Monopoly Review – Cost and Demand Approximation

A profit maximizing monopolist charges \$20 and sells 100 units. Elasticity of demand is -2.5. The monopolist's cost function is $C(Q)=F+cQ$ where F is a fixed cost and c is the constant per unit variable cost.

a) What is the per unit variable cost?

b) What is the highest fixed cost could be if the monopolist has not chosen to exit the industry?

c) Write a linear approximation of both demand and inverse demand around the current price. Hint, use the formula for point elasticity and the current price and quantity, then rearrange for Q to get demand and P to get inverse demand.

a) $MR=P(1+1/\eta_D)=c$, $20(1-2/5)=c$, $c=12$.

b) $\pi=(20-12)100-F=800-F$. Since the monopolist is still in business, $F \leq 800$.

c) $\eta_D=[(Q-Q_1)/(p-p_1)]\times(p_1/Q_1)$

$-2.5=[(Q-100)/(p-20)]\times(20/100)$

$-2.5\times5\times(p-20)=Q-100$

$-12.5p+250=Q-100$

$350=Q+12.5p$

From there, rearrange for whichever you need.

Demand: $Q=300-12.5p$

Inverse Demand: $p=(350-Q)/12.5=28-0.08p$.