1. Consider the following 2-region linear demand-and-supply setup:

**Region 1:**

\[ D_1(p_1) = 62 - 3p_1 \]
\[ S_1(p_1) = 20 + 5p_1 \]

**Region 2:**

\[ D_2(p_2) = 42 - 5p_2 \]
\[ S_2(p_2) = 26 + p_2 \]

Assume that the transport cost between the two regions is \( k \) per unit shipped.

Derive formulas for the equilibrium prices in the two regions when interregional trade becomes possible as a function of the transport costs \( k \); and find those prices for the case when \( k = 1 \). What is the equilibrium quantity shipped in this case? What is the maximum transport cost consistent with trade being possible?

**Hints:** you can answer most of this problem via the following steps:

(a) Find the autarkic price in Region 1
(b) Find the autarkic price in Region 2
(c) Decide which region will import and which will export the good.
(d) Find the excess demand function for the importing region
(e) Find the excess supply function for the exporting region
(f) Write down the equilibrium price condition when trade can take place
(g) Set excess demand equal to excess supply (to ensure that trade balances); plug in the equilibrium price condition and solve for the remaining price; the solution will depend on \( k \).
(h) Plug in \( k = 1 \) to find this price; use the equilibrium condition to find the other.
(i) Plug a price into the excess supply or excess demand functions to get the equilibrium quantity shipped. (You may want to confirm that they both give the same answer).