9. **Arfken, p. 465, Prob. 7.2.14 a) and b) (p. 477, Prob. 7.1.14 a) and b), 6th Ed.). For a)**, It Is Probably Best To Write the Cosine Function As the Real Part Of the Complex Exponential, $\cos x = \mathrm{Re}\, e^{ix}$. It Is Probably Best To Consider Adding the Semicircular Contour In the Complex Plane At Infinity, $R \to \infty$, Where the Real Integration Variable Gets Replaced With the Complex Variable, $x \to z = \mathrm{R}e^{i\theta}$, And the Integration Is Over the Angle, $0 \le \theta < \pi$, In Order To **Rewrite the Real Integral In Terms Of a Closed Loop Contour Integral Which Includes the Real Axis And the Semicircle In the Upper Half Plane**. In Order To Do This, **You Will Need To Show That the Integral In the Upper Half Plane Is Zero**, Which Shouldn't Be too Difficult, Since the Integral, Including the Differential Element, Will Go To Zero As the Inverse Of the Radius, $\lim_{R\to\infty} A\frac{R}{R^2}$. Given all of This, You Will Then be able to Utilize the Residue Theorem To Simply Perform the Integral. **Also, As Stated, Give the Result For** $\cos x \to \cos kx$. **For b)**, You Can Use the Same Procedure, While Writing the Sine Function As the Imaginary Part Of the Complex Exponential, $\sin x = \mathrm{Im}\, e^{ix}$; However, In Order To Transform the Real Integral In Terms Of a