Name:_____   Date:_____

Geometry Notes Into to Geo Proofs - 3: Definitions and Drawing Conclusions

Definitions (Review)

In math, a precise definition should work "both ways." (It is a biconditional.)

Ex: A triangle is a polygon with exactly three sides.

1.   If a polygon is a triangle, then it has exactly three sides.

2. If a polygon has exactly three sides, then it's a triangle.

Ex: A square is a polygon with exactly four sides.

1. If a polygon is a square, then it has exactly four sides.

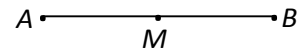2. If a polygon has exactly four sides, then it's a square.

Drawing simple conclusions

We can use definitions to draw simple conclusions.

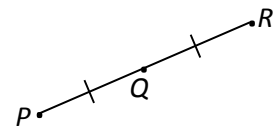1.   Given: M is the midpoint of $\overline{AB}$.

Conclusion:

Reason:

Note: Remember, in proofs, a "given" is *assumed to be true*.

2.   Given: $\overline{PQR}$ and $\overline{PQ} \cong \overline{QR}$.

Conclusion:

Reason:

3. Given: $m\angle ABC + m\angle XYZ = 180°$
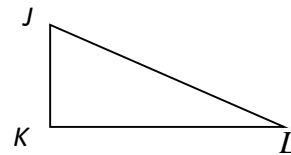
   Conclusion:

   Reason:

4. Given: $\angle JKL$ is a right angle.
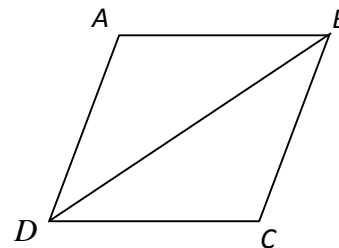
   Conclusion:

   Reason:

   Conclusion:

   Reason:

   Conclusion:

   Reason:

5. Given: $\overline{BD}$ bisects $\angle ABC$
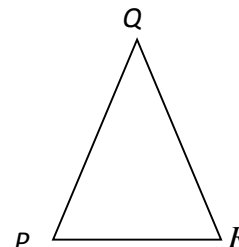
   Conclusion:

   Reason:

   <u>Not</u>:

   <u>Not</u>:

6. Given: $\overline{PQ} \cong \overline{QR}$

   Conclusion:

   Reason:

Name _____

Rewrite each definition in the form of two conditionals:

1. Perpendicular lines form right angles.

   a. If two lines _____

   b. If two lines _____

2. An angle bisector is a line (or segment) that divides an angle into two congruent parts.
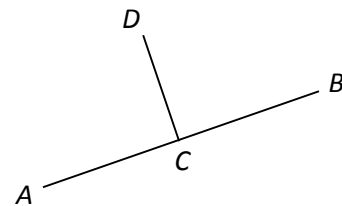
   a. If a line (or segment) _____

   b. If a line (or segment) _____

In problems #3 - 12, for each given, state a valid conclusion **and a reason** based on the definitions we have covered. (Note: some of these have more than one correct answer.)

3. Given: $\overline{AB} \perp \overline{CD}$
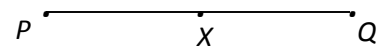
   Conclusion: _____

   Reason: _____

4. Given: X is the midpoint of $\overline{PQ}$.
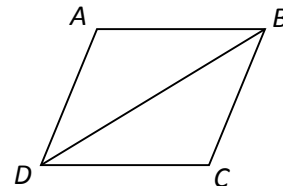
   Conclusion: _____

   Reason: _____

5. Given: $\overline{BD}$ bisects $\angle ABC$.
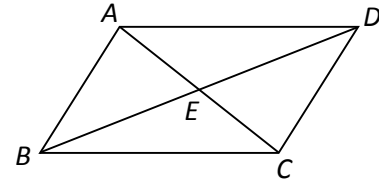
   Conclusion: _____

   Reason: _____

6. Given: $\overline{BD}$ bisects $\overline{AC}$ at E.
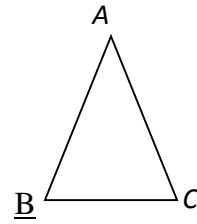
Conclusion: _____

Reason: _____

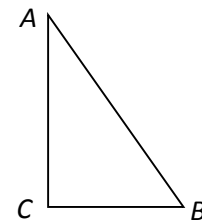7. Given: $\overline{AB} \cong \overline{AC}$

Conclusion: _____

Reason: _____

8. Given: $\overline{AC} \perp \overline{BC}$.

1st Conclusion: _____

Reason: _____
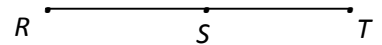
2nd Conclusion: _____

Reason: _____

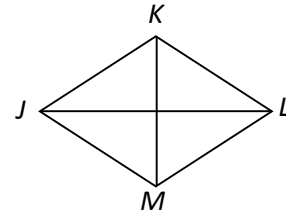9. Given: $\overline{RST}$ and $\overline{RS} \cong \overline{ST}$.

Conclusion: _____

Reason: _____

10. Given: $\overline{JL}$ divides $\overline{KM}$ into two congruent parts.
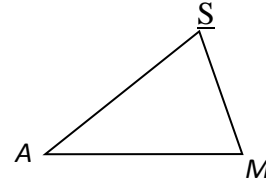
Conclusion: _____

Reason: _____

11. Given: *A* is the vertex of isosceles triangle *SAM*
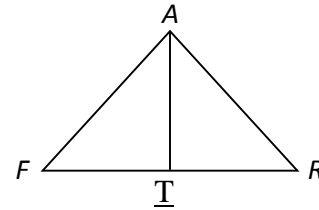
Conclusion: _____

Reason: _____

12. Given: $\angle FAT \cong \angle RAT$

Conclusion: _____

Reason: _____

13. Given $\overline{LINE}$, N is the midpoint of $\overline{IE}$, *LE* = 30 and *NE* is three less than *LI*. Find the numerical length of *LI*.

14. In the diagram at right, $\overrightarrow{BD}$ bisects $\angle ABC$, $m\angle ABD = 66 - 2x$ and $m\angle CBD = 3x - 24$. Find the numerical value (a number, not just an algebraic expression) of $m\angle ABC$.