Select the best answer for each problem. Drawings and figures are not drawn to scale.

1. Circle the letter of the diagram which can be used to prove lines $f$ and $g$ are parallel.

2) For the following triangles, classify the triangle by its angles and its sides then find the value of $x$

a.

b.

c.

By Sides: _____________________________

By Angles: _____________________________

$x = ______________$

3) Circle the statement which is NOT true.

a) $FH$ and $HB$ intersect at point $F$.

b) Points $A, J$, and $H$ are coplanar.

c) Rays $FA$ and $FB$ are opposite rays.

d) Point $I$ is collinear with points $D$ and $C$.

e) Plane $EFH$ intersects plane $AGC$.

4) Find the midpoint of $AB$ given $A = (-2, 7)$ and $B = (-4, -9)$

a) $(-6, 2)$  b) $(-3, -1)$  c) $(-6, -2)$  d) $(2, 2)$

5) Which statement is the converse statement of “If it is the weekend, then I am working.”

a). If it is not the weekend, then I am not working.

b). If it is Saturday, then I am working.

c). If I am working then it is the weekend.

(d) If I am not working, then it is not the weekend.
6) Complete the statement given that \( m\angle EHC = m\angle DHB = m\angle AHB = 90^\circ \).

The values may change except for the givens above.

Treat each question as a separate problem.

a. IF \( m\angle 7 = 28^\circ \), then \( m\angle 3 = 28^\circ \)
   b. IF \( m\angle EHB = 121^\circ \), then \( m\angle 7 = 31^\circ \)
   c. IF \( m\angle 3 = 34^\circ \), then \( m\angle 5 = 34^\circ \)
   d. IF \( m\angle GHB = 158^\circ \), then \( m\angle FHC = 158^\circ \)
   e. IF \( m\angle GHD = 119^\circ \), then \( m\angle 4 = 61^\circ \)

7) Sketch a polygon that has the following characteristics. Be sure to include the appropriate makings.

<table>
<thead>
<tr>
<th>a) concave quadrilateral</th>
<th>b) equiangular hexagon</th>
<th>c) equilateral octagon</th>
<th>d) regular pentagon</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="concave quadrilateral" /></td>
<td><img src="image2" alt="equiangular hexagon" /></td>
<td><img src="image3" alt="equilateral octagon" /></td>
<td><img src="image4" alt="regular pentagon" /></td>
</tr>
</tbody>
</table>

8) Which statement is the inverse of the statement "If a line exists then it contains at least two points.

a) A line exists if and only if it contains two points.
   b) If a line does not exist then it does not contain at least two points.
   c) If a line contains at least two points then it exists.
   d) A line that does not contain at least two points then does not exist.

9) Which statement can be written as a true biconditional statement?

a) If a polygon is a square, then it has four equal sides.
   b) If an angle is a right angle, then it measures \( 90^\circ \).
   c) If an angle measures \( 100^\circ \), then it is obtuse.
   d) If angles measure \( 30^\circ \) and \( 60^\circ \), then they are complementary.

10) Which statement is the contrapositive of the statement "If a line exists then it contains at least two points.

a) A line exists if and only if it contains two points.
   b) If a line does not exist then it does not contain at least two points.
   c) If a line contains at least two points then it exists.
   d) If a line does not contain at least two points then it does not exist.

11) Using the figure at the right, which of the following statements is not true?

a) ST lies in plane W.
   b) R, Q, and V are collinear.
   c) \( \overline{QR} \) and \( \overline{QT} \) are opposite rays.
   d) R, Q, and V are coplanar.

Oops, that goes over the ST in answer a.
12) a. Perform the transformation \((x, y) \rightarrow (x + 3, y - 4)\).  
   b. Perform a dilation with a scale factor of 2.

![Graph showing transformation](image)

13) Planes A and B intersect as shown. Points C and D lie on plane A. Points X, Y, and Z lie on plane B.

**True or False:** (Circle the correct choice.)

- a) \(CD\) is on plane A.  
  - T or F  
  - T

- b) Points C, D, and X are coplanar.  
  - T or F  
  - F

- c) \(XY\) intersects line \(EF\).  
  - T or F  
  - F

- d) \(XY\) intersects line \(CD\).  
  - T or F  
  - T

**Complete the sentence:**

- e) The intersection of plane A and plane B is \(\overrightarrow{EF}\) or line \(l\).

14) Select the appropriate property for the statement.

If \(m \angle R = m \angle S\) then \(m \angle R + m \angle K = m \angle S + m \angle K\)

- a) Addition Property of Equality  
- b) Reflexive Property of Equality  
- c) Symmetric Property of Equality  
- d) Transitive Property of Equality

15) Use the figure at the right to find the values of \(x\) and \(y\) that will make the two lines parallel.

\[
\begin{align*}
4x + 15 + x &= 180 \\
5x + 15 &= 180 \\
x &= 33
\end{align*}
\]

\[
\begin{align*}
3y &= 33 + x \\
y &= 11
\end{align*}
\]

16) Given \(\overrightarrow{EC}\) bisects \(\angle BED\) and \(\overrightarrow{EB}\) bisects \(\angle AEC\). \(m \angle BEC = 33^\circ\) find \(m \angle AED\).

- a) 33°  
- b) 66°  
- c) 99°  
- d) 121°
17) Select the correct property for each statement. Mark the letter of the appropriate choice in the blank.

A. Multiplication Property of =
B. Symmetric Property
C. Distributive Property
D. Subtraction Property of =
E. Transitive Property
F. Division Property of =
G. Addition Property of =
H. Substitution Property of =
I. Reflexive Property

\[ m \angle X = m \angle Z, \text{then } m \angle Z = m \angle X \]
\[ \text{If } BC = CD \text{ and } CD = EF, \text{then } BC = EF \]
\[ \text{For any segment } AB, \text{AB} = \text{AB} \]
\[ \text{If } m \angle K = 30^\circ, \text{then } 3( m \angle K ) = 90^\circ. \]
\[ \text{If } x + 2 = y + 5, \text{then } x = y + 3 \]

18) Find the values of x and y which will make a \( || \) b. Explain your reasoning.

Why does this value of x make the two lines parallel?

\[ 2x - 15 = x + 30 \]
\[ x = 45 \]

Why does this value of y make the two lines parallel?

\[ 4y + 25 + 75 = 180 \]
\[ 4y = 80 \]
\[ y = 20 \]

19) Using the image at the right, find the values of a and b.

\[ a = 95 \]
\[ b = 25 \]

20) For questions a-d use the figure to the right.

a) Name a pair of vertical angles. \( \underline{\angle 1, \angle 4} \)

b) Name a linear pair of angles. \( \underline{\angle 1, \angle 5} \)

c) Name an angle supplementary to \( \angle 4 \). \( \angle 15 \)

d) If \( m \angle 5 = 137^\circ \), then \( m \angle 1 = \frac{180 - 137}{43} \)

21) Find the value of t.

\[ \frac{12}{7} = \frac{24}{t} \]
\[ 12t = 168 \]
\[ t = 14 \]
22) For the following questions, use the diagram at the right.

a) Is \( m \parallel n \)? Yes or no?
   Explain your reasoning.
   \[ \consecutive \ \int \text{ L's suppl} \]

b) Is \( s \parallel t \)? Yes or no?
   Explain your reasoning.
   \[ \corresponding \ \text{L's } \sim \]

b) Is \( r \parallel s \)? Yes or no?
   Explain your reasoning.
   \[ \text{No information about angles on line } r \]

23) Find the value of the variable.

\[ \angle x = \]

24) Find the value of \( x \) based on the diagram at the right.

a) 27
b) 36

25) Choose the congruence relationship for the triangles at the right.

Given that \( BC \parallel AD \),

a) \( \triangle ABC \cong \triangle ACD \)
b) \( \triangle ABC \cong \triangle CDA \)
c) \( \triangle ABC \cong \triangle DAC \)
d) \( \triangle ABC \cong \triangle BCD \)

26) Which postulate or theorem would be used to prove the two triangles congruent?

a) H-L Theorem
b) ASA Postulate
c) SAS Postulate
d) AAS Theorem
27) Which postulate or theorem would be used to prove the two triangles congruent?

a) SAS Postulate
b) SSS Postulate
c) ASA Postulate
d) AAS Theorem

Given: $BD \parallel AE$, $AE \cong BD$

Prove: $\triangle ABE \cong \triangle BCD$

28) Given: $R, S$, and $T$ are midpoints. Which of the following is a false statement?

a) $RS \parallel FT$
b) If $ST = 9$ then $2AC = 18$.
c) $(1/2)AB = RS$
d) $\triangle STR \cong \triangle Art$

29) $ABCD \sim WXYZ$. Find the scale factor of $ABCD$ to $WXYZ$.

A. 1:1
B. 2:3
C. 3:2
D. 9:8

30) Find $EC$ in the picture to the right.

$EC = 6$

31) Which postulate or theorem proves the triangles are similar?

A. AA Similarity
B. ASA Similarity
C. SAS Similarity
D. SSS Similarity

32) Find the value of $y$.

A. 5.7
B. 11.2
C. 12.0
D. 17.5

$10 \div 14 = \frac{8}{y}$
$10y = 112$
$y = 11.2$