

Buying widgets

The XYZ Corp. has a budget of \$500,000, which it intends to use for buying widgets. There are three vendors, each with unlimited supply, who offered the following terms.

Vendor 1 stipulates that an order must be no less than 4,000 widgets, and charges a fixed cost of \$50,000, and a unit price of \$50.

Vendor 2 charges a fixed cost of \$20,000. The unit price depends on the quantity as follows. For orders of 500 widgets or less, the unit price is \$60. It drops to \$55 for orders between 501 and 1,000 widgets, and to \$50 for orders of 1,001 widgets or more.

Vendor 3 does not charge a fixed cost. The unit price is \$75 for an order up to 500 widgets. Then one can buy up to 500 widgets at a unit price of \$70. After 1,000 widgets have been bought, any additional widget has a unit price of \$65.

XYZ wants to buy from at least two vendors. If XYZ buys from a vendor, it must buy from him at least 20% of the total quantity.

Formulate a problem to maximize the number of widgets that XYZ can buy.