Reasoning with Angles and Triangles Lesson #6: Practice Test

Use the following information to answer the first two questions.

When two parallel lines are crossed by a transversal, corresponding angles, alternate angles, and co-interior angles are formed.

1. Alysha makes three statements about angle relationships.
   Statement 1: Corresponding angles are equal.
   Statement 2: Alternate angles are equal.
   Statement 3: Co-interior angles are equal.
   Which statements are true?
   A. Statements 1 and 2 only
   B. Statement 3 only
   C. Statements 1 and 3 only
   D. Statements 1, 2, and 3

2. Jordan makes three statements about angle relationships.
   Statement 1: Corresponding angles are supplementary.
   Statement 2: Alternate angles are supplementary.
   Statement 3: Co-interior angles are supplementary.
   Which statements are true?
   A. Statements 1 and 2 only
   B. Statement 3 only
   C. Statements 1 and 3 only
   D. Statements 1, 2, and 3

3. Four statements are made about triangles:
   I. The largest angle is opposite the largest side.
   II. An exterior angle of a triangle is equal to the sum of the interior opposite angles.
   III. The three interior angles have an angle sum of 180°.
   IV. The three exterior angles have an angle sum of 360°.
   How many of the above statements are true?
   A. one
   B. two
   C. three
   D. four

\[ a + b + c = 180° \]
\[ x + y + z = 180° - a + 180° - b + 180° - c = 540° - (a + b + c) = 540° - 180° = 360° \]

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Use the following diagram to answer the next two questions.

4. The value of \( a \) is
   
   A. 33  
   B. 57  
   C. 147  
   D. unable to be determined from the given information

5. The value of \( b \) is
   
   A. 57  
   B. 123  
   C. 147  
   D. unable to be determined from the given information

6. The value of \( p \) is
   
   A. 23  
   B. 27  
   C. 53  
   D. 55  
   
   \[ p = 180 - 104 - 53 = 23 \]

   **Numerical Response**
   
   I. The value of \( q \) is ______.
   
   (Record your answer in the numerical response box from left to right.)
   
   \[ t = p = 23 \quad q = 180 - 125 - 23 \]
   
   \[ = 32 \]
7. In the diagram, which of the following statements is false?

A. \( a = c \) alternate
B. \( c = g \) corresponding
C. \( b = d \)
D. \( b = f \) alternate

8. In the diagram, the value of \( a + b + c \) is ______.

\[
\begin{align*}
a &= 180 - 90 - 70 = 20 \\
b &= 180 - 69 - 75 = 36 \\
c &= 360 - 80 - 90 - 105 = 85 \\
a + b + c &= 20 + 36 + 85 = 141
\end{align*}
\]

(Record your answer in the numerical response box from left to right.)

8. The fourth interior angle of the quadrilateral is

A. 59°
B. 121°
C. 239°
D. 275°

9. The diagram shows a regular pentagon and a triangle. The value of \( x \) is

A. 36
B. 60
C. 70
D. 72

\[
\begin{align*}
\text{interior angle of pentagon} &= 180° - \frac{360°}{5} = 108° \\
y &= 180° - 108° = 72 \\
x &= 180° - 72° - 72° = 36
\end{align*}
\]
Use the following information to answer the next question.

Craig is trying to prove that the angle sum of quadrilateral $ABCD$ in the diagram is $360^\circ$.

His attempted proof is shown below.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1. $\angle FDA = 50^\circ$</td>
<td>angle sum of $\triangle ADF = 180^\circ$, $(180^\circ - 90^\circ - 40^\circ = 50^\circ)$</td>
</tr>
<tr>
<td>Line 2. $\angle DAB = 50^\circ$</td>
<td>alternate to $\angle FDA$</td>
</tr>
<tr>
<td>Line 3. $\angle DCB = 140^\circ$</td>
<td>co-interior to $\angle DFA$, $(180^\circ - 40^\circ = 140^\circ)$</td>
</tr>
<tr>
<td>Line 4. $\angle ADC = 130^\circ$</td>
<td>$\angle FDC$ is a straight angle, $(180^\circ - 50^\circ = 130^\circ)$</td>
</tr>
</tbody>
</table>

so $\angle DAB + \angle ABC + \angle BCD + \angle CDA = 50^\circ + 39^\circ + 140^\circ + 130^\circ = 359^\circ$

10. Which line of his proof contains an error?

A. Line 1  
B. Line 2  
C. Line 3  
D. Line 4

FA is not parallel to CB

Use the following diagram to answer the next question.

Interior angle sum
$= 180(7-2)^\circ$
$= 900^\circ$
$a = 900 - 136 - 141$
$- 119 - 120 - 132$
$- 144$
$a = 108$

Numerical Response 3. In the diagram the value of $a$ is _____.

(Record your answer in the numerical response box from left to right.)
11. The diagram shows part of the “Big Wheel” at the Calgary Stampede. The value of $x$ is
   \[ \text{central angle} = \frac{360^\circ}{8} = 45^\circ \]

   A. 45
   B. 60
   C. 67.5
   D. 135

   \[ 2x + 45 = 180 \]
   \[ 2x = 135 \]
   \[ x = 67.5 \]

4. A regular polygon has an interior angle of $165^\circ$.
The number of sides in the polygon is _____.

   (Record your answer in the numerical response box from left to right.)

   \[
   165 = 180 - \frac{360}{n}
   \]
   \[
   \frac{360}{n} = 15
   \]
   \[
   360 = 15n \quad n = 24
   \]

Note: Questions #12 - #15 and NR #5 are based on Lesson 5 and may be extension questions for some students.

12. Which of the following is not a congruence condition for proving triangles are congruent?
   
   A. 2 angles and the contained side
   B. 3 angles
   C. 2 sides and the contained angle
   D. 3 sides

13. If the two triangles in the diagram are congruent, which statement is false?

   A. $\angle TPS = \angle QRS$
   B. $\triangle PST \cong \triangle RSQ$
   C. $PT = QR$
   D. $PS = SQ$

14. Paying attention to the order of the letters, which of the following is the correct statement about the congruent triangles in the rectangle in the diagram?

   A. $\triangle SPQ = \triangle SQR$
   B. $\triangle SPT = \triangle SRT$
   C. $\triangle QTR = \triangle STP$
   D. $\triangle STR = \triangle TPQ$
Use the following information to answer the next question.

Four students are asked to answer the following question.

Using only the given information, which of the following diagrams show pairs of triangles that are congruent?

- Dana says that none of the pairs of triangles are congruent.
- Sharif says that all of the pairs of triangles are congruent.
- Louis says that only diagram II shows a pair of congruent triangles.
- Marius says that only diagrams II and III show a pair of congruent triangles.

15. The student who is correct is

A. Dana    B. Sharif    C. Louis    D. Marius

Use the following information to answer the next question.

There are six congruent triangles in the diagram and \( AB \parallel CD \).

5. The measure of \( \angle ACD \), in degrees, is \( \text{______} \).

(Record your answer in the numerical response box from left to right.)

\[ 60^\circ + 60^\circ = 120^\circ \]
Written Response - 5 marks

A ruler and a protractor are required to complete this question.

- Follow the instructions in steps 1 - 3 below, showing your work at the bottom of the page.

Step 1: Look at Sketch 1.

- Draw any line through P which starts on the left line and finishes on the right line.
- Measure the two angles a and b on the lower side of the line.
- Record your results in the table.

Answers may vary

Step 2: Look at Sketch 2.

- Draw a different line through P and again measure a and b and record the results in your table.

Step 3: Repeat Step 2 until you have six sets of results.
• Use inductive reasoning to make a conjecture about the relationship between \( a \) and \( b \).

\[ a + b = 226 \]

• Use deductive reasoning to prove the relationship between \( a \) and \( b \).

\[
\text{In the triangle } \quad 46^\circ + 180^\circ - a^\circ + 180^\circ - b^\circ = 180^\circ \\
406^\circ - a^\circ - b^\circ = 180^\circ \\
226^\circ = a^\circ + b^\circ \\
a + b = 226
\]

**Answer Key**

**Multiple Choice**


**Numerical Response**

1. \[ 3 2 \] 2. \[ 1 4 1 \] 3. \[ 1 0 8 \] 4. \[ 2 4 \] 5. \[ 1 2 0 \]

**Written Response**

* answers may vary
* \( a + b = 226 \)
* Angle sum of triangle \( 180 = (180 - a) + (180 - b) + 46 \)
  \[
  180 = 406 - a - b \\
  a + b = 226
  \]

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