

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

**Worksheet 6.6—Law of Cosines**

Show all work on a separate sheet of paper. Calculator permitted, show all set ups.

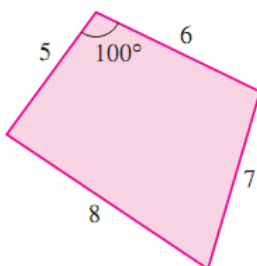
**Multiple Choice**

- What is the area of a regular dodecagon (12-sides) inscribed in a circle of radius 12?  
(A) 427 (B) 432 (C) 437 (D) 442 (E) 447
- The area of a triangle with sides 7, 8, and 9 is  
(A)  $6\sqrt{15}$  (B)  $12\sqrt{5}$  (C)  $16\sqrt{3}$  (D)  $17\sqrt{3}$  (E)  $18\sqrt{3}$
- Two boats start at the same point and speed away along courses that form a  $110^\circ$  angle. If one boat travels at 24 miles per hour and the other boat travels at 32 miles per hour, how far apart, in miles, are the boats after 30 minutes?  
(A) 21 (B) 22 (C) 23 (D) 24 (E) 25
- What is the measure of the smallest angle in a triangle with sides 12, 17, and 25?  
(A)  $21^\circ$  (B)  $22^\circ$  (C)  $23^\circ$  (D)  $24^\circ$  (E)  $25^\circ$

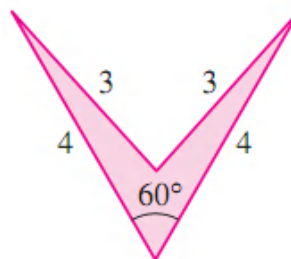
**Short Answer**

- Solve the following triangles  $ABC$ .  
(a)  $a = 3$ ,  $b = 4$ , and  $C = 53^\circ$  (b)  $b = 60$ ,  $c = 30$ , and  $A = 70^\circ$  (c)  $a = 20$ ,  $b = 25$ , and  $c = 22$
- Solve the following triangles using ANY appropriate method.  
(a)  $b = 125$ ,  $c = 162$ , and  $B = 40^\circ$  (b)  $a = 73.5$ ,  $B = 61^\circ$ , and  $C = 83^\circ$   
(c)  $a = e$ ,  $b = \pi$ , and  $C = e\pi^\circ$  (d)  $b = 3$ ,  $c = 4$ ,  $A = 90^\circ$
- In navigation, **dead reckoning** is the process of calculating one's current position by using a previously determined position, or fix, and advancing that position based upon known or estimated speeds over elapsed time, and course. A pilot flies in a straight path for an hour and a half. She then makes a course correction, heading  $10^\circ$  to the right of her original course, and flies for 2 hours in the new direction. If she maintains a constant speed of 625 miles per hour, how far is she from her starting point? What would be the heading, relative to her original heading, on which she would need to fly if she were to return to her starting point?
- Find the area of the regions in each of the following:

(a)



(b)



9. Land in downtown New Braunfels is valued at \$300 a square foot. What is value of a triangular lot with side lengths of 112, 149, and 191 feet?
10. The Law of Cosines can be used in the ambiguous case by creating a quadratic equation in terms of cosine. The number of REAL, POSITIVE solutions is the number of triangles formed by the given information. Use the law of cosines to solve the following ambiguous case in triangle  $ABC$ .  
 $A = 57^\circ$ ,  $b = 11.6$ , and  $a = 10$ .
11. (Fun Challenge) Three circles of radii 4, 5, and 6 inches are mutually tangent. Find the shaded area enclosed between the circles.

