

Math 2001: Negation (Katherine Stange, Spring 2023)

There are a collection of people in the room.

Name	Hat colour	Shoe size
Alexa	red	7
Josh	green	5
Amieh	red	1
David	blue	3
Hannah	red	10
Yiting	yellow	17
Connor	blue	7

Task 1: Mark if each statement is true or false.

Task 2: Negate each statement.

Task 3: Check if the negation is true or false.

1. There exists someone with a purple hat in the room.
2. There exists a negative integer which is a perfect square.
3. There exists someone with a blue hat in the room.
4. There exists a real number x such that $x = -x$.
5. Every shoe size in the room is greater than 0.
6. Every integer is a rational number.
7. All hats in the room are either red or green.
8. All real numbers are either positive or negative.
9. If someone is wearing a red hat, then they have size 7 shoes.
10. If $x \in \mathbb{Z}$ is even, then $x > 3$.

11. If someone is wearing a green hat, then they have size 5 shoes.
12. If $x \in \mathbb{Z}$ is even, then x^2 is even.
13. If someone is wearing a purple hat, then they have size 7 shoes.
14. If $x \in \mathbb{Z}$ is a negative perfect square, then x is prime.
15. Everyone has a positive shoe size and a red hat.
16. All integers are rational and prime.
17. Everyone has a positive shoe size and a coloured hat.
18. All integers are rational and real.
19. Everyone has either a two-digit shoe size or a red hat.
20. All integers are either odd or prime.
21. Everyone has either a name beginning with a consonant or an odd shoe size.
22. Every integer greater than 5 is either odd or composite.