**Cost and profit maximization: Practice problem.**

Definitions: MC is the € cost of a single particular t-shirt, e.g. the cost of the 19th produced

Total cost is the € cost of all the t-shirts produced

Average total cost is the average per-item cost of all the items produced

Everything in this problem is in the time period of one day.

A t-shirt factory is squatting in an abandoned warehouse and has a rental contract for two sewing machines. It can’t get out of this contract for a while. The sewing machines contract costs a **total** of €100/day.

To make t-shirts, the factory hires workers at €50 per worker per day. The cotton is free surplus cloth and there are no costs besides the machines and the workers.

a. Which is a fixed and which is a variable cost?

b. Which cost will **not** be part of marginal cost?

Below is selected cost information for t-shirt production.

Q t-shirts MC of one t-shirt and

1 50 1 t-shirt requires 1 worker for a day.

10 10 10 t-shirts require 2 workers for a day.

20 15 20 t-shirts require 5 workers for a day.

30 20 30 t-shirts require 9 workers for a day.

40 30 40 t-shirts require 14 workers for a day.

c. Fill in this table and then stop working for now.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Q of  t-shirts | Total fixed cost | Total variable  cost | Total cost | Average variable cost | Average total cost |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 10 |  |  |  |  |  |
| 20 |  |  |  |  |  |
| 30 |  |  |  |  |  |
| 40 |  |  |  |  |  |

d. Make a diagram and plot MC and ATC accurately. (Q = 1 need not be to scale). Estimate the values if necessary. Note: your cost curves won’t look exactly like the ones in the slides, because we have discrete cost info (not continuous functions) here.

e. Using both the shut-down rule and MC = MR, figure out how much the firm should produce if price is €8? €10? €20? €30? (Estimate specific quantities produced.)

f. What’s the break-even price—at which the firm earns zero profit?

g. What is total profit at a price of €20?