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1991 Q23

23. The Pythagoras High School band has 100 female and 80 male members. The Pythagoras High School orchestra has 80 female and 100 male members. There are 60 females who are members in both band and orchestra. Altogether, there are 230 students who are in either band or orchestra or both. The number of males in the band who are NOT in the orchestra is

(A) 10 **(B)** 20 **(C)** 30 **(D)** 50 **(E)** 70

23. **(A)** There are 100 females in the band, 80 in the orchestra, and 60 in both. Thus, there are $(100 + 80) - 60 = 120$ females in at least one of the groups. Since the total is 230, then there are $230 - 120 = 110$ males in at least one of the groups. There are 80 males in band and 100 males in orchestra, thus to find the number of males in both, $(80 + 100) - ? = 110$. There are 70 in both. Finally, the number of males in band who are not in orchestra is $80 - 70 = 10$.

OR

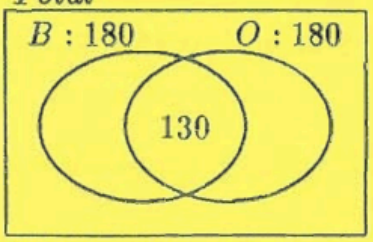
Make a chart for the given information:

	# in band	#in orchestra	# in both
Male :	80	100	?
Female :	100	80	60
Totals :	180	180	60+?

The total number of students is $180 + 180 - (60+?) = 230.$
Solving the equation we obtain $180 + 180 - 60 - ? = 230,$
$? = 70.$
Since 70 males are in both band and orchestra, it follows that $80 - 70 = 10$ males are in band who are not in orchestra.

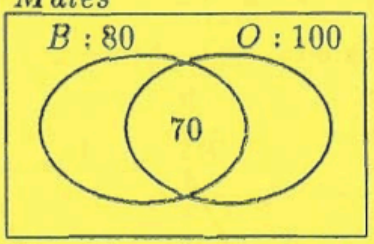
OR

Total



$180+180-230 = 130$ *in both*
$130-60 = 70$ *males in both*

Males



$80-70 = 10$ *males in band only*

OR

	Band	Orch	
Females	100	80	
	40	60	20 = 120
Males	80	100	
		?	= +110
			230

There are 130 in both,
thus ? equals 70.
It follows that 10 males are
in band only.