

## Exercise 1

In Exercises 1 through 4, take the indented contour in Fig. 101 (Sec. 82).

Derive the integration formula

$$\int_0^{\infty} \frac{\cos(ax) - \cos(bx)}{x^2} dx = \frac{\pi}{2}(b - a) \quad (a \geq 0, b \geq 0).$$

Then, with the aid of the trigonometric identity  $1 - \cos(2x) = 2 \sin^2 x$ , point out how it follows that

$$\int_0^{\infty} \frac{\sin^2 x}{x^2} dx = \frac{\pi}{2}.$$