Solving part f of the problem set:

You have two individual demand curves:

$P = 1000 - Q^{US}$ and $P = 500 - Q^{CAN}$

The individual marginal revenue curves were given as:

$MR^{US} = 1000 - 2Q^{US}$ and $MR^{CAN} = 500 - 2Q^{CAN}$

Now, with a combined market (unable to separate the U.S. market from the Canadian market) the demand curve (one) faced by the pharmaceutical company intersects the price axis at 1000 as before, and is written as follows:

$P = 1000 - Q$ [for $0 < Q < 500$] and $P = 750 - .5Q$ [for $500 < Q < 1500$].

The demand curve intersects the price axis at P = \$1,000 (Q = 0), has a slop of -1 for Q between 0 and 500, and then kinks out so that it has a slope of -½ (rise is 1 and run is -2) for Q between 500 and 1,500, which is here the new demand curve intersects the Q axis. This can be seen in the Q(Combined) column below.

Price	Q(US)	Q(CAN)	Q(Combined)
\$1,000.00	0	0	0
\$900.00	100	0	100
\$800.00	200	0	200
\$700.00	300	0	300
\$600.00	400	0	400
\$500.00	500	0	500
\$400.00	600	100	700
\$300.00	700	200	900
\$200.00	800	300	1100
\$100.00	900	400	1300
\$-	1000	500	1500

We can now figure out the marginal revenue functions for this demand curve. (Since the demand curve is kinked it will have two marginal revenue functions.)

$\mathbf{MR = 1000 - 2Q}$ [for $0 < Q < 500$] and then $\mathbf{MR = 750 - Q}$ [for $500 < Q < 1500$].

Using both of these marginal revenue functions and your marginal cost function, set marginal revenue equal to marginal cost to determine which of the two resulting price-quantity combinations maximizes the pharmaceutical company's profits. That is, find the quantities that equate each of the marginal revenue functions with the firm's marginal cost, plug these numbers back into their respective demand function segments above (i.e., for $Q \leq 500$ use the first demand segment, and for $Q > 500$ use the second demand segment) and then determine which of these two price-quantity combinations maximizes the firms profits given that it has to charge the same price in both markets.