Evaluate the integral $\oint_C \frac{e^{i\pi z}}{z(z-4i)^2} \, dz$ along the closed contour $C$, where $C$ is

(a) $|z - 2i| = 1$ (1 points)

(b) $|z| = 1$ (3 points)

(c) $|z - 3i| = 2$ (3 points)

(d) $|z| = 5$ (3 points)