Total, average, and marginal revenue

Let $P = f(Q)$ be a demand schedule facing a firm. Then the firm's revenue, assuming it must charge the same price for all units sold, is $R(Q) = QP = Qf(Q)$.

The firm's marginal revenue, the change in total revenue associated with the sale of one more unit, is the slope of the total revenue function: $MR = \mathrm{d}R(Q)/\mathrm{d}Q = R'(Q)$. Using the product rule for differentiation, $R'(Q) = Qf'(Q) + f(Q)$. Average revenue is simply total revenue divided by output: $AR = Qf(Q)/Q = f(Q) = P$.

Suppose markets are competitive. From the firm's perspective, then, price is constant over all reasonable ranges of output so that $f'(Q) = 0$. In that special case, $MR = f(Q) = P$. That is, the firm's marginal revenue and average revenue are both equal to the product price.