Honor's Keystone Geometry
5.6 Indirect Proof Practice

Name Key
Date ______

Write the first sentence of an indirect proof for the given statement.

1. ΔABC is equilateral
2. Kim isn't a violinist
3. Doug is Canadian
4. $a \geq b$
5. $m\angle x > m\angle Y$
6. $\overline{CX}$ isn't a median of ΔABC

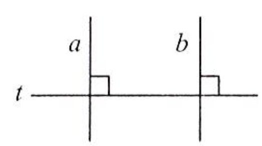
1 "Temporarily assume" ΔABC is not equilateral
2 Assume Kim is a violinist
3 Assume Doug is not Canadian
4 Assume $a < b$
5 Assume $m\angle x \leq m\angle Y$
6 Assume $\overline{CX}$ is a median of ΔABC

7. Suppose Taylor is planning to write an indirect proof that $\angle A$ is an obtuse angle. He begins by saying "Assume temporarily that $\angle A$ is an acute angle." What has Taylor overlooked?

$\angle A$ could also be a right angle or a straight angle

8. Arrange the sentences (a)-(e) in an order that completes an indirect proof of the following statement: *In a plane, two lines perpendicular to a third line are parallel to each other.*

Given: Lines *a, b,* and *t* lie in a plane
$a \perp t; b \perp t$
Prove: $a \parallel b$



a) Then *a* intersects *b* in some point *Z*.
b) But this contradicts the theorem which says that there is exactly one line perpendicular to a given line through a point outside the line.
c) It is false that *a* is not parallel to *b*, and it follows that $a \parallel b$.
d) Assume temporarily that *a* is not parallel to *b*.
e) ~~The~~ Then there are two lines through *Z* and perpendicular to *t*.

Ans. D, A, E, B, C

Write an indirect proof in paragraph form.

9. Given: ΔABC

   Prove: There can be no more than one obtuse angle in ΔABC

Temporarily assume there is more than one obtuse angle in ΔABC. Since one obtuse angle is greater than 90°, the sum of two obtuse angles would be greater than 180°. This fact contradicts the Triangle Sum Theorem which says there is 180° in a triangle. Therefore, the assumption must be false and there can be no more than one obtuse angle in ΔABC.

10. If two sides of a triangle are not congruent, then the angles opposite those sides are not congruent.

Temporarily assume that if two sides of a triangle are not congruent, then the angles opposite those sides ARE congruent. If two angles of a triangle are congruent, then by the Base Angles Theorem Converse, the sides opposite those angles must be congruent. However, this conclusion contradicts the given information. Therefore, the initial assumption is false and the angles opposite two noncongruent sides of a triangle CANNOT be congruent