1. Give an alternate name for angle $\angle 2$ using 3 points: $\angle GBC$ or $\angle CBE$ (1 answer)

2. Angles $\angle ABE$ and $\angle CBG$ can best be described as: $\text{VERTICAL ANGLES; CONGRUENT}$ (2 answers)

3. Angles $\angle 6$ and $\angle 3$ can best be described as: $\text{ALTERNATE INTERIOR ANGLES, CONGRUENT}$ (2 answers)

4. The line $\overline{GH}$ can best be described as a: $\text{TRANSVERSAL}$ (1 answer)

5. Which angle corresponds to $\angle DEB$ : $\angle ABG$ or $\angle GBA$ or $\angle 1$ (1 answer)

6. Angles $\angle FEB$ and $\angle CBE$ can best be described as: $\text{CONSECUTIVE INTERIOR ANGLES, SUPPLEMENTARY}$ (2 answers)

7. Angles $\angle 1$ and $\angle 8$ can best be described as: $\text{ALTERNATE EXTERIOR ANGLES, CONGRUENT}$ (2 answers)

8. Which angle is an alternate interior angle with $\angle CBE$ : $\angle DEB$ or $\angle DEG$ or $\angle 5$ (1 answer)

9. Angles $\angle GBC$ and $\angle BEF$ can best be described as: $\text{CORRESPONDING ANGLES, CONGRUENT}$ (2 answers)

10. Angles $\angle 2$ and $\angle 8$ can best be described as: $\text{CONSECUTIVE EXTERIOR ANGLES, SUPPLEMENTARY}$ (2 answers)

11. Which angle is an alternate exterior angle with $\angle ABG$ : $\angle FEH$ or $\angle HEF$ or $\angle 8$ (1 answer)

12. Which angle is a vertical angle to $\angle ABG$ : $\angle CBE$ or $\angle CBH$ or $\angle 4$ (1 answer)

13. Which angle can be described as consecutive exterior angle with $\angle 1$ : $\angle 8$ (1 answer)

14. Any two angles that sum to 180° can be described as $\text{SUPPLEMENTARY}$ angles. (1 answer)
TRIANGLE’s INTERIOR ANGLE SUM

1. a. First, Create a random triangle on a piece of patty papers.
   b. Using your pencil, write a number inside each interior angle a label.
   c. Next, cut out the triangle.
   d. Finally, tear off or cut each of the angles from the triangle
   e. Using tape, carefully put all 3 angles next to one another so that they all have the same vertex and the edges are touching but they aren’t overlapping

Paste or Tape your 3 vertices here:

2. What is the measure of a straight angle or the angle that creates a line by using two opposite rays from a common vertex?

180°

3. Collectively does the sum of your 3 interior angles of a triangle form a straight angle? What about others in your class? YES, EVERYONE’S ANGLES DO.

4. Make a conjecture about the sum of the interior angles of a triangle. Do you think your conjecture will always be true? (please explain using complete sentences)

THE SUM OF THE INTERIOR ANGLES SUM TO 180°
5. More formally, why do the 3 interior angles of any triangle sum to 180°?

Consider \( \triangle ABC \). The segment \( \overline{AB} \) is extended into a line and a parallel line is constructed through the opposite vertex. So, \( AB \parallel CD \).

a. Why is \( \angle 1 \cong \angle 2 \)? \( \text{ALTERNATE INT. ANGLES OF PARALLEL LINES ARE CONGRUENT} \)

b. Why is \( \angle 5 \cong \angle 4 \)? \( \text{ALTERNATE INT. ANGLES OF PARALLEL LINES ARE CONGRUENT} \)

c. Why is \( m\angle 2 + m\angle 3 + m\angle 4 = 180^\circ \)? \( \text{R/C COLLECTIVELY THEY FORM A STRAIGHT ANGLE} \)

d. Using substitution we can replace \( m\angle 2 \) with \( m\angle 1 \) and \( m\angle 4 \) with \( m\angle 5 \) to show that the interior angles of a triangle must always sum to 180°.

\[
(m\angle 1) + m\angle 3 + (m\angle 5) = 180^\circ
\]

Write the angle number in the ___ and then write the letter that corresponds with the number based on the code at the bottom in the box.

7. Angle 2 and Angle ___ \( \text{E} \) are alternate exterior angles.
8. Angle 7 and Angle ___ \( \text{V} \) are alternate exterior angles.
9. Angle 4 and Angle ___ \( \text{C} \) are corresponding angles.
10. Angle 5 and Angle ___ \( \text{L} \) are consecutive interior angles.
11. Angle 3 and Angle ___ \( \text{I} \) are alternate interior angles.
12. Angle 7 and Angle ___ \( \text{D} \) are consecutive exterior angles.
13. Angle 6 and Angle ___ \( \text{E} \) are vertical angles.
14. Angle 2 and Angle ___ \( \text{A} \) are a linear pair and on the same side of the transversal.
15. Angle 1 and Angle ___ \( \text{N} \) are corresponding angles.

| 1=D | 2=U | 3=L | 4=A | 5=N | 6=I | 7=E | 8=C |

What type of Geometry is this? \( \text{EUCLIDEAN} \)
16. Given lines p and q are parallel, find the value of $x$ that makes each diagram true.

a. 

\[ \frac{6x+5}{2x+45} = \frac{4x+5}{2x} \]

\[ \frac{6x+5}{2x+45} = \frac{4x+5}{2x} \]

\[ 4x+5 = 40 \]

\[ x = \frac{40}{4} \]

\[ x = 10 \]

b. 

\[ \frac{6x+5 + 2x+15}{6x+5} = \frac{180}{8x+20} \]

\[ 8x+20 = 180 \]

\[ \frac{8x}{8} = \frac{160}{8} \]

\[ x = 20 \]

17. Given lines m and n are parallel, find the value $y$ of that makes each diagram true.

a. 

\[ m \parallel n \]

\[ 130^\circ \]

\[ 40^\circ \]

\[ y = 90 \]

b. 

\[ m \parallel n \]

\[ 130^\circ \]

\[ 40^\circ \]

\[ y = 90 \]

18. ANGLE PUZZLE. Find $\angle AEF$

Given:
- $m \angle DEF = 85^\circ$
- $m \angle ABG = 50^\circ$
- $\angle BAE$ is a right angle
- $\angle CGE$ and $\angle DEG$ are supplementary

\[ m \angle AEF = 140 \]

\[ 360 - 40 - 95 - 85 = \]

\[ 140 \]
19. Converse of AIA, AEA, CIA, CEA. Which sets of lines are parallel and explain why?

a. 

b. 

20. By which property (SSS, AA, SAS) are the triangles similar ($\Delta RSQ \sim \Delta UST$)? Explain why.

\[ \frac{RS}{SU} = \frac{12}{9} = \frac{4}{3} ; \quad \frac{QS}{ST} = \frac{8}{6} = \frac{4}{3} \]

SAS

What is the measure of TU?

\[ \frac{12}{9} = \frac{10}{x} \]

\[ 90 = 12x \]

\[ x = \frac{15}{2} \]

21. Using (SSS, AA, SAS) which triangles can you determine must be similar? (explain why)

A) Suggests $BC \parallel EE$

B) $\Delta ABC \sim \Delta AEF$

C) $\frac{AC}{BC} = \frac{24}{16} = \frac{3}{2} ; \quad \frac{AB}{CD} = \frac{10}{20} = \frac{1}{2}$

$\Delta LDA \sim \Delta CAB$

D) Not enough info

E) $\Delta AEB \sim \Delta DEC ; \quad \angle B = \angle C ; \quad \angle AEB = \angle DEC ; \quad \angle AEB = \angle DEC$
22. Using some type of similar figure find the unknown lengths.

A. \[ \frac{5}{12} = \frac{x}{6+x} \]
\[ 12x = 30 + 5x \]
\[ 7x = 30 \]
\[ x = \frac{30}{7} \approx 4.29 \]

B. \[ \frac{3}{8} = \frac{x}{6+x} \]
\[ 8x = 18 + 3x \]
\[ 5x = \frac{18}{5} \]
\[ x = \frac{3.6}{5} = 0.72 \]

C. \[ \frac{8}{5} x = \frac{y}{3} \]
\[ 5y = \frac{24}{5} \]

D. \[ \frac{10}{6} = \frac{8}{8-x} \]
\[ 48 = 80 - 10x \]
\[ -32 = -10x \]
\[ x = \frac{3.2}{10} = 0.32 \]

HINT:

22c. \[ x = 3.2 \]

22d. \[ x = 4/3 \]
\[ x = \frac{4 \sqrt{3}}{3} \approx 6.928 \]
Prove the Pythagorean Theorem \((a^2 + b^2 = c^2)\) using similar right triangles:

\[
\begin{align*}
\triangle CDB & \sim \triangle ACB \\
\frac{e}{a} &= \frac{c}{a} \\
a^2 &= ec \\
b^2 &= cd \\
a^2 + b^2 &= ec + cd \\
a^2 + b^2 &= c(e + d) \\
a^2 + b^2 &= c \cdot c \\
\end{align*}
\]

\[a^2 + b^2 = c^2\]