$STC(Q) = 100 + 20Q + Q^2$.

$SFC = 36$, $NSFC = 64$

$SMC(Q) = 20 + 2Q$

$AVC(Q) + \frac{NSFC}{Q} = \frac{20Q + Q^2}{Q} + \frac{64}{Q}$

$= 20 + Q + \frac{64}{Q}$.

=> then we have to find the minimum value of this function.

1) $20 + Q + \frac{64}{Q} = MC = 20 + 2Q$

2) mathematically calculate the $\min(20 + Q + \frac{64}{Q})$.

For Q^* solve $p = SMC(Q^*)$

$p = 20 + 2Q$

$Q^* = \frac{p}{2} - 10$

Long-run equilibrium.

in long run there is free entry

- an equilibrium requires no firms have incentive to enter or exit
  - ↳ firm enter or exit small profits are zero $p = AC$.

by profit maximization, $p = MC$.

$D(p) = 25000 - 1000p$

$TC(Q) = 40Q - Q^2 + 0.01Q^3$

Supply: $AC = 40 - Q + 0.01Q^2$.

$MC(Q) = 40 - 2Q + 0.03Q^2$