

Indirect Proofs

6-1 The Coordinates of a Point in a Plane
(pages 213-214)

- 1) \overline{BC} must be vertical, $BC = AC = 7$.
B is (5, 3) or (5, -11)
- 3. b. 14 sq units 11. b. 10 sq units
- 5. b. 20 sq units 13. D(1, 4)
- 7. b. 21 sq units 15. a. Graph
- 9. b. 20 sq units b. 24 sq units

Agenda:

- 1) Do Now: review HW
- 2) Example Indirect Proof
- 3) Practice Indirect Proofs in pairs
- 4) Get TINSPIRE program on calcs

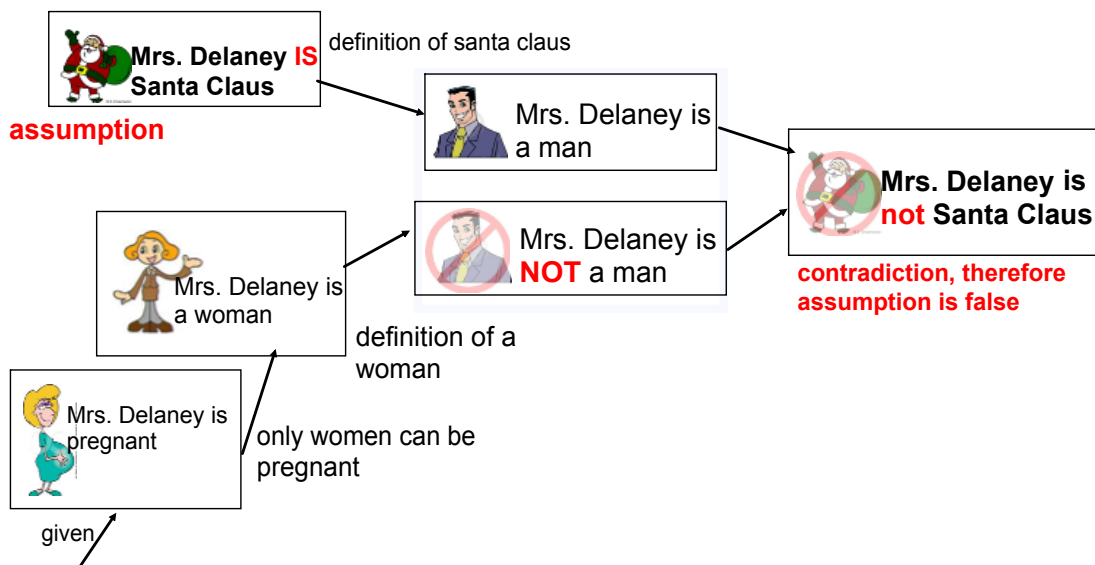
Indirect Proof:

How would you prove, in a court of law, that Mrs. Delaney was **NOT** Santa Claus?



Given: Mrs. Delaney is our pregnant math teacher.

Prove: Mrs. Delaney is **NOT** Santa Claus



Steps in an Indirect Proof:

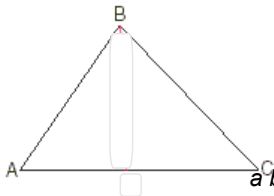
- Assume that the *opposite* of what you are trying to prove is true.
- From this assumption, see what conclusions can be drawn.
- Search for a conclusion that you know is **false** because it contradicts GIVEN or known information. If the assumption must be false- then what you are trying to prove must be true.

When is an indirect proof needed?

Generally, the word "not" or the presence of a "not symbol" (such as \neq) in a problem indicates a need for an Indirect Proof.

Example:

In the accompanying diagram, $\triangle ABC$ is *not* isosceles.
 Prove that if altitude \overline{BD} is drawn, it will *not* bisect \overline{AC} .



Given: $\triangle ABC$ is *not* isosceles. altitude \overline{BD}

Prove: \overline{BD} does not bisect \overline{AC}

a bisector divides a segment into two congruent segments

\overline{BD} bisects \overline{AC} **assumption** $\rightarrow AD \cong DC$

reflexive property of congruence $\rightarrow \overline{BD} \cong \overline{BD}$

$\angle BDA, \angle BDC$ are rt \angle 's $\rightarrow \angle BDA \cong \angle BDC$ *perpendicular lines form right angles* *all rt angles are congruent*

$\overline{BD} \perp \overline{AC}$ *an altitude extends from the vertex of a triangle perpendicular to the line containing the opposite side*

altitude \overline{BD} **given**

$\triangle BDA \cong \triangle BDC$ (SAS) $\rightarrow \triangle BDA \cong \triangle BDC$ (SAS) $\rightarrow \overline{AB} \cong \overline{CB}$ (CPCTC)

$\overline{AB} \cong \overline{CB}$ *Def. of isosceles triangle* $\rightarrow \triangle ABC$ is isosceles

$\triangle ABC$ is **not** isosceles **given** \rightarrow contradiction, therefore: assumption is false.

Attachments

Indirect%20Proofs.pdf