Reading: BKRW Section A.9; BKRW Chapter 2, Sections 1-4.
Supplementary Reading: VdVW, Chapter 3.10.

1. Show that with

$$d_{TV}(P,Q) \equiv \frac{1}{2}\int |dP - dQ| = \frac{1}{2}\int |p-q| d\mu$$

and $\pi(P,Q) \equiv ||P \wedge Q||_1 \equiv \int p \wedge q \, d\mu$, then

$$d_{TV}(P,Q) = 1 - \pi(P,Q) .$$

2. Show that with $\rho(P,Q) \equiv \int \sqrt{dP dQ} = \int \sqrt{pq}\, d\mu$ we have

$$\pi^2 \le \rho^2 \le 1-(1-\pi)^2 = \pi(2-\pi) \le 2\pi .$$