

ECON 332
 H. Fretwell
 Homework #2
 DUE: Tuesday, Oct 7
 20 points

Name: _____

1. Suppose that a fishery is characterized by the following relationship between operating fishing boats and total product (assume this information is translated from the population/yield relationship).

The price per ton of fish (P) is \$1000/ton (assume all fish caught can be sold).

The cost to operate a fishing boat for a year is \$4000.

Fill in the total revenue (TR), total cost (TC), marginal revenue (MR), marginal cost (MC), and average revenue (AR) columns of the table using the following formulas.

$$TR = TP * P$$

$$TC = \# \text{ of boats} * \text{Cost/boat}$$

$$MR = \text{change in TR} / \text{change in } \# \text{ of boats}$$

$$MC = \text{change in TC} / \text{change in } \# \text{ of boats}$$

$$AR = TR / \# \text{ of boats}$$

# of boats (effort)	Total Product (TP) (tons of fish)	TR	TC	MR	MC	AR
0	0					
100	1200					
200	2200					
300	2800					
400	3000					
500	2800					
600	2400					
700	1600					
800	800					
900	0					

B.) Construct a graph showing total revenues and total costs in the fishery as a function of the number of boats operating.

C.) Construct a graph showing marginal revenues, marginal costs, and average costs in the fishery as a function of the number of boats operating.

D.) Using your graphs, describe the equilibrium in this population in the following four cases:

i. A state with no fishing industry.

ii. A fishing industry at maximum sustainable yield.

iii. A fishing industry operating at profit maximization.

iv. A fishing industry characterized by open access.

D.) What does this economic analysis suggest concerning government policy on fisheries management?

2. The (hypothetical) marginal benefit (inverse demand) functions for agricultural and residential water users in Montana are:

$$\text{Agriculture: } MB_a = 60 - 20Q_a$$

$$\text{Residential: } MB_r = 160 - 80Q_r$$

where MB is in dollars and Q is in millions of acre feet. All water is surface water.

A.) Using the inverse demand functions, calculate the amount of water allocated to each use to maximize the net benefits if there are 4 million acre feet of water. Show your work.

B.) How would the water be allocated to each user if agricultural users had senior rights to the water under the prior appropriations rule?

C.) Give 2 alternative policies that may help western states allocate water more efficiently than the originally defined prior appropriation rules. Explain using economic reasoning.