



Republic of the Philippines
City of Olongapo

GORDON COLLEGE

Olongapo City Sports Complex, East Tapinac, Olongapo City
Tel. No. (047) 224-2089 loc. 314



LABORATORY

A. Explore

a. Patterson Electronics supplies microcomputer circuitry to a company that incorporates microprocessors into refrigerators and other home appliances. One of the components has an annual demand of 250 units, and this is constant throughout the year. Carrying cost is estimated to be \$1 per unit per year, and the ordering cost is \$20 per order.

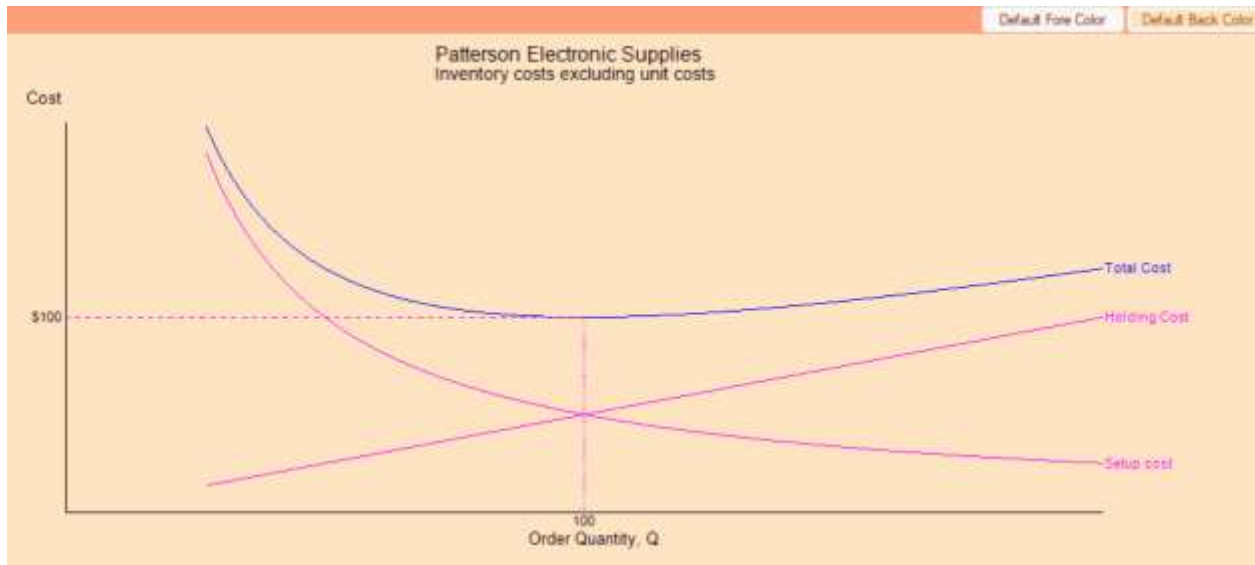
QM for Windows - [Data] Results			
Patterson Electronic Supplies Solution			
Parameter	Value	Parameter	Value
Demand rate(D)	250	Optimal order quantity (Q*)	100
Setup/ordering cost(S)	20	Maximum Inventory Level (Imax)	100
Holding/carrying cost(H)	1	Average inventory	50
Unit cost	0	Orders per period(year)	2.5
		Annual Setup cost	50
		Annual Holding cost	50
		Total Inventory (Holding + Setup) Cost	100
		Unit costs (PD)	0
		Total Cost (including units)	100



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b. Flemming Accessories produces paper slicers used in offices and in art stores. The minislicer has been one of its most popular items: Annual demand is 6,750 units and is constant throughout the year. Kristen Flemming, owner of the firm, produces the minislicers in batches. On average, Kristen can manufacture 125 minislicers per day. Demand for these slicers during the production process is 30 per day. The setup cost for the equipment necessary to produce the minislicers is \$150. Carrying costs are \$1 per minislicer per year.

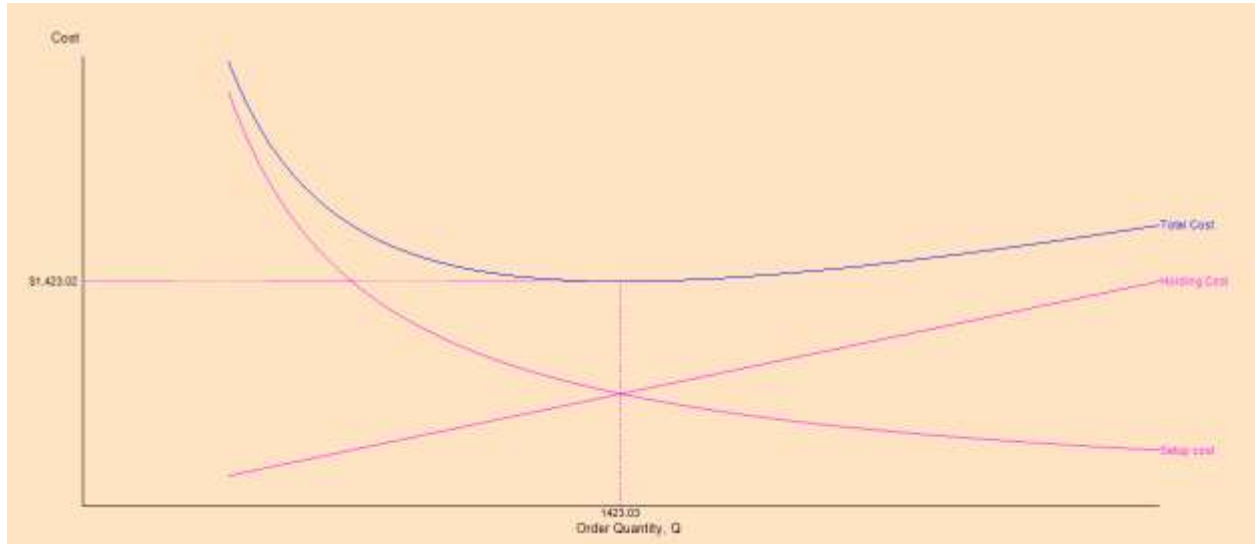
QM for Windows - [Data] Results				
(untitled) Solution				
Parameter	Value		Parameter	Value
Demand rate(D)	6750		Optimal order quantity (Q*)	1423.03
Setup/ordering cost(S)	150		Maximum Inventory Level (Imax)	1423.03
Holding/carrying cost(H)	1		Average inventory	711.51
Unit cost	0		Orders per period(year)	4.74
			Annual Setup cost	711.51
			Annual Holding cost	711.51
			Total Inventory (Holding + Setup) Cost	1423.03
			Unit costs (PD)	0
			Total Cost (including units)	1423.03



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B. Explain

a. Why wouldn't a company always store large quantities of inventory to eliminate shortages and stockouts?

- Storing large quantities of inventory might seem like a good strategy to prevent shortages and stockouts, but it's not always beneficial for several reasons. Holding large amounts of inventory can lead to high holding costs, which include expenses for storage space, insurance, and security. The capital used to purchase inventory could be better utilized for other business activities. There is also a risk of products becoming obsolete over time, particularly for high-tech or fashion items. Additionally, the longer inventory is held, the greater the chance it could be lost, stolen, or damaged. With advancements in supply chain management, companies can reduce inventory levels while still meeting customer demand. Therefore, it is crucial for companies to strike a balance between maintaining sufficient inventory to meet demand and minimizing the costs and risks associated with holding inventory.



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C. Engage

c. Ross White's machine shop uses 2,500 brackets during the course of a year, and this usage is relatively constant throughout the year. These brackets are purchased from a supplier 100 miles away for \$15 each, and the lead time is 2 days. The holding cost per bracket per year is \$1.50 (or 10% of the unit cost) and the ordering cost per order is \$18.75. There are 250 working days per year.

(a) What is the EOQ?

EOQ = Economic Order Quantity (units)

D = Demand rate (units per year) = 2,500 brackets/year

S = Ordering cost per order = \$18.75

H = Holding cost per unit per year = \$1.50

Formula:

$$EOQ = \sqrt{(2 * D * S) / H}$$

Solution:

$$EOQ = \sqrt{(2 * 2,500 \text{ brackets/year} * \$18.75) / \$1.50/\text{bracket/year}}$$

EOQ ≈ 750 brackets

(b) Given the EOQ, what is the average inventory?

Formula for Average Inventory:

$$\text{Average Inventory} = EOQ / 2$$

$$\text{Average Inventory} = 750 \text{ brackets} / 2$$

Average Inventory = 375 brackets

(c) What is the annual inventory holding cost?

Parameter	Value
EOQ	750 Brackets
Holding cost per unit per year	\$1.50
Annual demand rate	2,500 brackets per year
Average Inventory	375 (EOQ / 2)
Annual inventory holding cost	\$562.5 (average inventory * holding cost per unit)



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Formula:

(Average inventory * Holding cost per unit)

Solution:

$$375 * 1.50 = \text{\$562.5}$$

(d) What would be the annual ordering cost?

Formula:

Number of Orders per Year = Annual Demand Rate / EOQ

Annual Ordering Cost = Number of Orders per Year * Ordering Cost per Order

Solution:

Number of Orders per Year = **2,500** brackets/year / **750** brackets/order = **3.33** orders/year

Annual Ordering Cost = 4 orders/year * \$18.75/order = \$75.00

(e) What is the ROP?

Given:

Annual demand rate (D) is: **2,500 brackets/year**

Lead time (L) is: **2 days**

Formula:

ROP = Daily Demand Rate * Lead Time

Solution:

Daily Demand Rate = D / Working Days = 2,500 brackets/year / 250 days/year \approx 10 brackets/day

ROP = Daily Demand Rate * Lead Time = 10 brackets/day * 2 days = 20 brackets