

Exercise 11-7 (20 minutes)

1. ROI computations:

$$\text{ROI} = \frac{\text{Net operating income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average operating assets}}$$

$$\text{Perth: } \frac{\$630,000}{\$9,000,000} \times \frac{\$9,000,000}{\$3,000,000} = 7\% \times 3 = 21\%$$

$$\text{Darwin: } \frac{\$1,800,000}{\$20,000,000} \times \frac{\$20,000,000}{\$10,000,000} = 9\% \times 2 = 18\%$$

	<i>Perth</i>	<i>Darwin</i>
Average operating assets.....	<u>\$3,000,000</u>	<u>\$10,000,000</u>
Net operating income	\$630,000	\$1,800,000
Minimum required return on average operating assets—16% × Average operating assets	<u>480,000</u>	<u>1,600,000</u>
Residual income.....	<u>\$150,000</u>	<u>\$ 200,000</u>

3. No, the Darwin Division is simply larger than the Perth Division and for this reason one would expect that it would have a greater amount of residual income. Residual income can't be used to compare the performance of divisions of different sizes. Larger divisions will almost always look better. In fact, in the case above, Darwin does not appear to be as well managed as Perth. Note from Part (1) that Darwin has only an 18% ROI as compared to 21% for Perth.

Exercise 11A-2 (20 minutes)

1.

	<i>Division A</i>	<i>Division B</i>	<i>Total Company</i>
Sales	<u>\$3,500,000</u> ¹	<u>\$2,400,000</u> ²	<u>\$5,200,000</u> ³
Expenses:			
Added by the division ..	2,600,000	1,200,000	3,800,000
Transfer price paid	<u>—</u>	<u>700,000</u>	<u>—</u>
Total expenses	<u>2,600,000</u>	<u>1,900,000</u>	<u>3,800,000</u>
Net operating income	<u>\$ 900,000</u>	<u>\$ 500,000</u>	<u>\$1,400,000</u>

¹ 20,000 units × \$175 per unit = \$3,500,000.

² 4,000 units × \$600 per unit = \$2,400,000.

³ Division A outside sales (16,000 units × \$175 per unit) ..	\$2,800,000
Division B outside sales (4,000 units × \$600 per unit)	<u>2,400,000</u>
Total outside sales.....	<u>\$5,200,000</u>

Observe that the \$700,000 in intra-company sales has been eliminated.

2. Division A should transfer the 1,000 additional units to Division B. Note that Division B's processing adds \$425 to each unit's selling price (B's \$600 selling price, less A's \$175 selling price = \$425 increase), but it adds only \$300 in cost. Therefore, each tube transferred to Division B ultimately yields \$125 more in contribution margin (\$425 – \$300 = \$125) to the company than can be obtained from selling to outside customers. Thus, the company as a whole will be better off if Division A transfers the 1,000 additional tubes to Division B.

Exercise 11A-3 (30 minutes)

1. a. The lowest acceptable transfer price from the perspective of the selling division, the Electrical Division, is given by the following formula:

$$\text{Transfer price}^3 = \text{Variable cost per unit} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}}$$

Because there is enough idle capacity to fill the entire order from the Motor Division, there are no lost outside sales. And because the variable cost per unit is \$21, the lowest acceptable transfer price as far as the selling division is concerned is also \$21.

$$\text{Transfer price}^3 = \$21 + \frac{\$0}{10,000} = \$21$$

- b. The Motor Division can buy a similar transformer from an outside supplier for \$38. Therefore, the Motor Division would be unwilling to pay more than \$38 per transformer.

$$\text{Transfer price} \leq \text{Cost of buying from outside supplier} = \$38$$

- c. Combining the requirements of both the selling division and the buying division, the acceptable range of transfer prices in this situation is:

$$\$21 \leq \text{Transfer price} \leq \$38$$

Assuming that the managers understand their own businesses and that they are cooperative, they should be able to agree on a transfer price within this range and the transfer should take place.

- d. From the standpoint of the entire company, the transfer should take place. The cost of the transformers transferred is only \$21 and the company saves the \$38 cost of the transformers purchased from the outside supplier.

Exercise 11A-3 (continued)

2. a. Each of the 10,000 units transferred to the Motor Division must displace a sale to an outsider at a price of \$40. Therefore, the selling division would demand a transfer price of at least \$40. This can also be computed using the formula for the lowest acceptable transfer price as follows:

$$\begin{aligned}\text{Transfer price}^3 &= \$21 + \frac{(\$40 - \$21) \times 10,000}{10,000} \\ &= \$21 + (\$40 - \$21) = \$40\end{aligned}$$

- b. As before, the Motor Division would be unwilling to pay more than \$38 per transformer.
- c. The requirements of the selling and buying divisions in this instance are incompatible. The selling division must have a price of at least \$40 whereas the buying division will not pay more than \$38. An agreement to transfer the transformers is extremely unlikely.
- d. From the standpoint of the entire company, the transfer should not take place. By transferring a transformer internally, the company gives up revenue of \$40 and saves \$38, for a loss of \$2.