

**41. Correct. The answer is true.** Above the kink, OPEC's demand ( $Q_o$ ) is world demand ( $Q_w$ ) minus the supply of the fringe ( $Q_f$ ) represented by the inverse marginal cost of the fringe.  $Q_o = Q_w - Q_f = 25 - 0.2P - (-30+0.5P) = 55 - 0.7P$ . Then inverse OPEC demand is  $P = 78.571 - 1.429Q_o$  and  $MR = 78.571 - 2.858Q_o$ . Setting OPEC's marginal revenue equal to marginal cost  $78.571 - 2.858Q_o = 10 + 0.5Q_o$ . Solving yields  $Q_o = 17.442$ . Then  $P = 78.571 - 1.429*17.442 = 53.646$ . We need to check whether this production is to the left of the kink. The kink is at a price where the fringe produces nothing or where  $P = 60 + 2*0 = 60$ . World demand at a price of 60 is  $Q_w = 25 - 0.2*60 = 13$ . Since  $Q_o = 17.442$  is greater than 13, we are not to the left of the kink. So now check to the right of the kink, where the fringe is out of the market and OPEC faces world demand. Set OPEC's marginal revenue from world demand ( $125-10Q$ ) equal to OPEC's marginal cost ( $20+0.5Q_o$ ). Solving yield  $Q_o=10$ . Since  $Q_o$  is to the left of the kink, this is not the solution either. Therefore we must be at the kink, where  $P = 60$  and  $Q_o=13$ . OPEC's profits are:

$$P * Q_o - \int_0^{Q_o} MC_o = 60 * 13 - \int_0^{13} (20 - 0.5Q_o)dQ_o = 477.75$$

