Honors Geometry
Unit 1 Test (2017)

Complete the following questions.

1. Name the following line. [Circle ALL correct answers.]
   - \( \overline{GH} \)
   - \( \overline{HJ} \)
   - \( \overline{GJ} \)
   - line \( j \)
   - \( \overline{q} \)
   - \( \overline{JC} \)
   - \( \overline{JC} \)

2. Which of the following is a name for the plane? [Circle ALL correct answers.]
   - plane \( ABC \)
   - plane \( CDA \)
   - plane \( MDA \)
   - plane \( \mathcal{N} \)
   - plane \( EAB \)
   - plane \( D \)

Use the figure at the right to answer #3-11.

3. Use a red/orange/yellow colored pencil to shade plane \( \mathcal{N} \).
4. Give another name for plane \( \mathcal{N} \). plane \( ABE \)
5. Use a blue/green/purple colored pencil to shade plane \( DHE \).
6. Name the intersection of plane \( \mathcal{N} \) and plane \( DHE \). \( EB \)
7. What is another name for \( \overrightarrow{BC} \)? \( \overrightarrow{EH} \)
8. Name a plane that contains \( \overline{AD} \). plane \( AGD \)
9. Name three points that are collinear AND explain why they are collinear.
   - \( B, H, \) and \( C \) are collinear since they all lie on the same line.
10. Are \( \overline{KJ} \) and \( F \) coplanar? Briefly explain.
    - Yes, both \( \overline{KJ} \) and \( F \) lie on plane \( AGF \).
11. Are \( A, E, D, \) and \( G \) coplanar?
    - Yes, \( A, E, D, \) and \( G \) all lie on plane \( AGD \).
Make a conjecture about the next two items in the sequence. Then describe the pattern.

12. \[
\begin{array}{cccc}
\frac{3}{2} & \frac{9}{4} & 27 & 81 \\
\frac{2}{20} & \frac{100}{1000} & 243 & \frac{729}{12500}
\end{array}
\] Multiply by \(\frac{3}{5}\)

13. \[
\begin{array}{cccc}
2 & 3 & 6 & 11 \\
+1 & +3 & +5 & +7 & +9 & +11 & +13 \\
& \frac{38}{27} & \frac{51}{20}
\end{array}
\] Increase by next odd number

Draw a figure to model each of the following situations.

14. lines \(p, q,\) and \(r\) are parallel and are contained in plane \(M\)

15. \(B, C,\) and \(F\) are collinear with \(F\) between \(B\) and \(C\)

Write each statement in if-then form.

16. Every butterfly was once a moth.
   
   If an animal is a butterfly, then it was once a moth.

17. No mediaperson is allowed past security.

   If a person is medi, then they are not allowed past security.
22. Given the following sequence, what is the 102\textsuperscript{nd} term of the sequence?

\[A, B, C, D, E, F, A, B, C, D, E, F, A, ...\]

\[
\frac{102}{6} = 17 \text{ remainder } 0...
\]

So the 102\textsuperscript{nd} term is \(E\).

23. Write a conditional statement to represent the Venn diagram.

If something is a Yow, then it is a Moozy.

24. Statement 1: If a polygon has five sides, then it is a pentagon.
   Statement 2: If a polygon is a pentagon, then the interior angle sum is 540\degree.

   Conclusion: \textit{If a polygon has five sides, then the interior angle sum is 540\degree.}

25. Statement 1: If you get an A on the test, you will get a sticker.
    Statement 2: You get a sticker.

    Conclusion: \textit{no valid conclusion}

26. Given the following statement, match the related conditional statements with the correct term.

\textbf{If a polygon is regular, then it is convex.}

A. If a polygon is convex, then it is regular.
B. If a polygon is concave, then it is irregular.
C. If a polygon is regular, then it is convex.
D. If a polygon is irregular, then it is concave.

Converse: \(A\) \quad Inverse: \(D\) \quad Contrapositive: \(B\)
18. Determine if the following statement is true or false. If false, provide a counterexample.

If a whole number is odd, then its square is odd.

\[ \begin{align*}
3^2 &= 9 \quad \text{odd} \\
5^2 &= 25 \quad \text{odd}
\end{align*} \]

\[ \text{TRUE} \]

Write the hypothesis and conclusion of each of the following statements. Then determine the truth value.

19. If you own a car, then you are a good driver.

Hypothesis: You own a car.

Conclusion: You are a good driver.

Truth Value: False \( \rightarrow \) my friend Lisa owns a car, but is not a good driver.

20. Parallel lines never intersect. \( \rightarrow \) If lines are parallel, then they never intersect.

Hypothesis: Lines are parallel.

Conclusion: They never intersect.

Truth Value: True

21. Which of the following is the converse of the following statement? (Circle one)

All Goops wear hats. \( \rightarrow \) If something is a Goop, then it wears a hat.

A. If you are a Goop, then you wear a hat.

B. If you are not a Goop, then you do not wear a hat.

C. If you do not wear a hat, then you are not a Goop.

D. If you wear a hat, then you are a Goop.
Give the 'Reason' that justifies each statement.

27. If $9 = x + 5$, then $9 - 5 = x + 5 - 5$.

\[ \text{Subtraction Property of } = \]

28. If $m \angle 1 = m \angle 2$ and $m \angle 2 = m \angle 3$, then $m \angle 1 = m \angle 3$.

\[ \text{Transitive Property of } = \]

29. If $AB = CD$ and $AB + BC = AC$, then $CD + BC = AC$.

\[ \text{Substitution Property of } = \]

30. Draw and label a picture for the following description.

Plane $ABC$ intersects plane $DEF$ at $\overline{GH}$

31. In a group of 30 people, how many handshakes are necessary for every person to shake hands with each other?

\[ n = \# \text{ people} = 30 \]

\[ \# \text{ handshakes} = \frac{n(n-1)}{2} \]

\[ \Rightarrow \frac{30(30-1)}{2} = \]

\[ = \frac{30(29)}{2} \]

\[ = \frac{870}{2} \]

\[ = 435 \text{ handshakes} \]
33. Complete the following two-column proof.

Given: $4(2x - 3) = 7x$
Prove: $x = 12$

1. $4(2x - 3) = 7x$  
   1. Given
2. $8x - 12 = 7x$  
   2. Distributive Prop
3. $-12 = -1x$  
   3. Subtraction Prop of $=$
4. $12 = x$  
   4. Division Prop of $=$
5. $x = 12$  
   5. Symmetric Prop

Use the indicated property to complete each statement.

34. Substitution Property: If $m\angle 1 = 80$ and $m\angle 1 + m\angle 2 = 180$, then $80 + m\angle 2 = 180$

35. Transitive Property: If $3y = x$ and $x = y + 4$, then $3y = y + 4$. 