1. Evaluate the integral in two different ways (a) directly, (b) by rewriting the integral as the sum of the integrals of the real and imaginary part of the integrand.

$$\int_0^{\pi/2} e^{(1 + 2i)t} \, dt$$

2. Evaluate each integral

(a) $$\int_0^1 \frac{dt}{t - i}$$

(b) $$\int_0^\pi \sin(t + i) \, dt$$


4. Let $$f(z) = \pi$$. Evaluate $$\int_C f(z) \, dz$$ for the following contour $$C$$.

(a) $$z = e^{i\theta}, \quad \frac{\pi}{2} \leq \theta \leq \frac{3\pi}{2}$$

(b) $$C$$ is the closed contour $$C_1 + C_2 + C_3$$ where

- $$C_1 : y = x^2$$, from (0, 0) to (1, 1)
- $$C_2$$: the line segment from (1, 1) to (2, 0)
- $$C_3$$: part of the x-axis from (2, 0) to (0, 0)