a. TSC has a dominant strategy to open
The Nash equilibrium is TSC opening and TV not opening

b. True if a constant cost industry. Price increase above
   min AC in short-run
   ⇒ Profits
   ⇒ Induces entry
   ⇒ Shifts out SR industry
   supply curve until
   price falls back to min AC

C. Profits: \( T_1 = PQ - 10 - Q^2 \)
   Max profits: \( \frac{dT_1}{dQ} = 0 \Rightarrow P = 2Q \)
   \( MC \)
   This is the short run supply curve since the
   fixed cost of 10 is sunk

d. Uncertain
   Wage ↑ sub. effect → work more
   inc. effect → work less (if leisure is normal good)
   Total effect unclear

e. Find MRS:
   \( \frac{-MU_y}{MU_x} = \frac{-2x_1x_2}{2x_1} = -2x_2 \)
   Uncertain → depends on amount of each good that the
   consumer consumes
5. 1st degree price discrimination: Each consumer charged his or her WTP

2nd degree: Price depends on quantity

3rd degree: Price depends on some identifiable characteristic

\[
\begin{align*}
\text{MRS} &= -\frac{\text{MU}_x}{\text{MU}_y} \\
&= -\frac{2x_1}{x_2} = -\frac{2x_1}{x_1 - \frac{1}{2}x_2}
\end{align*}
\]

Well behaved: Convex, more preferred to less

b. \[
\begin{align*}
\frac{P_1}{P_2} &= \text{MRS} \\
\Rightarrow \frac{P_1}{P_2} &= -\frac{2x_1}{x_2} \\
-1 &= -\frac{2x_1}{x_2} \\
&= \frac{x_2}{x_1}
\end{align*}
\]

\[x_1 = \frac{m}{2}, \quad x_2 = \frac{m}{6}\]

2 conditions hold at optimum

\[2x_1 + 2x_2 = m\]

\[2x_1 + 2\left(\frac{1}{2}x_2\right) = m\]

\[3x_1 = m, \quad x_1 = \frac{m}{3}, \quad x_2 = \frac{m}{6}\]

C. \[
\begin{align*}
\frac{P_1}{P_2} &= \text{MRS} \\
\Rightarrow \frac{P_1}{P_2} &= \frac{2x_1 + x_2}{x_2}
\end{align*}
\]

\[2x_1 + 3x_2 = m\]

\[2x_1 + 3\left(\frac{m}{3}\right) = m\]

\[x_1 = \frac{m}{3}, \quad x_2 = \frac{m}{3}\]
Both the income and substitution effects suggest an increase in the consumption of \( x_2 \), so we can conclude that \( x_2 \) will rise.

\[ f(x_1, x_2) = (x_1)^{3/4} (x_2)^{1/4} \]
\[ = x_1^{3/4} x_2^{1/4} \]
\[ = \lambda f(x_1, x_2) \]

**b. Minimize cost:**

\[ C = 15x_1 + 5x_2 \]

Subject to the constraint \[ y = f(x_1, x_2) \]

Two conditions hold:

1. \[ \text{MRTS} = -\frac{MP_1}{MP_2} = -\frac{W_1}{W_2} \]

\[ \frac{3}{4} \frac{x_1 - x_2}{x_2} = -3 \]

\[ \frac{1}{4} \frac{x_2}{x_1} = -\frac{3}{4} \]

\[ 3 \frac{x_1}{x_2} = 3 \quad \Rightarrow \quad x_1 = x_2 \]

2. \[ y = x_1^{3/4} x_2^{1/4} \]

Substitute using 1:

\[ y = x_1^{3/4} x_1^{1/4} \]

\[ x_1 = y \quad \text{and} \quad x_2 = y \]

These are the conditional factor demand curves.

\[ C(y) = 15x_1(y) + 5x_2(y) \]
\[ = 15y + 5y = 20y \]

Would expect a price of 20 since this is marginal cost.
a. \( Q_5 = Q_0 \Rightarrow 10 + 2P = 50 - 2P \)
\[
4P = 40 \\
\therefore P = 10
\]
\( \Rightarrow Q = 30 \)

c. \( CS = \frac{1}{2} (25 - 10) (30) = 225 \)
\( PS = \frac{1}{2} (10 - -5) (30) = 225 \)

b. \( \bar{P} = 15 \)
\[
\therefore DWL = \frac{1}{2} (15 - 5) (30 - 20) \\
= 50 \]