Problem 1: The (hypothetical) four-firm concentration ratio for a number of markets is given below. For each market comment on the usefulness of this measure for diagnosing the presence of monopoly power in the market.

(a) the airline route between San Francisco and Los Angeles: 0.95 very concentrated
(b) all domestic airline routes 0.50 not concentrated
(c) fluid milk 0.18 not concentrated
(d) steel 0.45 not concentrated
(e) pharmaceutical preparations 0.26 not concentrated
(f) metal cans 0.90 very concentrated
(g) newspapers 0.17 not concentrated
(h) soaps and detergents 0.62 not too concentrated
(i) radio and television 0.34 not concentrated
(j) motion picture theaters 0.58 not too concentrated

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1.

\[ CR_{4FT} = 0.48 + 0.3 + 0.07 + 0.06 = 0.91 \]

\[ CR_{4TP} = 0.3 + 0.2 + 0.16 + 0.12 = 0.78 \]

\[ CR_{4PT} = 0.37 + 0.18 + 0.12 + 0.11 = 0.78 \]

2.

\[ HHI_{FT} = .48^2 + .3^2 + .07^2 + .06^2 + .09^2 \]
\[ = .3370 \]

\[ HHI_{TP} = .30^2 + .2^2 + .16^2 + 0.12^2 + .05^2 + .16^2 \]
\[ = 0.1981 \]

\[ HHI_{PT} = .37^2 + 0.18^2 + .12^2 + 0.11^2 + .04^2 + .18^2 \]
\[ = 0.2298 \]

3. Given the highest four-firm concentration ratio and a very high \( HHI \), facial tissue is the most concentrated with 2 firms controlling 78% of the market.

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Given a downward sloping demand curve, Monopoly Air could probably fill the planes if it lowered its price. At issue here is the cost of production versus the price charged. In order to
determine if this is a natural monopoly, it would be useful to have data on the demand function and the cost function for production of passenger miles. Only if one large firm can meet the market demand at cost less than the two firms is there a natural monopoly.

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We can write the Lerner index as follows

\[ \ell = \frac{P - MC}{P} = 1 - \frac{MC}{P} \]

First note that prices and MC are always positive. Then note that a profit maximizing firm will only operate at point where \( P > MC \). This means that the ratio \( MC/P \) is always less than one which means that \( \ell \) is always less than one and greater than 0.

Given that \( \ell \leq 1 \), it is clear that \( |\varepsilon| \geq 1 \) for a monopolist. In particular

\[ \ell = \frac{1}{|\varepsilon|} \]
\[ \ell \leq 1, \]
\[ \Rightarrow \frac{1}{|\varepsilon|} \leq 1 \]
\[ \Rightarrow 1 \geq |\varepsilon|. \]