3. Assume that the following quantity discount schedule is appropriate:

Order Size	Discount(%)	Unit Cost
0 to 49	0	$30.00
50 to 99	5	$28.50
100 or more	10	$27.00

If annual demand is 120 units, ordering costs are $20.00 per order, and the annual Holding rate is 25%, what order quantity would you recommend?

Solution

$$Q(0 \text{ to } 49) = \sqrt{\frac{2 \cdot 120 \cdot 20}{0.25 \cdot 30}} = 25$$

$$Q(50 \text{ to } 99) = \sqrt{\frac{2 \cdot 120 \cdot 20}{0.25 \cdot 28.5}} = 26$$

$$Q(100 \text{ or more}) = \sqrt{\frac{2 \cdot 120 \cdot 20}{0.25 \cdot 27}} = 27$$

$$Total\ cost\ (Q = 25) = \left(\frac{120}{25}\right)20 + \left(\frac{25}{2}\right)(0.25 \cdot 30) + 30 \cdot 120 = 3789.75$$

$$Total\ cost\ (Q = 26) = \left(\frac{120}{26}\right)20 + \left(\frac{26}{2}\right)(0.25 \cdot 28.5) + 28.5 \cdot 120 = 3604.93$$

$$Total\ cost\ (Q = 27) = \left(\frac{120}{27}\right)20 + \left(\frac{27}{2}\right)(0.25 \cdot 30) + 27 \cdot 120 = 3430.14$$

The total cost is minimal for $Q(100 \text{ or more})$, therefore I recommend order quantity "100 or more".

Answer: "100 or more".