Econ 0100 | Homework E1
Due: Friday, November 17

Homework is designed to both test your knowledge and challenge you to apply familiar concepts in new applications. Answer clearly and completely; show your work so I can understand your thought process for partial credit; you are welcomed and encouraged to work in groups as long as your work is your own. Submit your work to the Lecture Gradescope.

The Caulron Consolidation

In the wizarding world, the invention of the self-stirring cauldron revolutionized potion-making. Since the invention was so old, through, the original patent holder has been joined in the market by many other companies replicating the self-stirring technology. Until recently the market has been stable, with no meaningful firm entry or exit. The initial market price was $P = 20$.

Firm's produce with some positive fixed costs, a marginal cost and demand curve according to the following equations.

$$MC = Q + 10$$

$$D : P = 1010 - \frac{1}{2}Q$$

In recent years a new aggresive maker, Cauldron Charmers, received venture capital funding and has begun buying up other cauldron makers and suing those who refuse. This has led to considerable consolidation since many firms exited the market, fearing legal action, and many others sold to Cauldron Charmers. Today, Cauldron Charmers sells nearly all cauldrons. Their marginal revenue after the consolidation:

$$MR = 1010 - Q$$

Use a few graphs to describe the evolution of the self-stirring cauldron market in recent years.
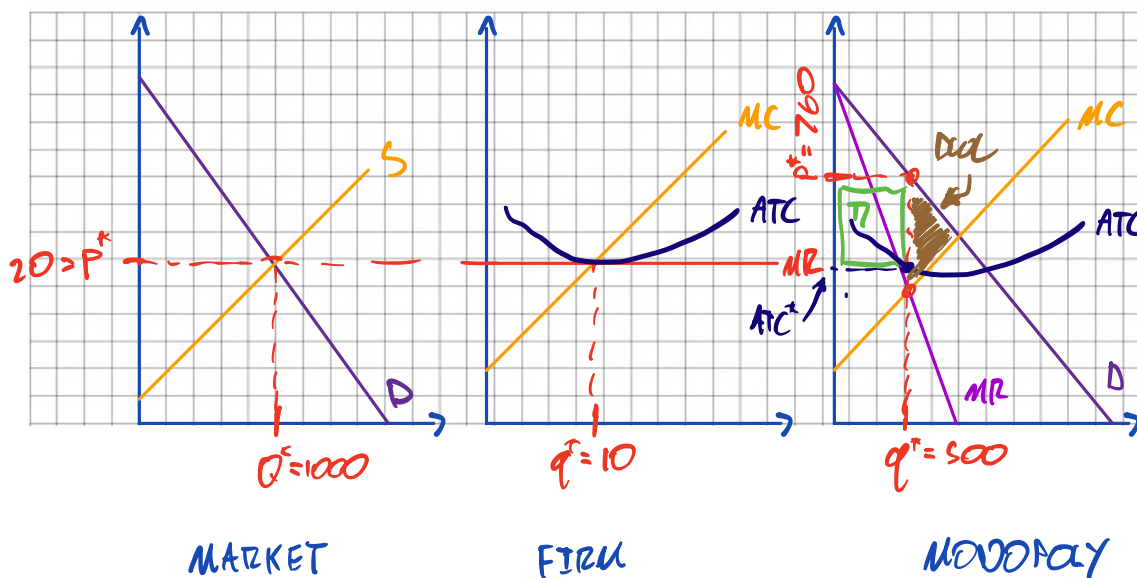
Use the following questions to guide your answers. Be sure to include your answers below on the graph above and offer a verbal description of the market consolidation above.

Question 1 | Initial Price and Quantity

Solve for and graph (above) price and quantity before the market consolidation.

$MR = MC$

$10 + q = 20$

$\boxed{q^* = 10}$ GIVEN $\boxed{P^* = 20}$

Question 2 | Initial Profit

Graph but do not solve for profit for a firm before the market consolidation.

ON GRAPH: $\pi = 0$

Question 3 | Consolidated Price and Quantity

Solve for price and quantity after the market consolidation.

$MR = MC$

$1010 - Q = 10 + Q$ $P^* = 1010 - \frac{1}{2} \cdot 500$

$1000 = 2Q$ $\boxed{P^* = 760}$

$\boxed{q^* = 500}$

Question 4 | Consolidated Profit

Graph but do not solve for the firm's profit after the market consolidation.

ON GRAPH: $\pi > 0$

Question 5 | Deadweight Loss

Solve for the deadweight loss after the market consolidation.

$DWL = \frac{1}{2}\left(760 - 510\right)\left(\frac{2000}{3} - \frac{1500}{3}\right)$

$= \frac{1}{2} \cdot 250 \cdot \frac{500}{3}$

$\boxed{DWL = \frac{250 \cdot 250}{3} \approx 20,833}$

$Q_{SP}: MB = MC$

$10 + Q = 1010 - \frac{1}{2}Q$

$\hookrightarrow Q_{SP} = \frac{2000}{3}$