

NET 2021 Power Round

Milgrom Division: Macroeconomics [ANSWER KEY]

April 2021

Problem 1: The Marginal Monopolists' Market Moves (29 Points)

Part A Initially, marginal cost declines due to specialization and division of labor. This leads to the first part of the MC curve. Then, as there are fewer opportunities to specialize, marginal costs increase as each additional unit has a higher marginal cost. This is known as diminishing marginal returns. Thus, the MC curve has a “swoosh” shape. 1 point for correctly identifying specialization and/or division of labor resulting in declining MC and 1 point for correctly identifying diminishing marginal returns as a cause of increasing MC.

Part B In a monopoly, the only way for the monopolist to sell more units is to decrease the price. Thus, each additional unit has a lower marginal revenue. For example, at a price of \$10, the monopolist sells 1 unit. Total revenue is \$10. At a price of \$9, the monopolist sells 2 units, and total revenue is \$18. Marginal revenue is thus \$8; which is less than the price of \$9. So, MR declines faster than price. 2 points for correctly explaining that monopolists must lower prices to sell additional units.

Part C Profit-maximizing firms operate where $MR = MC$. So, the monopolist produces at $Q = d$. However, they charge price $P = a$, not $P = c$, because price is derived from the demand curve. This is not efficient because price does not equal marginal cost ($a \neq c$). Monopolies are never efficient, as they result in deadweight loss. $Q = d$ and $P = a$. This is not efficient, as $P \neq MC$. .5 points for correctly identifying $P = a$, .5 points for correctly identifying $Q = d$, and 1 point for correctly identifying $P \neq MC$ as a source of inefficiency.

Part D Productive efficiency occurs when we are producing at the lowest possible cost. Thus, the U-shaped ATC curve should show the minimum where $MR = MC$. 1 point for correctly drawing an ATC curve with the minimum where $MR = MC$. 2 points for correctly defining productive efficiency as production at the lowest possible cost or where marginal cost = ATC .

Part E A negative externality is a harmful, unintended consequence affecting a third party. By “third party,” we mean someone not involved in the exchange (Not the producer or the consumer). A negative externality of production is generated in the production of the good, not consumption. Any form of pollution serves as a great example. Some examples of possible government responses include:

- Tax
- Quota
- Regulation
- Educational campaign

1 point for correctly defining a negative externality, 1 point for giving a relevant example, and 2 points for naming and explaining an action the government can take.

Part F Because the marginal cost of production to society is higher than the marginal cost to the firm, the marginal social cost curve should be higher than the marginal cost curve. Another way of thinking about it: We want less of the good because of the negative externality, so we put the MSC curve to the left of the MC curve. 2 points for correctly positioning the MSC curve to the left/above the MC curve (it's fine if it's not labelled MSC as long as the label makes sense).

Part G When internalizing the externality, the MSC curve becomes the MC curve. Thus, the firm will operate as though $MSC = MC$. The same profit-maximizing rule will apply: $MR = MSC$. 3 points for correctly identifying that the firm produces where $MR = MSC$.

Part H This market is dealing with two issues: A negative externality and a monopoly. The optimal level of production should eliminate these two problems. In any market, the perfectly competitive level of production happens where $P = MC$. In this case, however, the MC curve should take into account the externality; meaning the MC curve is the MSC curve. Thus, the socially optimal level of production happens where $P = MSC$. 2 points for correctly identifying the optimal level of production as the point where $P = MSC$.

Part I These questions are meant to test economic reasoning. So, they are a bit subjective; there are reasons for and against each of them as an effective solution. Here are a few common points:

Educational Campaign

- Reduce consumer demand for widgets, therefore reducing quantity produced
- Producers may take steps to reduce the externality as a result of consumer action
- Doesn't directly address production; more of a demand-side policy
- Would just shift the optimal level of production, not reach it

Tax Production

- Forces producers to internalize the externality (Pigou)
- Politically unfeasible

Ban Production

- Would certainly eliminate the externality
- No benefit can be derived from the product at all, leading to welfare loss
- Could lead to the formation of unregulated black markets

2 points for each argument for/against, partial credit on a weak explanation.

Part J Again, this is meant to stretch economic thinking and is thus subjective. 3 points for a great argument (could contrast with other options, etc.), partial credit on a weaker answer.

Problem 2: Wait! I (won't) get it done tomorrow (12 Points)

Part A \$1000 in 4 years

Part B \$1101 in 2031

Part C \$1050 in 2025, $1050 * 1.05 = 1102.5 > 1101$

Part D this is just multiply both sides with the same scalar, so the inequality is always preserved

Problem 3: Problem 3: The Perfectly Competitive Firm (9 points)

Part A The question states this is a perfectly competitive market; in a PC market, no firms earn economic profits. Thus, this firm is not earning any profit. 1 point for correctly stating the firm will not earn profits, and 1 point for explaining that the firm does not earn profit because it is in a PC market, or proving mathematically that the firm will not profit (although I'm pretty sure this is impossible)

Part B Because perfectly competitive firms don't earn profits, they operate where price is equal to average total cost. Thus, because the market price is \$20, $ATC = \$20$. 1 point for correctly stating that $ATC = \$20$.

Part C Some possibilities:

- No barriers to entry/exit
- Homogeneous cost curves
- Homogeneous products
- Infinite buyers/sellers
- No asymmetric information
- No market frictions

1 point for each assumption correctly identified and explained.

Part D Some possibilities:

- It allows us to see where markets go wrong and compare reality to the "ideal".
- A good approximation in the long run, when all information is known, product differentiation is less important, and any firms can enter/exit the market.
- Useful in macroeconomic models, when we focus on the economy as a whole instead of individual products.
- Easier math- making certain assumptions leads to simpler equations and lets us understand models better.

2 points each for correctly identifying and explaining a reason why.