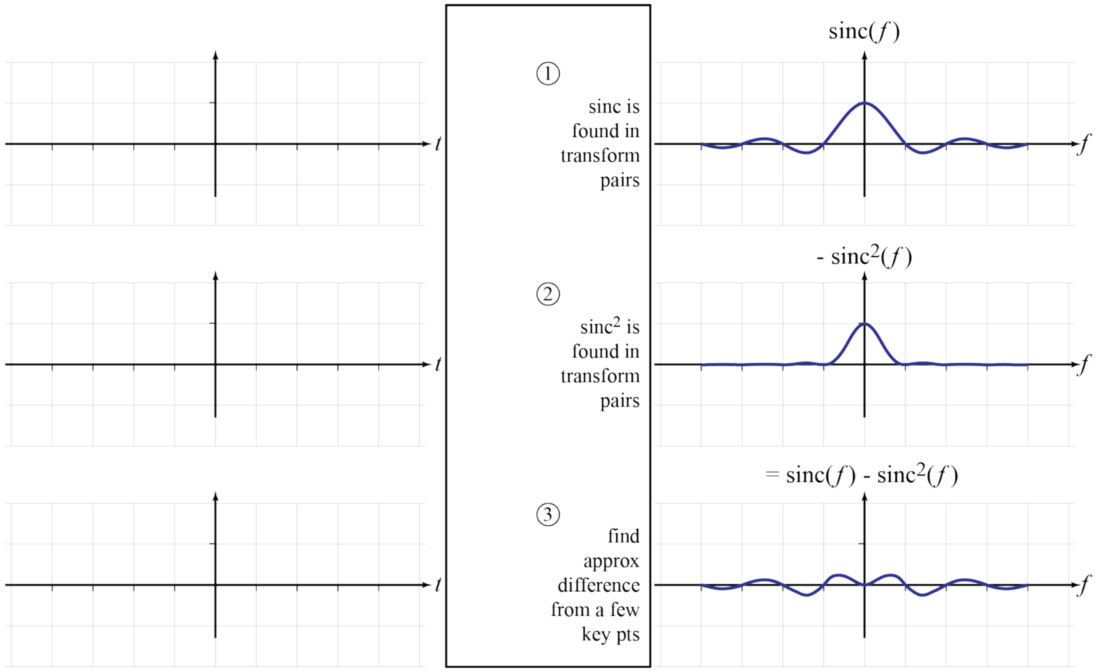
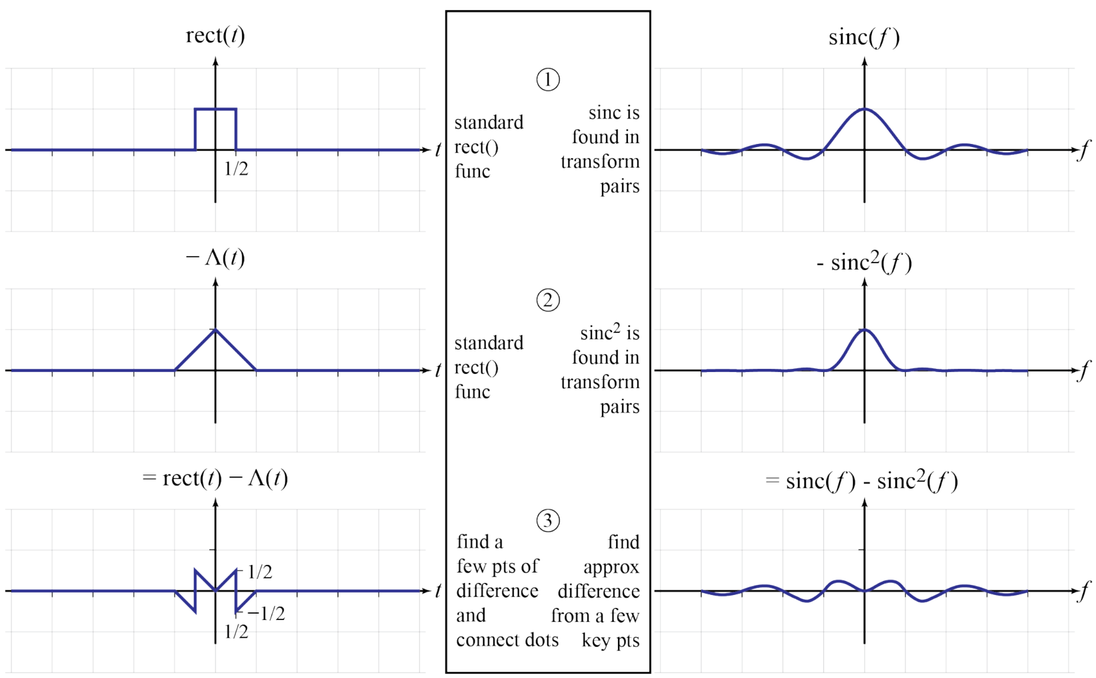
EX: Complete the left side of the Rosetta Stone diagram below to find the inverse Fourier transform of $X(f) = \mathrm{sinc}(f) - \mathrm{sinc}^2(f)$.



SOLN: Use Fourier transform pairs to complete the first two lines. For the third line, go to key points in time to find the difference of the functions, and connect those points.



For example, we have the following values of $\text{rect}(t)$, $\Lambda(t)$, and $\text{rect}(t)-\Lambda(t)$:

time			*function value*			*slope*
t	$\text{rect}(t)$	$\Lambda(t)$	$\text{rect}(t)-\Lambda(t)$	$\frac{d\text{rect}(t)}{dt}$	$\frac{d\Lambda(t)}{dt}$	$\frac{d\text{rect}(t)-\Lambda(t)}{dt}$
-1−ε	0	0	0	0	0	0
-1+ε	0	ε	−ε	0	1	−1
-1/2−ε	0	1/2−ε	−1/2+ε	0	1	−1
-1/2+ε	1	1/2+ε	−1/2−ε	0	1	−1
-ε	1	1−ε	ε	0	1	−1
0	1	1	0	0	?	indeterminate
+ε	1	1−ε	ε	0	−1	1
1/2−ε	1	1/2+ε	1/2−ε	0	−1	1
1/2+ε	0	1/2−ε	1/2+ε	0	−1	1
1−ε	0	ε	ε	0	−1	1
1+ε	0	0	0	0	−1	1

Note: ε is a vanishingly small value

Also, if we are summing two linear functions, as we are doing here, the slope of the sum is the sum of the slopes. So straight lines must connect the values calculated above.

If we have curved shapes, connecting a few points with curved shapes is usually enough for an approximate solution.

REF: Ronald Bracewell, *The Fourier Transform and its Applications*, 2nd Ed., New York, NY: McGraw-Hill, 1978. ISBN 0-07-007013-X