area	0.5	0.1666666666666	0.228680242338	0.225667922	0.22570595722	-6.760847	0.225705833

For this equation it took n = 64 pieces to get to a seventh decimal place accuracy. The difference between the real value and the value of the integral of n = 64 is
0.22570583 - 0.225705833 = 0.00000003

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Romberg Method

$$\int_{0}^{1/2} sin(\pi * x)dx = 0.318310989$$

pieces	Iteration 0	Iteration 1	Iteration 2	Iteration 3	Iteration 4
1	0.25				
2	0.301776695	0.31903559372			
4	0.314208718	0.31835272	0.3183072013		
8	0.3172865746	0.31831252	0.31830984678	0.31830988877	
16	0.31805418	0.318310050	0.31830988557	0.3183098861	0.31830988618

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$$\int_{0.5}^{2} e^{-x^2/2}dx = 0.71636279$$

pieces	Iteration 0	Iteration 1	Iteration 2	Iteration 3	Iteration 4
1	0.76337413936				
2	0.7250620910	0.71229140822			
4	0.71840326541	0.71618365687	0.71644314012		
8	0.716865093	0.71635236941	0.71636361692	0.7163623546	
16	0.71648788874	0.71636215385	0.71636280614	0.71636279327	0.7163627949

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$\int_0^1 Sinc(2 * \pi * x)dx$, where $\{Sin(2 * \pi * x)/(2 * \pi * x)\ if\ x \neq 0,\ 1\ if\ x = 0\ \}$ = 0.22570583

pieces	Iteration 0	Iteration 1	Iteration 2	Iteration 3	Iteration 4	
1	0.5					
2	0.25	0.16666666				
4	0.23110329	0.22480439	0.22868024			
8	0.22701938	0.22565807	0.22571498	0.22566792		
16	0.22603206	0.22570295	0.22570595	0.22570580	0.22570595	
32	0.22578725	0.22570565	0.22570583	0.22570583	0.22570583	0.22570583