2.2: Definitions and Biconditional Statements

Objective: Recognize + use definitions and Biconditional statements

Warm-up - copy of 2.2 warm-up and daily homework quiz

Vocab.

Biconditional Statement - a statement that contains the phrase "if and only if"

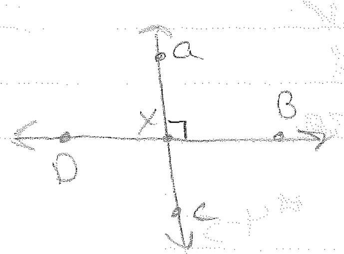
Perpendicular lines - lines that intersect to form a right angle

Line $\perp$ to a plane - a line that intersects a plane at a right angle

- Write these two definitions as if-then statements. Now find the inverse, converse, and contrapositive

Using definitions

Decide whether the statements are true. Use definitions you have learned to support your answer.



1) D, X, B are collinear
2) $\overleftrightarrow{ac} \perp \overleftrightarrow{DB}$
3) $\measuredangle aXB$ is adjacent to $\measuredangle CXD$

Rewriting Bi-Conditional Statements

Rewrite the bi-conditional statement into a conditional statement and it's converse

a bi-conditional statement is equivalent to writing the converse and it's converse

Three lines are coplanar if and only if they lie in the same plane.

Cond: If three lines are coplanar then they lie in the same plane

Converse: If three lines lie in the same plane, then they are coplanar

Now try: exercise for example 1 #1,2,3

Analyizing a bi-conditional statement

Always answer: Is this a bi-conditional statement?
Is the statement true?
- to see if the statement is true, write it as a conditional statement and the converse

ex $x=3$ if and only if $x^2=9$
a) is it a biconditional? Yes, contains iff
b) Write the conditional + converse
If $x=3$ then $x^2=9$: ✓
If $x^2=9$ then $x=3$: X
The biconditional statement is false

Now try: Exercise for Example 2 #4-5

Writing a Biconditional Statement

What must be true for a bi-conditional statement?
- The if-then statement is true, and the converse is true.

You must first see if both are true before you write a biconditional statement.

ex: If two points lie in a plane, then the line containing them lies in the plane. True

Converse: If the line containing two points lies in the plane, then the points lie in the plane. True

Biconditional: Two points lie in a plane if and only if the line containing them lies in the plane

ex 2: If the product of ab is negative, then either "a" or "b" is negative

Converse: If either "a" or "b" is negative, then the product of ab is negative

- converse is false, give a counter example
  $a = -3$ $b = 0$

Closure: What must be true for a biconditional statement to be true? How is a biconditional statement different than a conditional statement?

Homework: 2.2B #1-17