We're just answering your questions today

Prop $a, b \in \mathbb{Z}$, p is prime. If $ab \equiv 0 \pmod{p}$

then $a \equiv 0 \pmod{p}$ or $b \equiv 0 \pmod{p}$

Hint: If $p \mid xy \to p \mid x$ or $p \mid y$

⋮

_____ or _____

unique (only one)

exactly two

there is a thing and all other things are not a second one

there is a unique prime even integer.

neg

$$\exists x\,(\mathrm{Prime}(x) \wedge \mathrm{Even}(x) \wedge \forall y\,[[\mathrm{Prime}(y) \wedge \mathrm{Even}(y)] \to x = y])$$

$$\exists x \exists y\,(m(x) \wedge m(y) \wedge x \neq y \wedge \forall z\,([m(z)] \to [x = z \vee y = z]))$$

$$\neg\left[\exists x\left(\underline{P(x)} \wedge E(x)\right) \wedge \forall y\left([P(y) \wedge E(y)] \rightarrow y = x\right)\right)\right]$$

$$\forall x\left(\neg P(x) \vee \neg E(x) \vee \neg\left[\forall y\left(P(y) \wedge E(y)\right) \rightarrow \underline{y = x}\right)\right]\right)$$

$$\forall x\left(\underline{\neg P(x)} \vee \underline{\neg E(x)} \vee \exists y\left(P(y) \wedge E(y) \wedge y \neq x\right)\right)$$

$$\underline{\forall x}\left([P(x) \wedge E(x)] \rightarrow \exists y\left(\ldots\ldots \right)\right]$$

$\neg(a \to b)$

$\neg(\neg a \vee b)$

$a \wedge \neg b$

quantifier contrapositives

$\forall x\,(P(x) \to Q(x))$

$(\forall x\,(P(x))) \to (\exists x\,Q(x))$

1. Define $P(n)$
- returns T/F
- make sure it depends on n

2. Base Case(s)

3. IH Suppose $P(n)$ holds for $n = b, b+1, \ldots, k$ for an arbitrary $k \geq$ last base case

4. IS .. $P(k+1)$

5. Conclusion