You MUST SHOW YOUR WORK clearly either in the margins or on an attached sheet of paper for complete credit.

CAUTION: Be careful of the sign of the intercept on the Supply curves.

A. Review (6 pts) The market for apples is:

\[ P: 2 \leq P \leq 4 \leq 6 \leq 8 \leq 10 \] etc.,
\[ Qd: 52 \leq Qd \leq 44 \leq 36 \leq 28 \leq 20 \] etc.,
\[ Qs: 10 \leq Qs \leq 14 \leq 18 \leq 22 \leq 26 \] etc.,

1. \[ P_e = 9 \] What is equilibrium \( P \) and \( Q \)?
2. \[ Q_s = 24 \] What are the total gains from trade?

B. Market Failure (11 pts) Suppose there is an uncounted cost from the production of apples (pesticides cause damage to wildlife) so that the TRUE cost to society of producing apples is \( Q_s = 6 - 2P \).

1. At the equilibrium above (Answer to A#2) what is the TRUE cost?
2. At the equilibrium above, what is the TRUE producer surplus?
3. At the equilibrium above, what is the dead weight loss?
4. Suggest one policy that will eliminate this dead weight loss. (many correct answers)

C. Market Power.(33 pts) The market for widgets is:

\[ P: 8 \leq P \leq 16 \leq 24 \leq 32 \leq 40 \leq 48 \] etc.,
\[ Qd: 10 \leq Qd \leq 8 \leq 6 \leq 4 \] etc.,
\[ Qs: 5 \leq Qs \leq 13 \leq 15 \leq 18 \leq 21 \leq 29 \] etc.,

1. \[ Q^d = 11 - \frac{1}{2}P \] What is the equation for the demand curve (\( Qd = f(P) \))? \[ Q^s = 1 + \frac{1}{2}P \] \[ P \leq 10 \leq 6 \leq 4 \] etc.,
\[ P \leq 6 \leq 4 \leq 2 \leq 0 \] etc.,
\[ P \leq 4 \leq 2 \leq 0 \] etc.,

2. \[ P = 16 \] What is equilibrium \( P \) and \( Q \)? \[ P = 58 - 8 \] \[ Q = 9 \]
3. \[ MR = 88 - 16Q \] What is the equation for the marginal revenue curve (\( MR = f(Q) \))? \[ MC = 2Q - 2 \] \[ MR = \frac{d}{dQ} (88 - 16Q) = 0 \]
4. \[ MC = 2Q - 2 \] What is the equation for the marginal cost curve (\( MC = f(Q) \))? \[ MC = \frac{d}{dQ} (2Q - 2) = 2 \] \[ Q = \frac{58}{16} = \frac{29}{8} \] \[ Q = \frac{58}{16} = \frac{29}{8} \]
5. \[ Q = 5 \] What is the \( Q \) that maximizes producer surplus?
6. \[ P = 48 \] What is the \( P \) which maximizes producer surplus?

7. Draw a rough diagram, clearly showing equilibrium (#2) and the \( P \) & \( Q \) for the monopoly (#5 & #6).
8. \[ \Delta CS = \frac{32(4)}{2} = -224 \] What is the change in consumer surplus caused by the monopoly?
9. \[ \frac{32(4)}{2} + \frac{32(4)}{2} = \frac{200}{2} + \frac{200}{2} = 224 \] \[ P = \frac{32(4)}{2} = 5 \]
10. \[ \frac{32(4)}{2} - \frac{32(4)}{2} = \frac{200}{2} - \frac{200}{2} = 0 \] \[ P = 0 \]
11. \[ \Delta PS = -80 \] What is the dead weight loss caused by price searching?