7.2

Notations：

λ (arrival rate)：$\frac{20 vehicles}{8 hours} = \frac{20 vehicles}{480 \min utes} = 0.04167$

μ (mean time of unloading time)=40

W (Expected time of trucks in system).

L (Expected number of trucks in system).

$L = \lambda \cdot W \Rightarrow W = \frac{L}{\lambda}$ (Little's formula)

$\because$W<50

$\therefore \frac{L}{\lambda}$<50=>L=50* λ =50*0.04167=2.0833

Hence, the warehouse needs 3 docks at least.

7.22

a)

Total demand for item A=100 units × 1 ft^3/unit = 100 ft^3

Total demand for item B=50 units × 0.5 ft^3/unit = 25 ft^3

Total demand for item C=200 units × 2 ft^3/unit = 400 ft^3

b)

400 ft^3 / 20 ft^3 =20 replenishments

c)

100 ft^3 / 50 weeks = 2 ft^3/week

25 ft^3 / 50 weeks = 0.5 ft^3/week

400 ft^3 / 50 weeks = 8 ft^3/week

d)

Item A: (25 Requests / 50 weeks)= 0.5 requests / week = Rank 1

Item C: (16 Requests / 50 weeks)= 0.32 requests / week = Rank 2

Item B: (5 Requests / 50 weeks)= 0.1 requests / week = Rank 3.

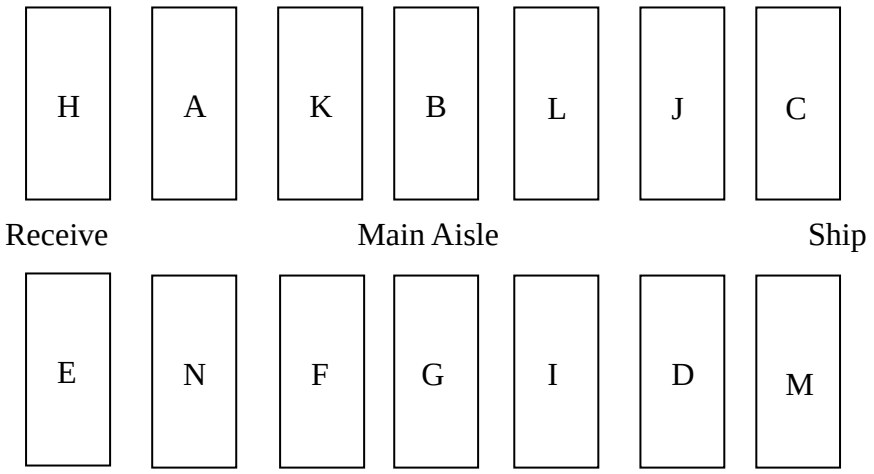
7.25

更正題目：Figure **6.20a→7.27a**

計算 Receiving/Shipping Ratio：

Product	Trips to Receive	Trips to Ship	Receiving/ Shipping
A	300	150	2
B	50	50	1
C	10	50	0.2
D	400	800	0.5
E	1000	600	1.67
F	40	20	2
G	200	200	1
H	2250	1800	1.25
I	50	50	1
J	500	715	0.69
K	80	40	2
L	400	400	1
M	1167	2334	0.5
N	140	100	1.4

Product	Monthly Throughput	Quantity per Receipt	Receiving/ Shipping	Average Customer Order Size
H	high	9000	1.25	5
E	high	6000	1.666667	10
N	low	700	1.4	7
A	high	300	2	2
K	low	80	2	2
F	low	40	2	2
L	high	400	1	4
B	low	200	1	1
G	high	200	1	1
I	low	50	1	1
J	high	500	0.69	0.7
M	high	7000	0.5	3
D	high	400	0.5	0.5
C	low	10	0.2	0.2

Receiving/Shipping Ratio>1 表示 Receiving 動作較頻繁，屬於同一類型需靠近 Receive 端，再以 Quantity per Receipt 做排序。
Receiving/Shipping Ratio=1，需靠近中間。
Receiving/Shipping Ratio<1，需 Ship 端。

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