Suppose the weekly demand for a certain brand of blue ray players is given by $D(q) = 200 - 5q - q^2$ dollars per player, and the supply function is $S(q) = q^2 + 4q$ dollars per player, where q is in hundreds of blue ray players per week. Find the equilibrium quantity. Round to the nearest unit.

To find q_0: $D(q) = S(q)$

$$200 - 5q - q^2 = q^2 + 4q$$

$$0 = 2q^2 + 9q - 200$$

$$q = \frac{-(9) \pm \sqrt{\overset{81 + 1600}{9^2 - 4(2)(-200)}}}{2(2)}$$

$$= \frac{-9 \pm 41}{4} = 8, \; -\frac{50}{4}$$ ← can't have negative quantity

A. 8

B. 9

C. 10

D. 7

Suppose the weekly demand for a certain brand of blue ray players is given by $D(q) = 200 - 5q - q^2$ dollars per player, and the supply function is $S(q) = q^2 + 4q$ dollars per player, where q is in hundreds of blue ray players per week. Find the equilibrium price.

To find p_0, plug q_0 into either of $D(q)$ or $S(q)$:

from previous slide

$$S(q_0) = S(8) = 8^2 + 4(8) = 64 + 32$$

A. $80

B. $92

C. $87

D. $96

Suppose the weekly demand for a certain brand of blue ray players is given by $D(q) = 200 - 5q - q^2$ dollars per player, and the supply function is $S(q) = q^2 + 4q$ dollars per player, where q is in hundreds of blue ray players per week. Find the consumers' surplus. $\int_0^{q_0} (D(q) - p_0)\,dq$

A. \$501.33

B. \$671.32

C. \$381.96

D. \$481.96

$$= \int_0^{q_0} (200 - 5q - q^2 - p_0)\,dq = (200-p_0)q - \frac{5q^2}{2} - \frac{q^3}{3} \Big|_0^{q_0}$$

$$= (200-p_0)q_0 - \frac{5q_0^2}{2} - \frac{q_0^3}{3} - \left[(200-p_0)(0) - \frac{5(0)^2}{2} - \frac{0^3}{3}\right]$$

$$= (200-96)(8) - \frac{5(8^2)}{2} - \frac{8^3}{3} = \frac{1504}{3}$$

104 160 512

Suppose the weekly demand for a certain brand of blue ray players is given by $D(q) = 200 - 5q - q^2$ dollars per player, and the supply function is $S(q) = q^2 + 4q$ dollars per player, where q is in hundreds of blue ray players per week. Find the producers' surplus. $\int_0^{q_0} (P_0 - S(q))\,dq$

A. \$511.23 $= \int_0^{q_0} (P_0 - q^2 - 4q)\,dq = P_0 q - \frac{q^3}{3} - 2q^2 \Big|_0^{q_0}$

B. \$469.33

C. \$495.28 $= P_0 q_0 - \frac{q_0^3}{3} - 2q_0^2 - \left[P_0(0) - \frac{0^3}{3} - 2(0)^2\right]$

D. \$552.19 $= 96(8) - \frac{8^3}{3} - 2(8)^2 = \frac{1408}{3}$