

30. Correct. The answer is true. To maximize profits, the price discriminating monopolist would produce when $MR = MC$. For a perfectly price discriminating monopolist

$$P = 50 - 0.25Q = MR = 50 - 0.25$$

or the demand curve.

$$50 - 0.25Q = 2.5Q,$$

$$Q = 50/2.75 = 18.18.$$

Substituting Q into demand curve, $P = 50 - 0.25*18.18 = \$45.45$.

Total profits for this monopolist are the total area under the demand curve minus the total area under the marginal cost curve. In general notation, profits would be the integral of the demand curve from 0 to 18.18 minus the integral of the marginal cost curve from 0 to 18.18 or

$$\int_0^{18.18} (50 - 0.25q) dq - \int_0^{18.18} (2.5Q) dq$$

The integral of the demand curve is

$$50q - 0.125q^2 \Big|_0^{18.18} = 50*18.18 - 0.125*(18.18)^2 - (50*0 - 0.125*(0)^2) = 867.7.$$

The integral of the marginal cost curve is

$$1.25 * q^2 \Big|_0^{18.18} = 18.18^2 * 1.25 - 0^2 * 1.25 = 413.14.$$

Total profits for the perfectly discriminating monopolist are

$$\text{\$} = 867.7 - 413.14 = 454.56.$$