Some important terms to know:

You use **inductive reasoning** when you find a pattern in specific situations and then write a conjecture for the general case.

A **conjecture** is an unproven statement that is based on observations.

A **counter example** is a specific case for which the conjecture is false.

**Deductive Reasoning:** Process of using facts, definitions, and laws of logic to form a logical argument, which can be valid or, actually, invalid as well.
Laws of Logic

**Law of Detachment:** If the hypothesis \( h \) of a true conditional statement is true, then the conclusion \( c \) is also true.

This is also called a **direct argument**.

**Law of Syllogism:**

If the hypothesis \( a \) then conclusion \( b \)
If the hypothesis \( b \), then conclusion \( c \)

If hypothesis \( a \), then conclusion \( c \)
We sometimes call the Law Of Syllogism the "chain rule".
Example: Describe the pattern in the numbers and then write the next three.

18, 11, 4, -3, ...

How are these numbers changing?

Answer!
Example: Write the if-then form, converse, inverse, and contrapositive of the following statement:

**Statement:**
Two lines that intersect form two pairs of vertical angles.

**If-Then Format:**

Converse:

Inverse:

Contrapositive:
Using the law of syllogism, write the statement that follows from the pair of statements that are given.

If you give a pig a pancake, then she will want some syrup to go with it.

If you give a pig some syrup, she will then probably get all sticky.

ANSWER!
In Geometry, rules that are accepted without proof are called **Postulates or Axioms**. Rules that are proved are called **theorems**. So far we have 11 postulates:

**Postulate 1:** Two points on a line can be matched with numbers. Distance between two points is the absolute value of the difference of the coordinates.

**Postulate 2:** If B is on a line between A and C, the \( AB + BC = AC \) (SAP)

**Postulate 3:** A protractor can be used to determine the measure of an angle.

**Postulate 4:** If P is between an angle \(<RST\), then \( m <RSP + m <PST = m <RST \) (AAP)

**Postulate 5:** Through any two points there exists exactly one line.

**Postulate 6:** A line contains at least two points.

**Postulate 7:** If two lines intersect, then their intersection is exactly one point.

**Postulate 8:** Through any three noncollinear points there exists exactly one plane.

**Postulate 9:** A plane contains at least three noncollinear points.

**Postulate 10:** If two points lie in a plane, then the line containing them lies in the plane.

**Postulate 11:** If two planes intersect, then their intersection is a line.
What Can We Assume Here?

T  F

B, E, M and K are coplanar.

A, C, M and D are collinear.

<\text{AEB} and <\text{JEB} are supplementary.

<\text{GDJ} and <\text{ADG} are linear pair angles

\text{EM} and \text{JA} are the same line

\text{BC} and \text{DJ} intersect

\text{ME} and \text{FG} do not intersect

\text{J} and \text{H} are collinear.

<\text{MDF} \cong <\text{FDJ}

\text{FD} \perp \text{MD}
## Algebraic Properties Of Equality:

<table>
<thead>
<tr>
<th>Property</th>
<th>Condition</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition Property</td>
<td>If $a = b$</td>
<td>$a + c = b + c$</td>
</tr>
<tr>
<td>Subtraction Property</td>
<td>If $a = b$</td>
<td>$a - c = b - c$</td>
</tr>
<tr>
<td>Multiplication Property</td>
<td>If $a = b$</td>
<td>$a \times c = b \times c$</td>
</tr>
<tr>
<td>Division Property</td>
<td>If $a = b$, and $c \neq 0$</td>
<td>$a = b$ if $c \neq 0$</td>
</tr>
<tr>
<td>Substitution Property</td>
<td>If $a = b$</td>
<td>then $a$ can be substituted for $b$ in any expression or equation</td>
</tr>
<tr>
<td>Distributive Property</td>
<td>If $a = b$</td>
<td>$a(b + c) = ab + ac$</td>
</tr>
</tbody>
</table>
Solve the equation. Write a reason for each step.

\[ 8x + 30 = 78 \]

<table>
<thead>
<tr>
<th>Problem</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>8x + 30 = 78</td>
<td>This is the problem!</td>
</tr>
</tbody>
</table>
Review Assignment:
EP4: 1-9, 11-30