**IF AND ONLY IF: BICONDITIONAL**

**{WORKS BOTH WAYS}**

|  |  |  |
| --- | --- | --- |
| P | Q | P Q |
| T | T | T |
| T | F | F |
| F | T | F |
| F | F | T |

1. A triangle is a right triangle if and only if it contains a right angle.
2. A triangle contains a 90 degree angle if and only if it is a right triangle.
3. A triangle is not a right triangle if and only if it does not contain a 90 degree angle.

In 6-15, identify the truth value to be assigned to each biconditional.

1. x+3 = 30 if and only if x = 27.
2. A polygon is a pentagon if and only if it has exactly three sides.
3. x+4 = 12 if and only if x+6 = 14
4. A rectangle is a square if and only if the rectangle has all sides of equal length.

More examples…….

**IF, THEN Statements**

**{ONE IMPLIES THE OTHER}**

|  |  |  |
| --- | --- | --- |
| P | Q | P Q |
| T | T | T |
| T | F | F |
| F | T | T |
| F | F | T |

1. If you come in early tomorrow, then I will give you 5 extra points.

1. If a stop sign has 8 sides, then a square has 6 sides.

Which compound statement is true?

1 A triangle has three sides and a quadrilateral has five sides.

2 A triangle has three sides if and only if a quadrilateral has five sides.

3 If a triangle has three sides, then a quadrilateral has five sides.

4 A triangle has three sides or a quadrilateral has five sides

**Closing**

Make up 3 of your own statements using **and**, **or**, **if** **then**, or **if and only if**. Assign truth values to your statements.

Review

1. Write the converse of the following: If I do not like ice cream, then I do not want a sundae.

1. (True or False?) Starbucks sells coffee or dogs meow.
2. (True or False?) Mr. Desmond is my teacher and I am a thirteen.
3. (True or False?) A triangle is isosceles if and only if the triangle has two congruent sides.
4. What is the negation of the statement “Squares are parallelograms”?
5. (True or false?) If you are in Social Studies class, then Mr Desmond is not your teacher.
6. Write a logically equivalent statement to: “If you like math, then you are cool.”
7. Write the inverse of the statement “I do not want to go to Geometry.”
8. Write the contrapositive of the statement “If your name is Argend, then you love basketball.”