# **NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_PER.\_\_\_\_\_\_**

## **2.2 BICONDITIONALS & REASONING**

**Write the conditional statement and converse within each biconditional.**

|  |  |
| --- | --- |
| 1. Conditional:

 Converse: | Perry can paint the entire living room if and only if he has enough paint. |
| 1. Conditional:

 Converse: | Three points are coplanar if and only if they lie in the same plane. |
| 1. Conditional:

 Converse: | A lunar eclipse occurs if and only if Earth is between the sun and the moon. |

For each conditional statement below, write the converse and a biconditional statement.

|  |  |
| --- | --- |
| 1. Converse:

 Biconditional: | If a student is a sophomore, then the student is in the tenth grade. |
| 1. Converse:

 Biconditional: | If Greg has the fastest time, then he wins the race. |

Write each definition as a biconditional.

|  |  |
| --- | --- |
|  | Parallel lines are two coplanar lines that never intersect. |
|  | A circle is the set of all points in a plane that are a fixed distance from a given point. |

Determine if each biconditional is true. If false, give a counterexample.

|  |  |
| --- | --- |
| 1. TRUE or FALSE

 Counterexample: | $$xy= 0 iff x=0 $$$$or y=0$$ |
| 1. TRUE or FALSE

 Counterexample: | Felix is a swimmer if and only if he is an athlete. |

Find the next item in each pattern.

|  |
| --- |
| 1. March, May, July, …
 |
| 1. $75, 64, 53, $…
 |

Complete each conjecture.

|  |
| --- |
| 1. The product of two negative numbers is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
 |
| 1. The sum of the angles in a linear pair is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
 |

Make a conjecture about each pattern. Write the next two items.

|  |  |
| --- | --- |
| 1. $2, 4, 16, $…
 | Conjecture: |
| 1. $-3, 6, -9, 12, $…
 | Conjecture: |

**Show that each conjecture is false by finding a counterexample.**

|  |  |
| --- | --- |
| 1. Counterexample:
 | Three points on a plane always form a triangle. |
| 1. Counterexample:
 | For any real number $x$, if $x^{2}\geq 1$, then $x\geq 1$. |
| 1. Counterexample:
 | Every pair of supplementary angles includes one obtuse angle. |

**Determine if each conjecture is true. If not, write or draw a counterexample.**

|  |  |
| --- | --- |
| 1. TRUE or FALSE

 Counterexample: | Points $X, Y,Z $and W are coplanar. |
| 1. TRUE or FALSE

 Counterexample: | If B is between A and C and AC = 10, then AB = 5 and BC = 5. |

**Determine whether each conclusion uses inductive or deductive reasoning.**

|  |  |
| --- | --- |
|  | At Martin High School, students must play JV Football before they can be on Varsity. Sam is on Varsity, so Marcia concludes that he was on JV last year. |
|  | The sum of the angle measures of a triangle is $180°$. Two angles of a triangle measure $40°$ and $60°$, so Kandy concludes that the third angle measures $80°$. |
|  | All of the students in Henry’s Geometry class are juniors. Alex takes Geometry but has another teacher. Henry concludes that Alex is also a junior. |