1. Use the given figure to answer the following questions.
   a. Name four points that are coplanar
   
   Example (more than one correct answer):
   \( A, C, D, H \)
   
   b. Name the intersection of plane \( KED \) and plane \( CAF \).
      \( \overline{CD} \)
   
   c. Name a plane containing point \( H \).
      \( \text{Plane } FGH \) (more than one correct answer)

2. Point \( O \) is between \( H \) and \( P \). \( HP = 7x - 2, OP = 4x + 6, OH = 25 \).
   Make a sketch of the given information. Write an equation and solve for \( x \). Determine \( HP \).
   
   ![](equation.png)

3. Use the given diagram to answer the following questions.
   a. What is the distance between points \( A \) and \( B \)?
      \( 8^2 + 5^2 = d^2 \)
      \( 64 + 25 = d^2 \)
      \( 8.9 \) (rounded)
   
   b. What is the midpoint of \( AB \)?
      \( \left( \frac{2+3}{2}, \frac{1+2}{2} \right) \)
      \( (1, 0.5) \)

4. In the figure, \( AF \) bisects \( \angle EAH \).
   If \( m\angle EAF = (6x - 7)^\circ \) and \( m\angle FAH = (3x + 29)^\circ \), then determine \( m\angle EAF \).
   
   ![](equation2.png)

5. Use the given figure to answer the following questions.
   a. Name an angle supplementary with \( \angle PAL \).
      \( \angle OAP \)
   
   b. If \( m\angle KAM = 130^\circ \), then what does \( m\angle 2 \) equal? \( 50^\circ \) (Linear Pair)
   
   c. Name a pair of vertical angles.
      \( \angle 2 \) & \( \angle 5 \) (more than one correct answer)
   
   d. Name a linear pair of angles.
      \( \angle PAN \) & \( \angle PAK \) (more than one correct answer)
6. Two sides of a regular octagon are represented by the expressions $5x + 4$ and $2x + 16$
   a. Make a sketch of a regular octagon including appropriate marking to indicate it is regular.

   ![Sketch of a regular octagon]

   b. Solve for the value of $x$.
   \[
   5x + 4 = 2x + 16 \quad \text{(All sides of a regular polygon are congruent)}
   \]
   \[
   3x = 12
   \]
   \[
   x = 4
   \]

   c. Determine the side length.
   \[
   5(4) + 4 = 24
   \]

7. Use the statement below to answer the following questions.
   **A number is even if it is divisible by six.**
   a. Rewrite the statement as a conditional statement in if-then form.
   \[
   \text{If a number is divisible by six, then it is even.}
   \]
   Is your statement true or false? If false, then provide a counterexample.

   b. Write the converse.
   \[
   \text{If a number is even, then it is divisible by six.}
   \]
   Is your statement true or false? If false, then provide a counterexample.

   c. Write the inverse.
   \[
   \text{If a number is not divisible by six, then it is not even.}
   \]
   Is your statement true or false? If false, then provide a counterexample.

   d. Write the contrapositive.
   \[
   \text{If a number is not even, then it is not divisible by six.}
   \]
   Is your statement true or false? If false, then provide a counterexample.

8. **If two angles are complementary, then the sum of the measures of the angles is 90°.**
   a. Could the statement above be written as a true biconditional? **Yes** or **No**
   \[
   \text{(Both original and converse are true)}
   \]

   b. If yes, then write the biconditional statement below. If no, then provide a counterexample.
   \[
   \text{Two angles are complementary if and only if the sum of the measures of the angles is 90°.}
   \]
9. Write a proof:
Given: \( m\angle JAK = 37^\circ, m\angle GAK = 92^\circ \)
Prove: \( \angle GAJ \) is an obtuse angle

\[
\begin{align*}
\angle JAK &= 37^\circ \quad \text{(Given)} \\
\angle GAK &= 92^\circ \quad \text{(Given)} \\
\angle JAK + \angle GAK &= \angle GAJ \quad \text{(Angle Addition Postulate)} \\
37^\circ + 92^\circ &= \angle GAJ \quad \text{(Substitution Property)} \\
129^\circ &= \angle GAJ \quad \text{(Simplify)} \\
\angle GAJ &\text{ is an obtuse angle} \quad \text{(Definition of an obtuse angle)} \\
(90^\circ < \angle GAJ < 180^\circ)
\end{align*}
\]

10. Write a proof:
Given: \( SE = LD \)
Prove: \( SL = ED \)

\[
\begin{align*}
SE &= LD \quad \text{(Given)} \\
SL + LE &= SE \quad \text{(Segment Addition Postulate)} \\
SL + LE &= LE + ED \quad \text{(Segment Addition Postulate)} \\
SL &= ED \quad \text{(Transitive Property)} \\
SL &= ED \quad \text{(Subtraction Property of Equality)}
\end{align*}
\]
11. Use the diagram at the right to answer the following questions:
   a. Name two lines that appear parallel to $\overline{CH}$
      Choose two: $\overrightarrow{EF}, \overrightarrow{EB}, \overrightarrow{AD}$
   b. Name two lines that appear perpendicular to $\overline{CH}$
      Choose two: $\overrightarrow{GC}, \overrightarrow{AC}, \overrightarrow{FH}, \overrightarrow{DH}, \overrightarrow{EC}, \overrightarrow{BH}$
   c. Name two lines that appear skew to $\overline{CH}$
      Choose two: $\overrightarrow{AB}, \overrightarrow{AE}, \overrightarrow{AF}, \overrightarrow{AG}, \overrightarrow{BD}, \overrightarrow{BE}, \overrightarrow{BG}, \overrightarrow{DE}, \overrightarrow{DF}, \overrightarrow{DG}$

12. Use the diagram below to solve for $x$ and $y$.

13. Determine the value of $x$ that would make $s \parallel r$. Explain your reasoning. Why does that value make the lines parallel?

14. If $m\angle 1 = (7x + 1)^\circ$ and $m\angle 3 = (6x - 2)^\circ$ determine $m\angle 4$.

15. If $\angle 2$ is a right angle, $m\angle 5 = 20^\circ$, and $m\angle 7 = 35^\circ$, then determine $m\angle 4$. 

If the lines are going to be parallel, then the two angles I have marked $4x^\circ$ must be congruent as they are corresponding. The new $4x^\circ$ angle is a linear pair with the $(12x - 10)^\circ$ angle, so they must be supplementary.
16. Translate $\triangle ABC$  
$(x, y) \rightarrow (x - 5, y - 2)$

$A' = (-4, 2)$

$B' = (-3, -1)$

$C' = (0, 0)$

17. Rotate $\triangle ABC$ $90^\circ$  
clockwise about the origin

$A' = (1, 1)$

$B' = (3, 0)$

$C' = (4, 3)$

18. Draw the reflection of $\triangle ABC$ in the given line. List the coordinates of the vertices $A'$, $B'$, and $C'$.

a. $y$-axis

$A' = (-1, 3)$

$B' = (-2, 1)$

$C' = (-5, 2)$

b. $y = -1$

$A' = (-3, -4)$

$B' = (0, -1)$

$C' = (2, -3)$

c. $x = 2$

$A' = (5, 3)$

$B' = (3, -2)$

$C' = (2, 2)$

19. Given $\triangle DEF$ is reflected in line $a$ followed by a  
reflection in line $b$ where $a \parallel b$.  

a. If $FF'' = 36$ ft, then find the distance $x$  
between lines $a$ and $b$.

$$\frac{36 \text{ ft}}{a} = 18 \text{ ft} + x$$

b. Find the value of $y$.

$$\frac{y}{y} = 0.79$$

$$\frac{y}{4.12} = 3.16$$

c. Find $D'F'$.  

$4.12$