Exercise 6-14: Part 1

Sales price = $40/unit
Contribution Ratio = 30%
Fixed Expenses = $180,000

\[
\text{Contribution Margin} = \text{Sales} - \text{Variable costs} = \text{Contribution margin ratio} \times \text{Sales}
\]

\[
\text{Contribution Margin} = 0.30 \times 40 = 12
\]

\[
\text{Sales} - \text{Variable costs} = \text{Contribution Margin}
\]

\[
\text{Variable costs} = \text{Sales} - \text{Contribution Margin}
\]

\[
\text{Variable costs} = 40 - 12 = 28
\]

Part 2(a)

Sales = Variable expenses + Fixed expenses + Profit
At the break-even point, Profit is zero
Let \( X \) = Break-even point in units.
\[
40X = 28X + 180,000 + 0
\]

\[
12X = 180,000
\]

\[
X = 180,000 / 12 = 15,000 \text{ units}
\]

Break-even point in sales dollars = 15,000 units \( \times \) 40/unit = $600,000

Part 2(b)

Sales = Variable expenses + Fixed expenses + Profit
Let \( X \) = #Units to sell to earn a profit of $60,000

\[
40X = 28X + 180,000 + 60,000
\]

\[
12X = 240,000
\]

\[
X = 240,000 / 12 = 20,000 \text{ units}
\]

20,000 units \( \times \) 40/unit = $800,000 in sales dollars.
Part 2(c)

<table>
<thead>
<tr>
<th></th>
<th>/Unit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price</td>
<td>$40</td>
<td>100%</td>
</tr>
<tr>
<td>Less variable expense ($28 - $4)</td>
<td>$24</td>
<td>60%</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>$16</td>
<td>40%</td>
</tr>
</tbody>
</table>

Let X = New break-even point

$40X = 24X + 180,000 + 0

$16X = 180,000

X = $180,000 ÷ $16 = 11,250 units

11,250 units x $40/unit = $450,000

Part 3(a)

Break-even point in units = Fixed expenses ÷ Unit contribution margin

Break-even point in units = $180,000 ÷ $12/unit = 15,000 units

Break-even point in dollars = 15,000 units x $40/unit = $600,000

Note: This is the same answer as obtained in part 2(a)

Part 3(b)

Unit sales to attain profit = (Fixed expenses + Target profit) ÷ Unit contribution margin

Unit sales to attain profit = ($180,000 + $60,000) ÷ $12/unit = 20,000 units

In sales dollars: 20,000 units x $40/unit = $800,000

Note: This is the same answer as obtained in part 2(b)
Part 3(c)

Unit break-even point = Fixed expenses ÷ Unit contribution margin

Unit break-even point = $180,000 ÷ $16/unit = 11,250 units

Break-even point in dollars = 11,250 units x $40/unit = $450,000

Note: This is the same answer as obtained in part 2(c)