

# Think Break #5 Answer

Choose  $X$  to Maximize  $\pi(X) = 10(30 + 5X - 0.4X^2) - 2X - 18$

1) What  $X$  satisfies the FOC? FOC  $\pi'(X) = 0$ , solve for  $X$

$$10(5 - 0.8X) - 2 = 0$$

$$50 - 8X = 2 \quad \rightarrow \quad 48 = 8X \quad \rightarrow \quad X = 6$$

2) Does this  $X$  satisfy the SOC for a maximum?

SOC:  $\pi''(X) < 0$   $\pi''(X) = -8 < 0$ , so  $X = 6$  is a max

3) What is  $\pi(X)$  at  $X = 6$ ?  $\pi(6) = 10(30 + 5(6) - 0.4(6^2)) - 2(6) - 18$

$$\pi(6) = 10(45.6) - 12 - 18 = 456 - 30 = 426$$