1. Define monopolistic competition. Specifically, there are many firms, facing downwards-sloping demand curves, selling close substitutes. The minimum point of the AC curve, as shown, would not be chosen, since at lower output the firm's profit would be higher, since \( P > AC \). In the limit of equilibrium, the firm would choose to operate where \( \pi = 0 \) but a maximum when the demand curve (downwards sloping) is tangential to the AC curve. TRUE.

2. Define monopoly and revenue. For a linear demand curve, the MR curve is as shown (for uniform pricing). Revenue is a maximum when \( MR = 0 \) (see Table 17, page 2), which occurs at unity elasticity. To maximize profit, the firm chooses output \( y^* \) when \( MR(y^*) = MC(y^*) \). The lowest possible \( MC \) is zero, so the highest possible profit-maximizing \( y^* \) is when \( MR(y) = 0 \) at \( y^* \) where Revenue is maximal. If \( MC > 0 \), then \( y^* \) will be less than \( y' \). TRUE.
3. With uniform pricing, any profit-maximising firm chooses output where \( MR(y^*) = MC(y^*) \).
For a firm facing a downwards-sloping demand curve (a firm with market power), and with a single price (no discrimination), the firm will produce \( y^* \) and sell at \( p^* \).
If, however, it can practice perfect price discrimination, then the \( D \) curve becomes the \( MR \) curve, and the firm produces \( y^* \) output, selling each unit at its maximum it can along the demand curve (\( y_1 \) at \( p_1 \), \( y_2 \) at a slightly lower price, etc.). It will produce more than under uniform (single) pricing: \( y^* > y^* \). TRUE.

4. 14\(^{th}\) litre in 1978  CPI  60.5  1978
70\(^{th}\) litre in 1997  162.8  1997

Petrol prices have risen by \( 70/14 = 500\% \).
Overall prices have risen by \( 162.8/60.5 = 269\% \).
\( \therefore \) TRUE, the real price of petrol has risen.
The equivalent (real) price of petrol in 1997 of the price curve 14\(^{th}\) litre in 1978
\[ = 14 \times 162.8 \div 60.5 = 37.7 \text{ \$}/\text{litre} < 70\%. \]
TRUE
5. The cost of the two plans will differ depending on the intensity of usage. What is the level of usage (in rentals per year) at which the two plans cost the same?

Let \( x = \) number of rentals/year.

Plan A: \( C_A = 40 + 2x \)
Plan B: \( C_B = 4x \)

\( C_A = C_B \) when \( x = 20 \) rentals/year.

If \( x > 20 \), then \( C_B > C_A \).
If \( x < 20 \), then \( C_B < C_A \).

The logic is to offer a choice, depending on the consumer's expected usage, to capture more of the CS. If expected \( x \leq 20 \) rental/year, then pay $4 per rental (B), but if expected \( x > 20 \) rental/year, then sign up for plan A; the video store gets $40 even if you end up only renting 15.

Possible to offer a plan C, with, say, an annual charge of $300 and a per-rental charge of only $1.

6. $/article

\[(a) \quad MR(Q) = MC(Q^*)\] with \( P^* \) as shown, and positive \( MR \) because \( AR > AC \) at \( Q^* \).

\[P^* = 60^*/\text{article}, \quad Q^* = 2.7\text{m articles/day}\]
(b) Yes, since AC is falling over the region of demand, it seems that the P.O. has high fixed costs.

(c) As a monopoly, it would produce at $Q^* = \frac{P^*}{2 - \frac{1}{P^*}}$, where $P^*$ is the price at which marginal cost equals marginal revenue. Traditionally, post offices have been government owned (as here, water, sewerage, and other "utilities"). But not necessarily. Regulation could force higher output, lower price, and lower profit, so long as a normal return to capital is achieved.

(d) At break-even, the P.O. will operate at the level of output $Q'$ where $AR(Q') = AC(Q')$. $Q' = 4$ m articles/day, $P' = 30\$ /article.

(e) The socially efficient level would be where $P = MC(Q'')$, as shown. $Q'' = 4.3$ m articles/day, $P'' = 25\$ /article. Unfortunately, the P.O. would go out of business, since $AC(4.3) > 25\$, and $\Pi < 0$. So a natural monopoly can not operate at the socially efficient level without a subsidy.
<table>
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<th>D</th>
<th>AVC</th>
<th>TR</th>
<th>TVC</th>
<th>FC+</th>
<th>TC</th>
<th>MC</th>
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</table>

(a) Since it faces a downwards-sloping demand curve (as can be seen by the first two columns), it has market power; it can raise its price, say, from $10 to $11 without losing all its sales.

(b) See above

(c) See below

(e) From the graphs and the table, its short run profit is maximized when Q = 4000, at price $12/unit. Its profit is $3200. At this output Q:
- MR (4000) is between $900 and $700.
- MC (4000) is between $700 and $900.

(f) Depends on the FC. In the short run, TR = $4800 > TVC = $1600, so do not shut down.
In the long run, are FC > $3200? If so, then this level of profit is unsustainable, so shut down.