Geometry- Chapter 2 Review

Make a conjecture about the next term in the sequence.
1. –4, -1, 2, 5, ___________
2. –2, 4, -8, 16, ___________
3. 2, 1, .5, .25, ___________

Make a conjecture based on the given information. Draw a figure to illustrate your conjecture.
4. Point S is between R and T.
   Picture: ___________
   Conjecture: ___________
5. \( \angle 9 \) and \( \angle 10 \) form a right angle.
   Picture: ___________
   Conjecture: ___________

Determine whether each conjecture is true or false. Give a counterexample for any false conjecture.
6. Given: Two angles are supplementary.
   Conjecture: They are both acute angles.

7. Given: \( MATH \) is a rectangle.
   Conjecture: \( MA = TH \) and \( MH = AT \)

Underline the hypothesis and circle the conclusion of each statement.
8. If it is Saturday, then there is no school.

9. If it rains before noon, then we will not play football.

10. If Penn State wins, then they will go to a bowl game.
Write each statement in if – then form. Then identify the hypothesis and conclusion.

11. A triangle with a right angle is called a right triangle.

12. All elephants are afraid of mice.

13. An angle with a measure greater than 90 is an obtuse angle.

For Problem 14-15 Write the converse, inverse, and contrapositive of the conditional statement.

14. Conditional: If the month is March, then it has 31 days.
   Converse:
   Inverse:
   Contrapositive:

15. Conditional: If the angle is obtuse then it is more than 90 degrees.
   Converse:
   Inverse:
   Contrapositive:

16.) Using the Law of Detachment, determine whether the stated conclusion is valid based on the given information. If not, write invalid. Explain your reasoning.

   If two angles are adjacent, then they have a common vertex.

a.) Given: \( \angle 3 \) and \( \angle 4 \) have a common vertex.
   Conclusion: \( \angle 3 \) and \( \angle 4 \) are adjacent angles

b.) Given: \( \angle 1 \) and \( \angle 2 \) are adjacent angles.
   Conclusion: \( \angle 1 \) and \( \angle 2 \) have a common vertex.
17.) Use the Law of Syllogism to reach a valid conclusion. If possible, write it. If not, write no conclusion.
   a.) If the measure of $\angle A$ is less than 90, then $\angle A$ is acute.
       If $\angle A$ is acute, then $\angle A \equiv \angle B$.

   b.) If you study for the test, then you will receive a high grade.
       Your grade on the test is high.

18.) Determine whether each statement is always, sometimes, or never true. Justify your answer.
   a.) Two segments that have the same measure are congruent.

   b.) The intersection of two lines is a plane.

   c.) Two angles whose sum is 180 form a linear pair.

   d.) A plane contains at least three points not on the same line.

19.) Which statement is true given that K is between J and L?
   a. $JK + KL = JL$
   b. $JL + LK = JK$
   c. $LJ + JK = LK$
   d. $JK \equiv KL$

20.) State a conclusion that can be drawn from the statement:
     W is between X and Z.

21.) Which is a valid conclusion for the statement:
     $\angle R$ and $\angle S$ are vertical angles?
   a. $m\angle R + m\angle S = 180$
   b. $m\angle R + m\angle S = 90$
   c. $\angle R$ and $\angle S$ are adjacent
   d. $\angle R \equiv \angle S$
22.) Which is a valid conclusion for the statement:
\[ \angle R \text{ and } \angle S \text{ are vertical angles?} \]

a. \( m\angle R + m\angle S = 180 \)
b. \( m\angle R + m\angle S = 90 \)
c. \( \angle R \text{ and } \angle S \text{ are adjacent} \)
d. \( \angle R \equiv \angle S \)

23.) If P is in the interior of \( \angle MON \) and \( m\angle MOP = \frac{1}{2} m\angle MON \), what can you conclude?

a. \( \angle PON \equiv \angle NOM \)
b. \( \angle MON \text{ is an acute angle} \)
c. \( OP \text{ is the angle bisector of } \angle MON \)
d. \( m\angle MON > m\angle PON \)

24.) Find the measure of each numbered angle.

a.) \( m\angle 1 = 5x + 20 \)
\( m\angle 2 = 3x + 80 \)

b.) \( m\angle 1 = 8x + 18 \text{ and } m\angle 2 = 16x - 6 \).


c.) \( \angle 7 \text{ and } \angle 9 \text{ are complementary.} \)
\( m\angle 7 = 6x + 15 \text{ and } m\angle 9 = 2x - 21 \)

25.) The measures of two complementary angles are in the ratio 7:8. What is the measure of the larger angle?

a. 42 \hspace{1cm} b. 48 \hspace{1cm} c. 84 \hspace{1cm} d. 96
26.) Find the value of $x$ and $AP$, if $P$ is between $A$ and $B$ and $AB = 42$ cm, $AP = 6x - 4$, and $PB = 10$ cm.

27.) What is the midpoint of the segment having endpoints $X(-2, 8)$ and $Y(7, 4)$?

Using the figure at right:

28.) Name the vertex of $\angle 2$.

29.) Give the sides of $\angle 2$.

30.) If $\angle 2 = 75$, what is the measure of its supplement?

31.) Find $SR$ if $R$ is the midpoint of $SU$.

32.) If $\overline{AB} \cong \overline{BC}$, $AB = 4x - 2$ and $BC = 3x + 3$, find $x$
   
a. 5  
b. 4  
c. 3  
d. 2

33.) If $\overline{BD}$ bisects $\angle ABC$, $m\angle ABD = 2x + 3$ and $m\angle DBC = 3x - 13$, find $m\angle ABD$.

34.) What is the value of $x^2 + 3yz$ if $x = 3$, $y = 6$, and $z = 4$?
35.) Solve $2(x - 7) = 5x + 4$

36.) Is $(-2, 5)$ a solution of $3x + 4y = 14$?

37.) What is the perimeter of triangle DEF if its vertices are D (-2, -6), E (-2, 6), and F (3, -6)?

Prove the following by writing a two-column proof.

38.) **Given:** $2x - 7 = 4$

   **Prove:** $x = \frac{11}{2}$

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39.) **Given:** $6x + 2(x - 1) = 30$

   **Prove:** $x = 4$

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