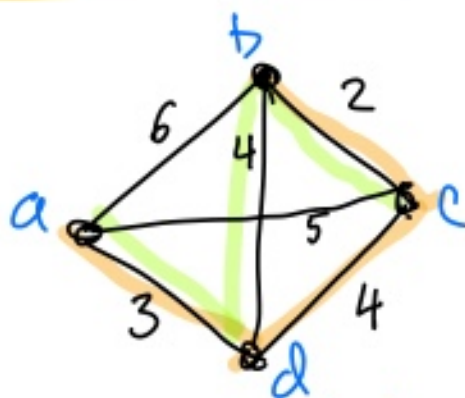


Question: 7 integers are chosen at random from $\{1, 2, \dots, 10\}$. Prove that there exist 2 pairs of these integers that sum to 11. (Did it last time)

[Would this still be true if we chose 6 integers?]

No
could choose, 1, 2, 3, 4, 5, 6,
and only 5, 6 add to 11.

Example



Prim Algorithm for min spanning tree:

$\{b, c\}, \{c, d\}, \{a, d\}$
weights 2 4 3 $\rightarrow 9$.

Kruskal Algorithm:

$\{b, c\}, \{a, d\}, \{b, d\}$
2 3 4 $\rightarrow 9$

Question: 21 Math students & 21 Physics Students compete in a problem solving competition. No one solved more than 6 problems. For each pair of math+physics students, they solved at least one question in common. Prove there exists at least one question that was solved by at least 3 math and 3 physics students