

**GUIDED PRACTICE** for Examples 2, 3, and 4Solve $\triangle ABC$.

3. $A = 122^\circ, a = 18, b = 12$

4. $A = 36^\circ, a = 9, b = 12$

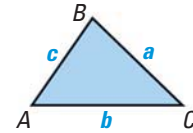
5. $A = 50^\circ, a = 2.8, b = 4$

6. $B = 105^\circ, b = 13, a = 6$

AREA OF A TRIANGLE You can use the following result to find the area of a triangle when you know the lengths of two sides and the measure of the included angle. This result can also be used to derive the law of sines (see Exercise 42).

KEY CONCEPT*For Your Notebook***Area of a Triangle**

The area of any triangle is given by one half the product of the lengths of two sides times the sine of their included angle. For $\triangle ABC$ shown, there are three ways to calculate the area:



Area = $\frac{1}{2}bc \sin A$

Area = $\frac{1}{2}ac \sin B$

Area = $\frac{1}{2}ab \sin C$

EXAMPLE 5 Find the area of a triangle

BIOLOGY Black-necked stilts are birds that live throughout Florida and surrounding areas but breed mostly in the triangular region shown on the map. Find the area of this region.

**Solution**

The area of the region is:

Area = $\frac{1}{2}bc \sin A$

Write area formula.

= $\frac{1}{2}(125)(223) \sin 54.2^\circ$

Substitute.

$\approx 11,300$

Use a calculator.

▶ The area of the region is about 11,300 square miles.

**GUIDED PRACTICE** for Example 5Find the area of $\triangle ABC$ with the given side lengths and included angle.

7. $a = 10, b = 14, C = 46^\circ$

8. $a = 19, c = 8, B = 75^\circ$

9. $b = 11, c = 7, A = 120^\circ$

10. $a = 20, b = 24, C = 87^\circ$