**P3.5 Demand Function.** The Creative Publishing Company (CPC) is a coupon book publisher

with markets in several southeastern states. CPC coupon books are either sold directly to the

public, sold through religious and other charitable organizations, or given away as promotional

items. Operating experience during the past year suggests the following demand

function for CPC's coupon books:

 Q = 5,000 - 4,OOOP + 0.02Pop + **0.375/** + *1.5A*

where Q is quantity, P is price ($), *Pop* is population, *I* is disposable income per household ($),

and *A* is advertising expenditures ($).

A. Determine the demand faced by CPC in a typical market in which P = $10, *Pop =* 1,000,000

persons, I = $40,000, and *A =* $10,000.

B. Calculate the level of demand if CPC increases annual advertising expenditures from $10,000 to $15,000.

C. Calculate the demand curves faced by CPC in parts A and B.

**P3.6 Demand Curves.** The Eastern Shuttle, Inc is a regional airline providing shuttle service between New York and Washigton DC. An analysis of the monthly demand for service has revealed the following demand relation:

Q = 26,000 – 500P – 250Pog + 200*I*b – 5000S

Where Q is quantity measured by the number of passengers per month, P is price ($), P og is a regional price index for other consumer goods (1967 = 1.00),*I* b is an index of business activity, and S, a binary or dummy variable, equals 1 in summer months and 0 otherwise.

1. Determine the demand curve facing the airline during the winter month of January if P og = 4 and *I*b = 250.
2. Determine the demand curve facing the airline, quantity demanded, and total revenues durng the summer month of July if P = $100 and all other price-related and business activity variables are as specified previously.

**P3.7** **Supply Function**. A review of industry-wide data for the jelly and jam manufacturing industry suggests the following industry supply function:

Q = -59,000,000 + 500,000P – 125,000P L

 -500,000Pk + 2,000,0000W

Where Q is cases supplied per ear, P is the wholesale price per case ($), P l is the average price paid for unskilled labor ($), Pk is the average price of capital (in %), and W is weather measured by the average seasonal rainfall in growing areas (in inches).

1. Determine the industry supply curve for a recent year when P l = $8, Pk = 10%, and W = 20 inches of rainfall, Show the industry supply curve with quantity expressed as a function of price and price expressed as a function of quantity.
2. Calculate the quantity supplied by the industry at prices of $50, $60, and $70 per case.
3. Calculate the prices necessary to generate a supply of 4 million, 6 million, and 8 million cases.

**P3.8**

**Supply Curve Determination.** Olympia Natural Resources, Inc., and Yakima Lumber, Ltd

supply cut logs (raw lumber) to lumber and paper mills located in the Cascade Mountain

region in the state of Washington. Each company has a different marginal cost of production

depending on its own cost of landowner access, labor and other cutting costs, the distance *cut*

logs must be shipped, and so on. The marginal cost of producing one unit of output, measured

as 1,000 board feet of lumber (where 1 board foot is 1 square foot of lumber, 1-inch thick), is

MC0 = $350 + $0.00005Q0 (Olympia)

MCy = $150 + $0.0002QY (Yakima)

The wholesale market for cut logs is vigorously price competitive, and neither firm is able tol

charge a premium for its products. Thus, P = *MR* in this market.

A. Determine the supply curve for each firm. Express price as a function of quantity and

quantity as a function of price. (Hint: Set P = MR = MC to find each firm's supply curve.)

B. Calculate the quantity supplied by each firm at prices of $325, $350, and $375. What is the

minimum price necessary for each individual firm to supply output?

C. Assuming these two firms make up the entire industry in the local area, determine the industry supply curve when P < $350.

D. Determine the industry supply curve when P > $350. To check your answer, calculate quantity at an industry price of $375 and compare your result with part B.