ALBERT

Name _____ Date _____

Angles of Triangles and Parallel Lines Worksheet

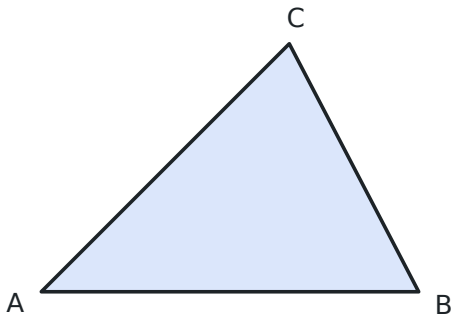
Grade 8 · Common Core 8.G.A.5

> Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

Practice

Builds the skill step by step.

1. Two angles of triangle ABC measure 45° and 70°. What is the measure of the third angle?



2. An exterior angle of a triangle is formed at vertex C. The two angles of the triangle not at C measure 40° and 75°. What is the measure of the exterior angle?

3. Two parallel lines are cut by a transversal. One angle measures 110°. What is the measure of its corresponding angle?

4. Two parallel lines are cut by a transversal. An angle measures 65°. What is the measure of its alternate interior angle?

5. Two parallel lines are cut by a transversal. One of two same-side interior angles measures 72°. What is the other?

6. What is the sum of the three angles of any triangle?

   A. 90°

   B. 180°

   C. 270°

   D. 360°

7. A right triangle has an acute angle of 34°. What is the measure of the other acute angle?

8. Two parallel lines are cut by a transversal, and ∠3 and ∠6 are alternate interior angles. What must be true?

   A. ∠3 and ∠6 are equal.

   B. ∠3 and ∠6 add to 180°.

   C. ∠3 and ∠6 add to 90°.

   D. ∠3 is twice ∠6.

9. An isosceles triangle has two base angles of 50° each. What is the measure of the third angle?

10. An exterior angle of a triangle measures 130°. One of the two remote interior angles measures 55°. What is the other?

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On Level

Grade-level practice.

1. The angles of a triangle measure x°, 2x° and 3x°. What is the measure of the largest angle?

2. An exterior angle of a triangle measures (4x + 10)°. The two remote interior angles measure 50° and 60°. What is x?

3. Two parallel lines are cut by a transversal. Two corresponding angles measure (3x − 20)° and (2x + 15)°. What is x?

4. Two parallel lines are cut by a transversal. Two same-side interior angles measure (5x)° and (3x + 20)°. What is x?

5. One triangle has angles of 40° and 60°. Another has angles of 60° and 80°. Are they similar?

   A. No, because the side lengths are not given.

   B. No, because only one listed angle matches.

   C. Yes, because all triangles are similar.

   D. Yes, because two pairs of angles match.

6. Triangle ABC has a line through B drawn parallel to side AC. Use that line to explain why $\angle A + \angle ABC + \angle C = 180°$.

7. In triangle ABC, $\angle A = 50°$ and $\angle B = 70°$. In triangle DEF, $\angle D = 50°$ and $\angle F = 60°$. Are the triangles similar? Answer Yes or No.

8. In triangle ABC, $\angle A = 38°$. The exterior angle at vertex B measures 104°. What is $\angle C$?

9. Two parallel lines are cut by a transversal, making 8 angles. One of them measures 47°. How many of the 8 angles measure 133°?

10. Two lines are cut by a transversal. Two corresponding angles measure 75° and 80°. What can you conclude?

    A. The angles are alternate interior angles.

    B. The two lines are parallel.

    C. The two lines are not parallel.

    D. The transversal is perpendicular to both lines.

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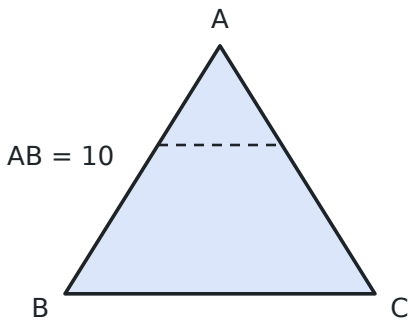
Challenge

Multi-step and word problems that stretch it.

1. The angles of a triangle measure $(x + 10)°$, $(2x + 5)°$ and $(3x − 15)°$. What is the measure of the largest angle?

2. In triangle ABC, point D is on AB and point E is on AC, with DE parallel to BC. AD = 4, AB = 10 and DE = 6. How long is BC?



3. Lia says a triangle can have angles of 100° and 90°. What is wrong with her claim?

   A. Nothing; the third angle would be 10°.

   B. A triangle can never have an obtuse angle.

   C. Those two angles already add to more than 180°.

   D. A triangle needs three acute angles.

4. A triangle has one exterior angle at each vertex. What is the sum of the three exterior angles?

5. Explain why two triangles with two pairs of equal angles must be similar.

6. An isosceles triangle has an exterior angle of 110° at its vertex angle (the angle between the two equal sides). What is the measure of each base angle?

7. Two parallel lines are cut by a transversal. Two alternate interior angles measure $(6x + 4)°$ and $(10x - 20)°$. What is the measure of each angle?

8. The angles of a triangle are in the ratio 2 : 3 : 4. What is the measure of the largest exterior angle of the triangle?

9. Which pair of triangles must be similar?

   A. Both triangles have angles of 35° and 55°.

   B. Both triangles are isosceles.

   C. Both triangles have a 40° angle.

   D. Both triangles have a side of 5 cm.

10. Two parallel lines are cut by a transversal. Two same-side interior angles measure $(2x + 10)°$ and $(x + 20)°$. What is the measure of the larger angle?