

§1.5, #28

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A is true. All real numbers, when squared, yield another real number. Since there's no upper limit on real numbers, there will always be some real number y that satisfies the condition, no matter the size of x .

B is true. For all x , there exists some y that is \sqrt{x} , which satisfies the condition $x = y^2$.

C is true. There does exist some real number x that will yield 0 when multiplied with all real numbers. It's 0.

D isn't true. In fact, the Commutative Property of Addition is written $\forall x \forall y (x + y = y + x)$, and that's an established truth. D is literally a straight negation of that, which makes it false.

E is true. This statement just says that for any real number that isn't 0, there's some real number that multiplies with it to make 1. Since a number and its reciprocal always multiply to make 1, and every number has a reciprocal, this is true.

F is false. This statement says that there's some real number that multiplies to 1 with all nonzero real numbers. This is impossible. Whenever only one term in multiplication changes, the product changes, unless the other term is 0, which it isn't.

G is true. All numbers have a number that, when added, yield 1. You can find this number with the equation $y = 1 - x$.

H is false. There are no values of x and y that fulfill the 2 equations $x + 2y = 2$ and $2x + 4y = 5$. If you graph them, they're parallel lines.

I is false. The 2 equations $x + y = 2$ and $2x - y = 1$ are only true when x and y are both 1. There is no other value of x where both are true, making this statement false.

J is true. No matter which x and which y you pick, there will always be an average between the two of them.