Business Math: Chapter 4: Mathematics of Merchandising
Answer Key by Michael Reimer

1) \( d = 35\% = \frac{0.35 \times \$150}{100} = \$47.50 \)

\( N = L(1-d) = \frac{\$150(1-0.35)}{100} = \frac{\$150(0.65)}{100} = \$47.50 \)

2) \( d = 42\% = \frac{0.42 \times L}{100} \)

You cannot find \( N \) without first solving for \( L \)

\( L = \frac{D}{d} = \frac{\$435}{0.42} = \$1035.71 \)

\( D = \frac{\$435}{0.42} = \$1035.71 \)

\( N = L - D = \frac{\$1035.71 - \$435}{0.42} = \frac{\$600.71}{0.42} = \$1428.57 \)

3) \( L = \$450 \)

\( N = \frac{\$375}{0.75} = \$450 \)

\( d = \frac{\$75}{\$450} \times 100 = 16.66666667\% \)

4) Competition: \( L = \$56 \)

\( d = \frac{15\%}{0.15} = \frac{100}{0.15} = \$600 \)

\( N = \frac{\$56(1-0.15)}{100} = \frac{\$56(0.85)}{100} = \$47.60 \)

Their \( N \) becomes our \( N \)

\( \text{Us: } L = \$60, d = \frac{\$12.40}{\$60} = \frac{12.40}{100} = 0.15 \% \)

\( N = \frac{\$60 - \$47.60}{\$12.40} = \frac{\$12.40}{\$60} = 20.66666667\% \)
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5) 3/5, 2/10, 1/30

Number of days the discount is available for
Rate of Discount
so: 3% off if you pay in 5 days, 2% off if you pay in 10 days and the net (remainder) is due in 30 days

a) May 16 - May 21 = 5 days = 3% discount
   \[ L = \$645 \quad d = 3\% = 0.03 \quad N = ? \]
   \[ N = L (1 - d) = \$645 \times (1 - 0.03) = \$645 \times 0.97 = \$625.65 \]

b) May 16 - May 26 = 10 days = 2% Discount
   \[ L = \$645 \quad d = 2\% = 0.02 \quad N = ? \]
   \[ N = \$645 \times (1 - 0.02) = \$645 \times 0.98 = \$632.10 \]

c) May 16 - June 15 = 30 days \( d = \) d
   \[ L = \$645 \quad d = \) \quad N = ? \]
   \[ N = \$645 \times (1 - 0) = \$645 \times 1 = \$645 \]

6) In a partial payment question:
   - \( N \) = Amount Paid
   - \( L \) = Amount Credited (Reduced)

1st Payment: June 3 - June 13 = 10 days \( d = 2\% \)
   \[ L = \? \quad d = 2\% = 0.02 \quad N = \$475 \]
   \[ L = \frac{N}{(1-d)} = \frac{\$475}{(1 - 0.02)} = \frac{\$475}{0.98} = \$484.69 \]

Continued –>
6) 2nd Payment \( \frac{2}{} \) June 3 - June 23 = 20 days \( d = 1\% \div 100 = 0.01 \)
\[
L = ? \quad d = 0.01 \quad N = 350\n\]
\[
L = 350 \times 0.99^{14} \quad 2nd \quad \frac{3}{nd} \n\]
3rd Payment: \$1999 - \$484.69 - \$353.54 = \$1160.77

7) 
<table>
<thead>
<tr>
<th>31 days d = 0</th>
<th>10 days d = 2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 22</td>
<td>Aug 12</td>
</tr>
<tr>
<td>$425</td>
<td>$235</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
</tr>
</tbody>
</table>
| 2nd Debt: \( L = \$235 \) \( d = 0.02 \) \( N = ? \)
| \( N = \$235 \times (1 - 0.02) = \$235 \times 0.98 = \$230.30 \)
| 3rd Debt: \( L = \$125 \) \( d = 0.02 \) \( N = ? \)
| \( N = \$125 \times (1 - 0.02) = \$125 \times 0.98 = \$122.50 \)
| Payment on August 22 \( \frac{nd}{10} = \$425 + \$230.30 + \$122.50 \)
| = \$777.80 |

8) a) \( s = ? \) \( L = \$5 \) \( M = 35\% \) \( \frac{\circ{C}0st + 0.35 \times \$5 = \$1.75}{s = (\$5 + \$1.75) = \$6.75} \)

b) \( s = \$6.75 \) \( M = \$1.75 \)
\[
\text{Rate of Markup on } = \frac{M}{s} \times 100 = \frac{\$1.75}{\$6.75} \times 100 = 25.92592593\%\]
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9) \( S = \$20, \ C = ? \) \( M = 25\% \) of \( C \) \( + \) \( \frac{1}{4} C \)

\[
S = C + M \\
\$20 = 1C + 0.25C \\
\$20 = 1.25C \\
1.25 \underline{- \quad 1.25} \\
C = \$16.
\]

10) \( S = \$45, \ C = ? \) \( M = 37.5\% \) of \( \text{Selling Price} \) \( = \frac{1}{3} S \)

\[
\frac{1}{3} S = \frac{1}{3} \times \$45 = \$15, \quad M = \$16.88
\]

\[
S = C + M \\
\$45 = C + \$16.88 \\
\underline{- \quad 16.88} \\
\underline{28.12 = C}
\]

11) a) "less a trade discount" means you have to compute Not Price \( (N) \) first, then compute \( C \) to \( \text{Cost (C)} \)

\[
C = \$85 \quad d = 25\% \times 100 = 0.25 \quad N = ?
\]

\[
N = L (1-d) = \$85 (1-0.25) = \$85 (0.75) = \$63.75
\]

\[
2\text{nd} \quad N \text{ becomes } C = \$63.75
\]

\[
3\text{rd} \quad C = \$63.75 \quad S = ? \quad M = 55\% \text{ of Selling Price} = 0.55 S
\]

\[
S = C + M \\
1S = \$63.75 + 0.55S \quad \text{Cancel} \\
\underline{-0.55S} \\
0.45S = \$63.75 \\
0.45 \quad 0.45
\]

\[
S = \$141.67
\]
11. b) Rate of Markup \( M \) = \( \frac{\text{profit}}{\text{cost}} \times 100 \)
\[ \text{Given: } C = \$63.75, \text{ profit } M = 0.55 \text{, so } S = \$141.67 \]
\[ M = 0.55(\$141.67) = \$77.97 \]
\[ S = C + M = \$77.97 + \$63.75 = \$141.72 \]

12. a) "less a trade discount"
\[ C = \$89, \text{ discount } d = 22.5\% = 0.225, \text{ so } N = ? \]
\[ N = C(1 - d) = \$89(1 - 0.225) = \$89(0.775) = \$68.975 \]
\[ N = \$68.98 \]

b) Break even means the jeans to cover all the costs + expenses with no profit
\[ E = \] \[ C = \$68.98, \text{ so } E = 0.25S, S = \] \[ S = \frac{C}{1 + E} = \frac{\$68.98}{1 + 0.25} = \$54.78 \]
\[ S = \$54.78 + 0.65 = \$60.43 \text{ (rounded up)} \]

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\[ S = \$54.78 + 0.65 = \$60.43 \text{ (rounded up)} \]
B) \( C = \$599 \quad M = 45\% \text{ of } \text{Cost} = 0.45(\$599) = \$269.55 \quad s = ? \)

1st Find \( s \)

\[ s = C + M = \$599 + \$269.55 = \$868.55 \]

2nd Now mark down. For markdown use \( N = L(1-d) \)

\[ L = \$868.55 \quad d = \frac{35}{100} = 0.35 \quad N = ? \]

\[ N = \$868.55 (1 - 0.35) \]

\[ N = \$868.55 (0.65) \]

\[ N = \$564.53 \]