Problem of the Week
Problem D and Solution
Ski Camp

Problem
For a winter ski camp, exactly 400 campers registered. Each camper registered for an outdoor activity, either downhill skiing or cross-country skiing. No camper could register for both of these outdoor activities. Also, each camper registered for an activity in the gym, either an aerobics group or a weight training group, but not both.

From the completed registrations, the following information is known: \( \frac{5}{8} \) of the campers are registered for the aerobics group; 40\% of the campers registered for downhill skiing are also registered for the aerobics group; and 66\( \frac{2}{3} \)\% of the campers registered for the aerobics group registered for cross-country skiing as their outdoor activity. Determine the percentage of campers registered in both cross-country skiing and the weight training group.

Solution
There were 400 students registered for the camp. Since \( \frac{5}{8} \) registered for the aerobics group, \( \frac{5}{8} \times 400 \) or 250 campers were in the aerobics group. Since all 400 campers had to be in either the aerobics group or the weight training group, it follows that 400 - 250 or 150 campers registered for the weight training group.

Since 66\( \frac{2}{3} \)% of the campers in the aerobics group were registered for cross-country skiing, \( 0.664 \times 250 \) or 166 campers were registered for both cross-country skiing and the aerobics group. The remainder of the aerobics group, 260 - 166 or 84 campers, were in the aerobics group and downhill skiing.

But these 84 campers then represent 40\% of the total number of campers registered for downhill skiing. Therefore, 84 \( \div \) 0.4 or 210 campers are registered for downhill skiing. It follows that 210 - 84 or 126 campers were registered in both weight training and downhill skiing.

The remaining campers had to be registered in both weight training and cross-country skiing. That is, 400 - 84 - 126 - 166 = 24 campers were registered in both weight training and cross-country skiing. This number, expressed as a percentage, is \( \frac{24}{400} \times 100\% = 6\% \).

Therefore, 6\% of the campers registered for both cross-country skiing and weight training.

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