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TROOP MOVEMENT

An army wants to move troops from 3 training camps to 4 different bases. How should the troops be moved to minimize cost?

Moving Cost Per Man

	Base 1	Base 2	Base 3	Base 4
Camp 1	$34	$26	$29	$31
Camp 2	$42	$33	$28	$35
Camp 3	$36	$29	$32	$38

Number Of Troops Moved

	Base 1	Base 2	Base 3	Base 4	Total	Available
Camp 1	100	100	100	100	400	500
Camp 2	100	100	100	100	400	400
Camp 3	100	100	100	100	400	400
Total	300	300	300	300		
Required	200	250	350	300		
Cost	$11,200	$8,800	$8,900	$10,400	$39,300	

Problem

An army wants to move troops from 3 training camps to 4 different bases. All costs of moving a soldier from any camp to any base are known. How should the army move the troops to minimize cost?

Solution

1) The variables are the number of soldiers that are moved from each camp to each base. On worksheet Troops these are given the name Troops_moved.

2) The constraints are

Troops_moved >= 0 via the Assume Non-Negative option

Troops_per_camp <= Troops_available

Troops_per_base = Troops_required

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3) The objective is to minimize the total cost. This is defined on the worksheet as Total_cost.

Remarks

This model is a transportation model, like those shown in the Logistics Examples workbook. You might wonder why there is no constraint to assure that the numbers of troops moved are integers. It is a mathematical property of these types of problems that if the constants in the constraints are integers, the solution values for the variables are always integers. It is beyond the scope of these examples to further explore this.

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