Lecture 3

Pricing Decisions

Role of cost information in pricing decisions

- Price takers are those firms that have little control over the prices of their products or services.

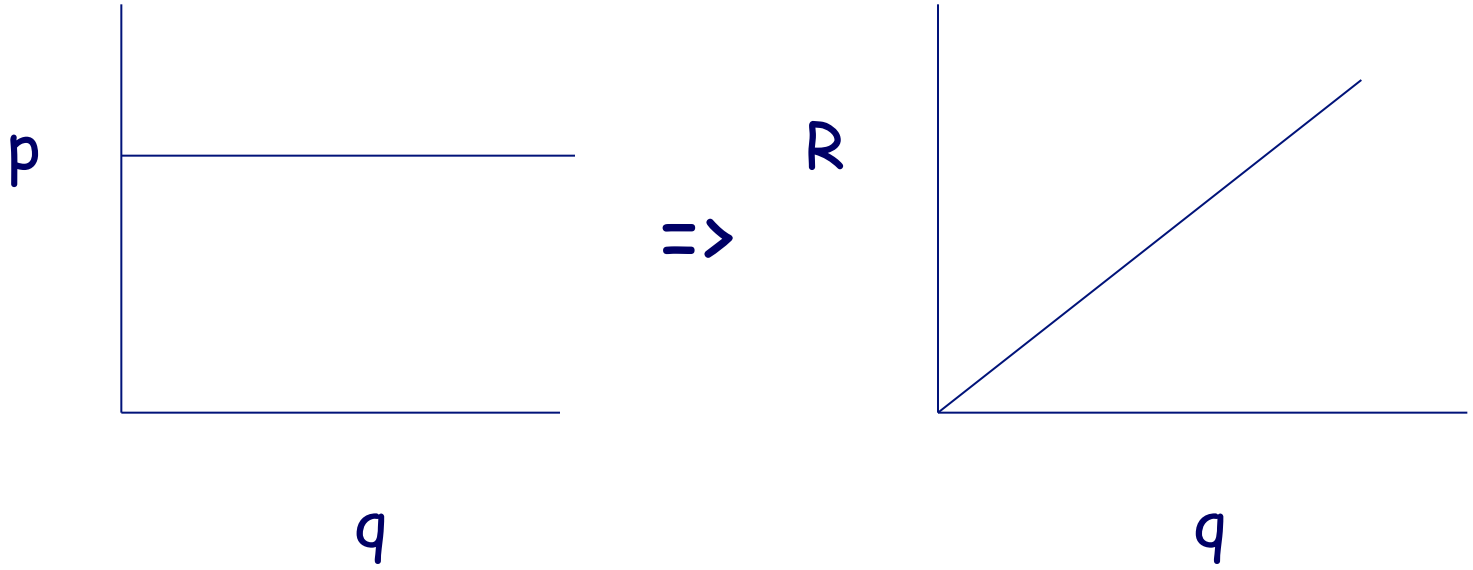
- For price takers cost information is of vital importance in deciding on the output and mix of products and services.

- Price setters are those firms that have some discretion over the setting of selling prices for their products or services.

- Cost information is of vital importance to price setters in making pricing decisions.

- Firms may be price setters for some of their products /services and price takers for others.

Price taker firm



Where
p = price per unit
q = quantity sold
R = Sales Revenue

Costs and revenues for a price taker firm

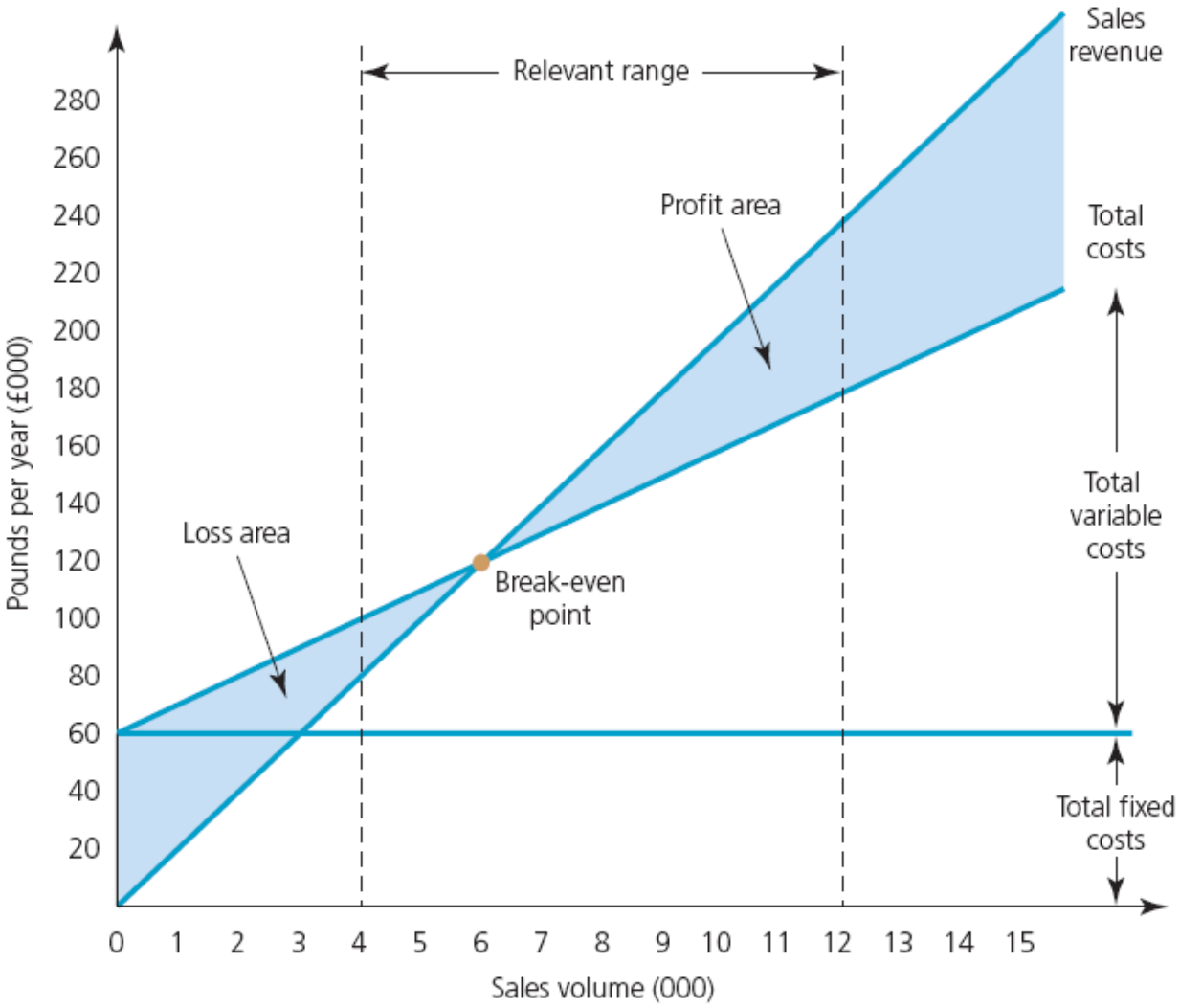


FIGURE 8.5
Break-even chart for Example 8.1

Assumes linearity of costs and revenue

No theoretical maximum to profit

From Drury Ch 8

Setting selling prices for a price setter

Broadly 2 approaches

"Demand Based"

Economist's pricing model ("theoretically superior")

Which, if the demand and cost functions are known, can, using calculus, find the profit maximising output and price.

This occurs where **MC = MR**

"Cost Based"

Broadly 2 approaches

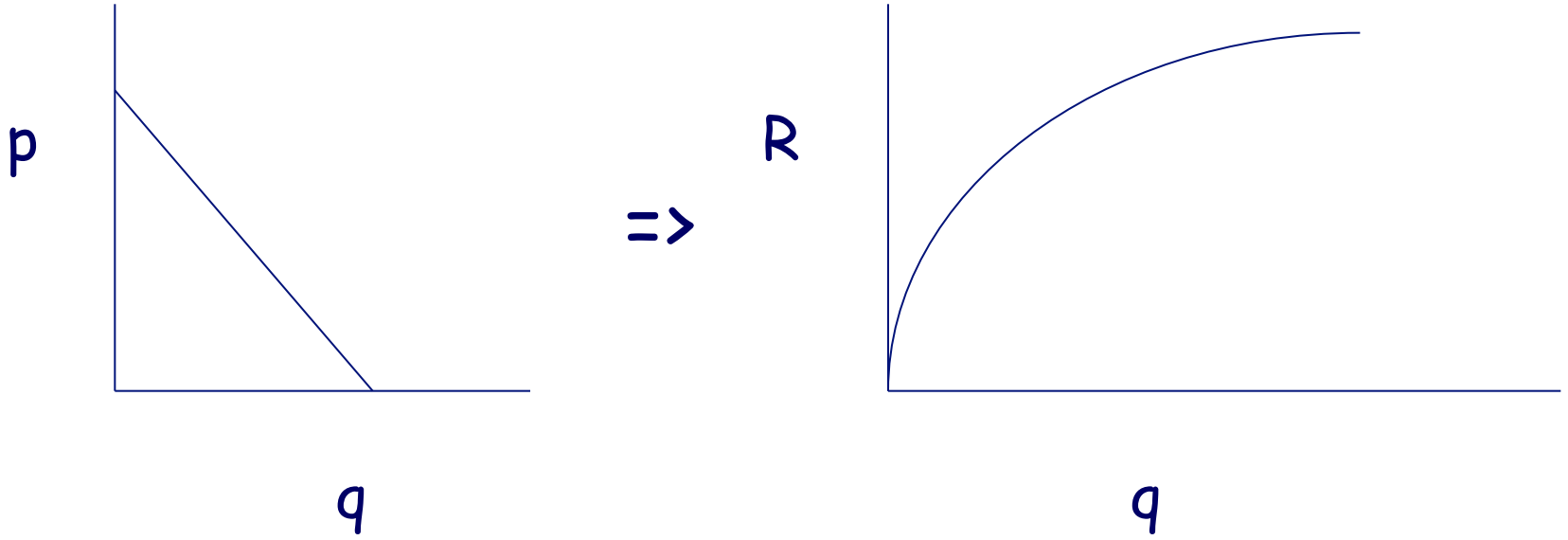
(1) "Full cost" plus or just "Cost plus"

(various approaches exist) for "normal" or "business as usual" pricing

(2) Relevant (marginal) cost plus for short term decisions when demand is low and there is spare capacity.

We'll consider the Economist's pricing model first and start by considering how revenue behaves depending on the price/quantity relationship /…

Price setting firm



p = price per unit

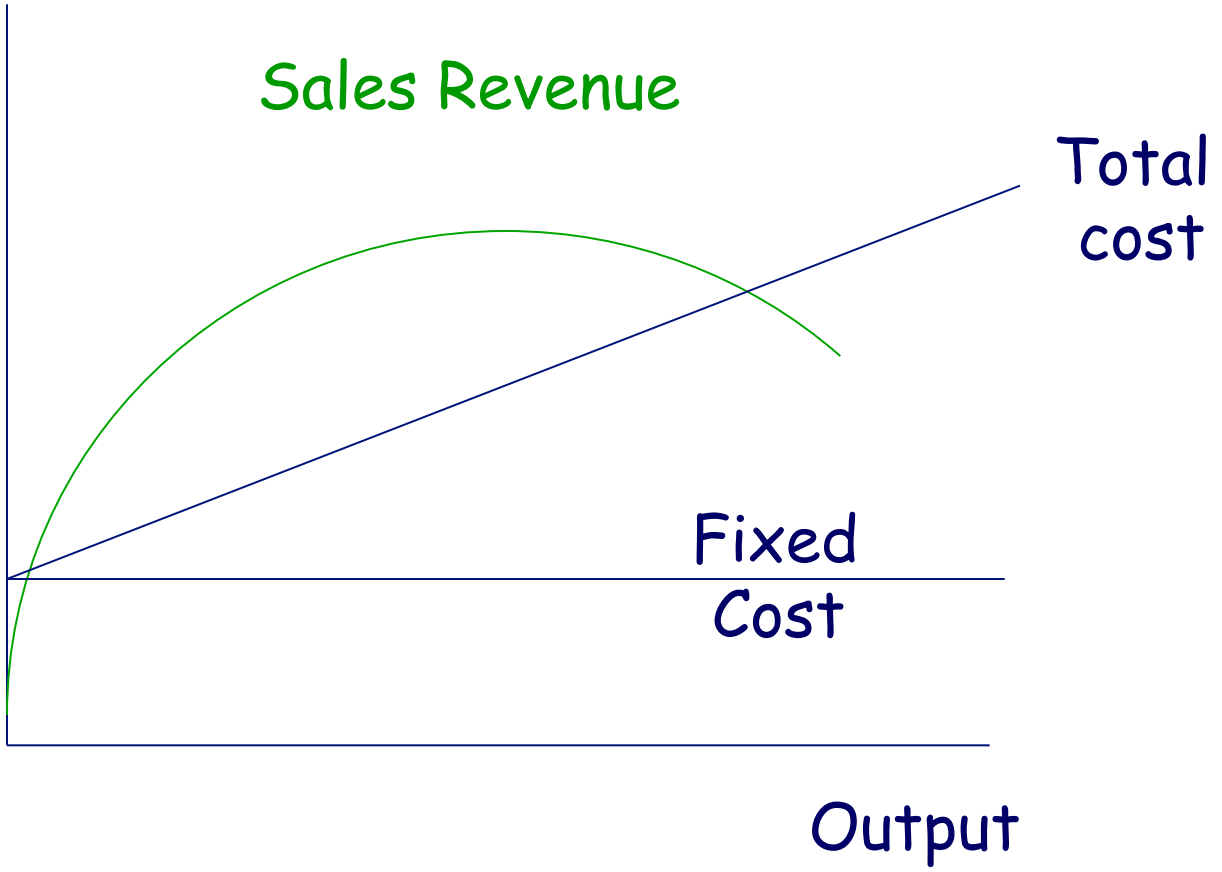
q = quantity sold

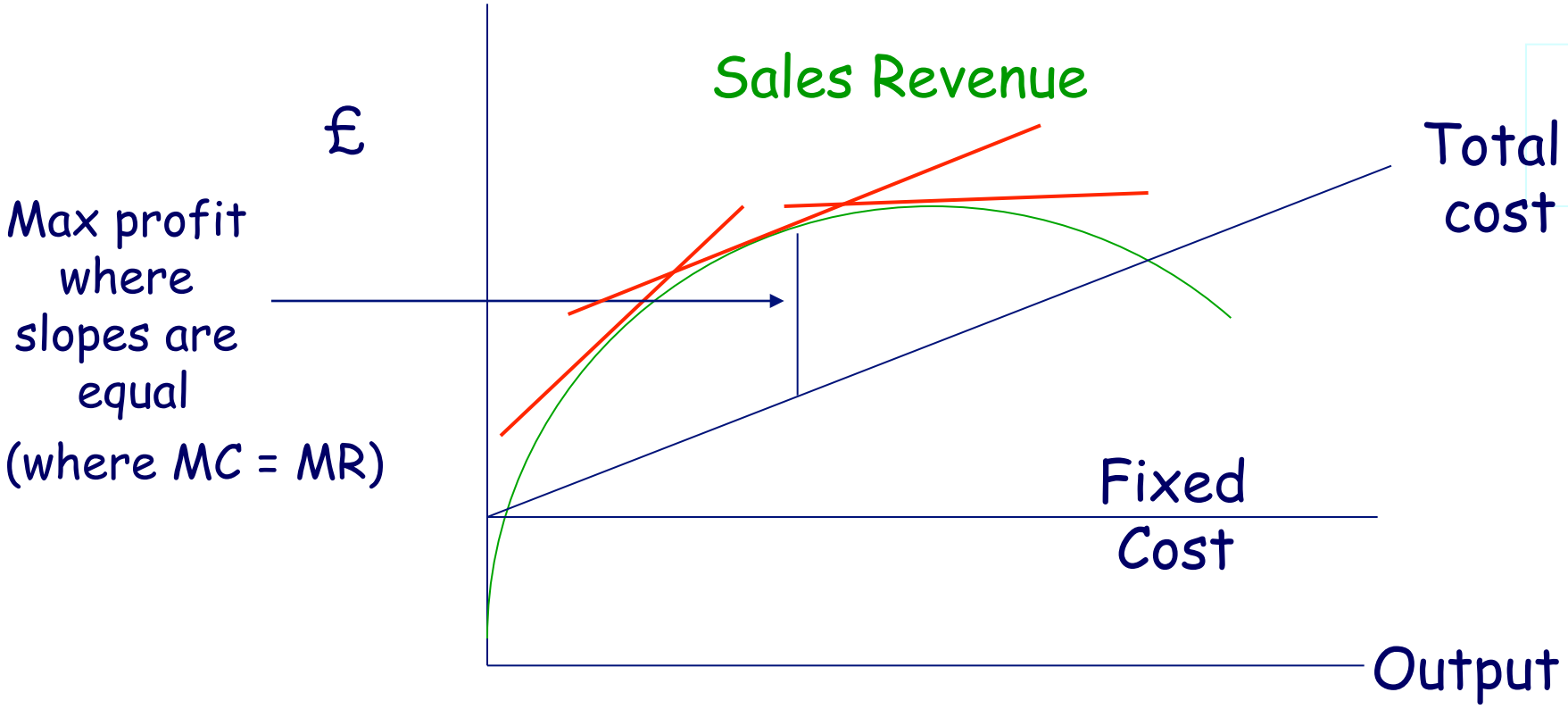
R = Sales Revenue

Typical –simplified- costs and revenues for a price setting firm

Non linear sales revenue

£





Redlines show "slope", or rate of change, of the sales revenue curve i.e. Marginal Revenue

Slope of total cost = Variable cost per unit = Marginal cost

Slope of sales revenue? For that we need a little calculus

Some calculus revision

General formula for differentiation

$$y = ax^n + c$$

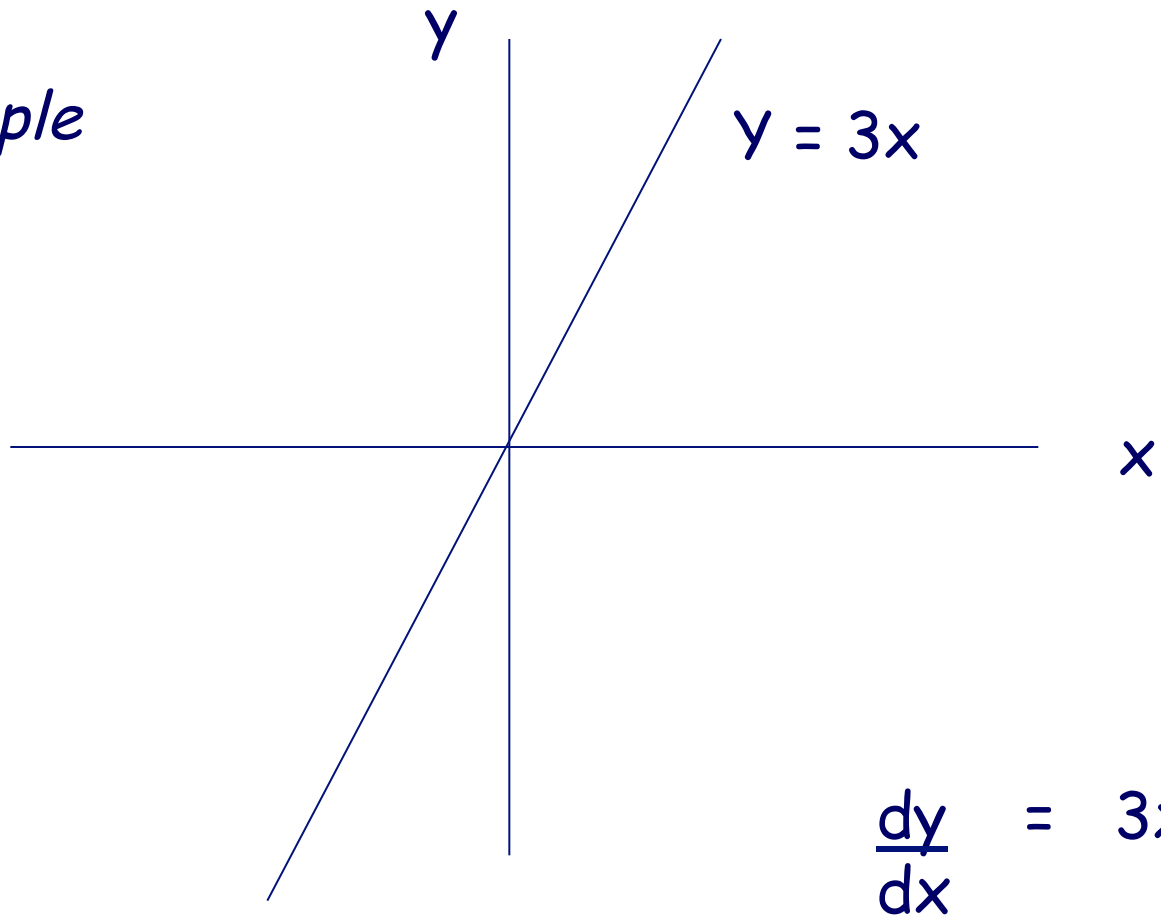
$$\frac{dy}{dx} = nax^{n-1}$$

This gives the slope (or gradient, or rate of change) of a function

$\frac{dy}{dx}$ just means the rate of change, or slope, at any given value of x

Note that any constant value disappears

Example



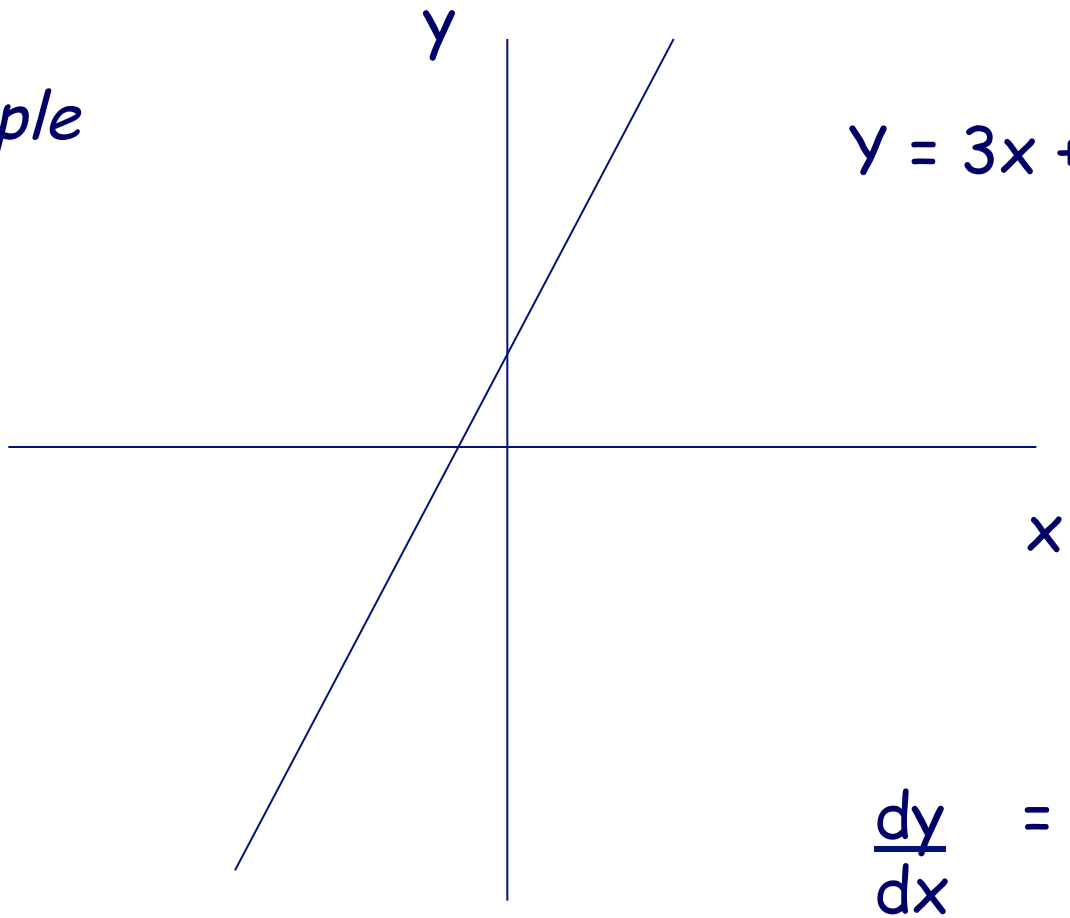
$$\frac{dy}{dx} = 3x^{1-1}$$

$$= 3x^{0}$$

$$= 3x1$$

$$= 3$$

Example



$Y = 3x + 1$

$$\frac{dy}{dx} = 3x^{1-1}$$

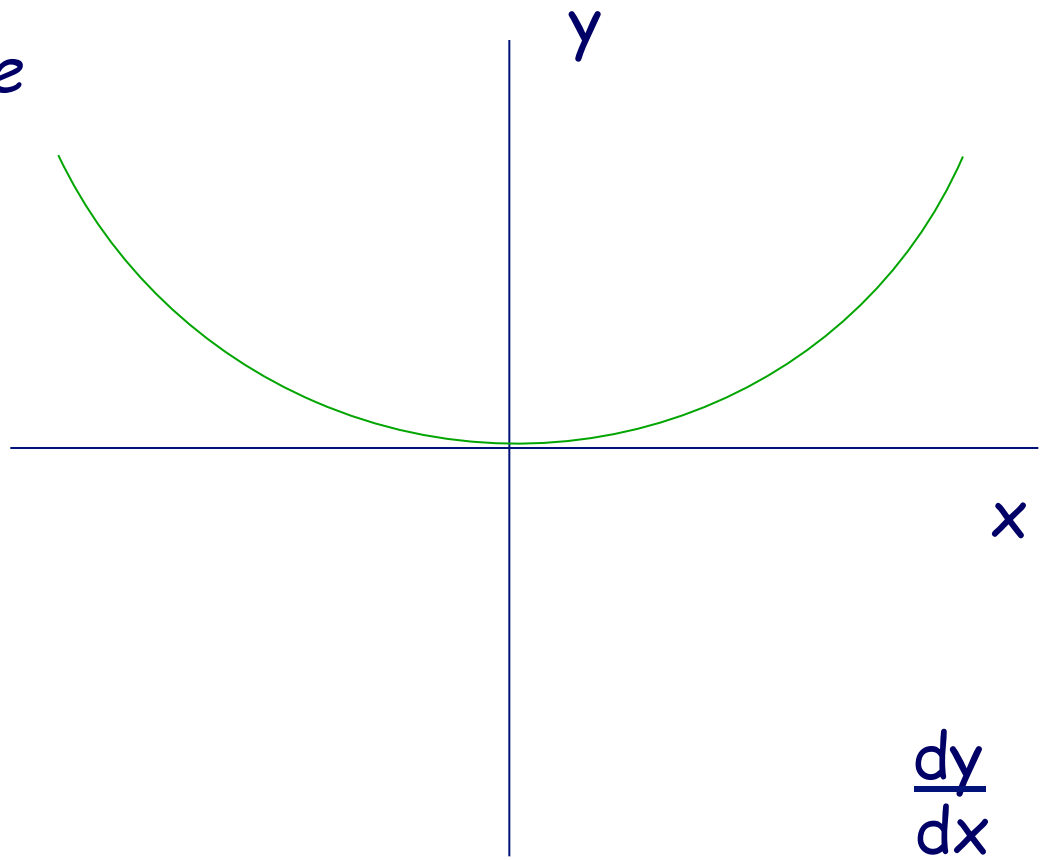
$$= 3x^{0}$$

$$= 3$$

Adding a constant does not affect slope

(So fixed costs will not affect marginal cost)

Example



$y = x^2$

$$\frac{dy}{dx} = 2x^{2-1}$$

$$= 2x^1$$

$$= 2x$$

Pricing – Calculus Example (See Drury Ch 11)

Fixed cost = £700,000
Variable cost per unit = £70

Suppose there is a linear demand function as follows:

- At a Selling Price per unit of £160, demand = 10,000 units
- When Selling Price per unit increases (decreases) by £20 demand decreases (increases) by 5,000 units

Calculate optimum output and price

We require MC = MR (C=Cost R = Revenue)

Let p = price per unit (£)

q = quantity (000units)

MR = dR/dq but R = pq

so we need p as f(q) ("as a function of q")

but we know p = mq + c (linear relationship)

(where m = slope, c = intercept)

Do we know 2 points on that line?

- 160 = m x 10 + c and, say,
- 180 = m x 5 + c

Solve and show
m = -4 c = 200

So $p = -4q + 200$ and $R = pq = (-4q + 200)q$

$$\Rightarrow R = -4q^2 + 200q$$

$MR = dR/dq = -8q + 200$

$MC = 70$
(at all output levels –it is the variable cost per unit)

so when MC = MR

$$70 = -8q + 200$$

$\Rightarrow q = 16.25$ (16,250 units)
$\Rightarrow p =$ £135

- Thus to maximize profit sell 16,250 units @ £135

- Note: For maximum revenue MR = 0
- i.e. $-8q + 200 = 0$

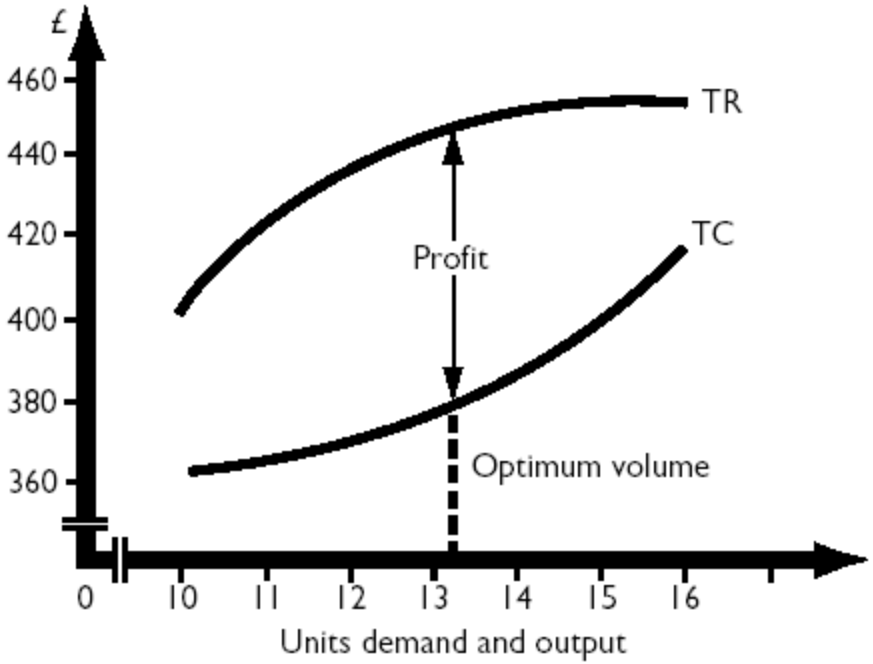
- $=> q = \frac{200}{8} = 25$ (25,000 units)
- $=> p =$ £100

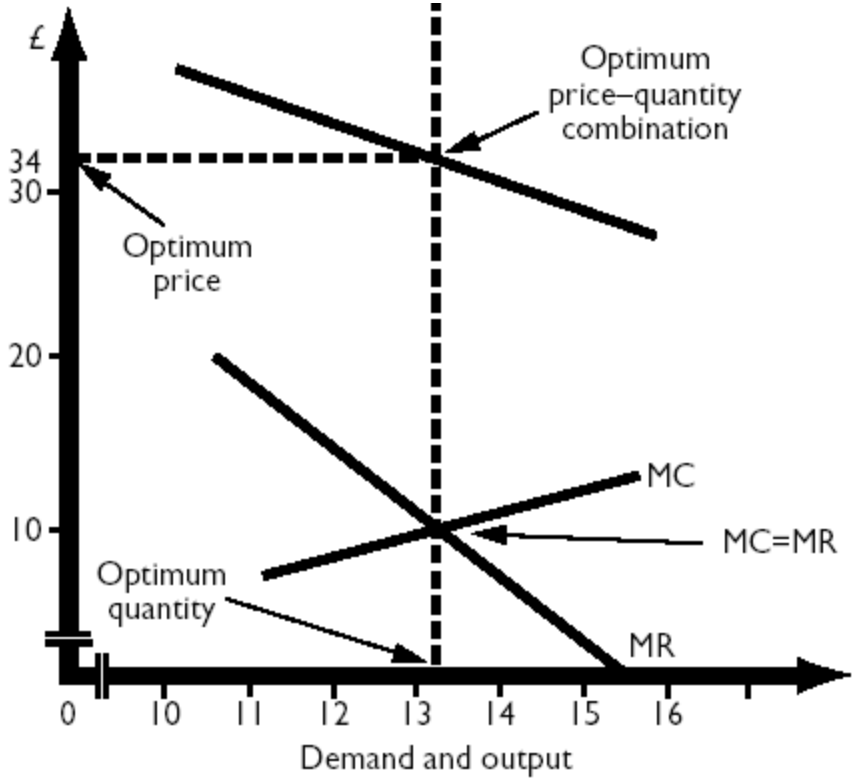
Alternative explanation in Drury

Economic theory

The optimum selling price is the price at which marginal revenue equals marginal cost.

Note that in this case the costs are non linear – (numbers not based on previous example)





Problems with applying economic theory

1. Difficult and costly to derive reasonably accurate estimates of demand.

2. Difficult to estimate cost functions to determine marginal cost at different output levels for many different products.

3. Demand is influenced by other factors besides price.

4. Profit maximization assumed – firms may pursue other goals.

Cost-plus pricing

- Target mark-ups seek to cover any costs not already included and to give a profit.

- Target mark-ups can be adjusted to reflect demand, types of products, industry norms,competitive position,etc.

- Potential criticisms of cost-plus pricing:

1. Ignores demand
2. Does not necessarily ensure that total sales revenue will exceed total cost.
3. Can lead to wrong decisions if budgeted activity is used to unitize costs.
4. Circular reasoning —Volume estimates are required to estimate unit fixed costs and ultimately price.

Cost-plus pricing

Reasons for using cost-plus pricing:

- May encourage price stability
- Demand can be taken into account by adjusting the target mark-ups.
- Mark-up can be based on a target ROI*
- Simplicity (easily delegated)
- Difficulty in applying sophisticated procedures where a firm markets hundreds of products/services.
- Used as a guidance to setting the price but other factors are also taken into account.
- Applied to only the relatively minor revenue items.
- Morally justifiable?

* $\frac{\text{Profit}}{\text{Investment}} = \frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$

Short run pricing decisions – typically where there is spare capacity

Relevant (marginal) cost plus

- Only the incremental cost of undertaking the order should be taken into account.

Bids should be made at prices that exceed the incremental cost and meet the following conditions:

1. Sufficient capacity must be available to meet the order.

2 The bid price should not effect future selling prices and the customer should not expect repeat business based on short-term incremental cost.

3. The order will utilise unused capacity for only a short period and capacity will be released for use on more profitable opportunities.

Target costing - Drury pages 544-548 (539-543)

Target costing is the reverse of cost-plus pricing —The target selling price is the starting point.

Four stages are involved:

Stage 1: Determine the target price which customers will be prepared to pay for the product.

Stage 2: Deduct a target profit margin from the target price to determine the target cost.

Stage 3: Estimate the actual cost of the product.

Stage 4: If estimated actual cost exceeds the target cost investigate ways of driving down the actual cost to the target cost.

Marketing factors and customer research provide the basis for determining selling price (Not cost).

Emphasises a team approach to achieving the target cost.

Most suited to high sales volume products.

Pricing policies

- price skimming
- penetration/predatory pricing
- product line pricing
- price discrimination
- perceived value

Customer Profitability Analysis

Profits traditionally analysed by product

Increasingly profits are being analysed by customers using an Activity Based Costing approach

Typical drivers:

- Sales order processing
- Sales visits
- Normal delivery costs
- Urgent delivery costs
- Credit collection costs