

## **TAKE-HOME EXAM 4**

**Solve the following problems showing all your work for full credit.**

1. (4 pts.) Consider a triangle  $\triangle ABC$  with a standard notation. Find the value of  $a$  if  $b = 5$ ,  $A = 45^\circ$ , and the area of the triangle equals 8.
  
  
  
  
  
  
  
  
  
  
2. Solve  $\triangle ABC$  if possible. Round answers to the nearest tenth. Standard lettering has been used:
  - a) (7 pts.)  $b = 10, A = 29^\circ, C = 87^\circ$ .
  
  
  
  
  
  
  
  
  
  
  - b) (5 pts.)  $b = 8, c = 9, B = 74^\circ$ .
  
  
  
  
  
  
  
  
  
  
  - c) (7 pts.)  $a = 10, b = 7, C = 120^\circ$ .
  
  
  
  
  
  
  
  
  
  
  - d) (12 pts.)  $b = 5, c = 2, C = 14^\circ$ .

3. A triangular spot has sides of lengths 13 m, 12 m, and 9 m. Find:

a) (7 pts.) the angles of the spot to the nearest degree.

b) (4 pts.) the area of the spot.

4. (8 pts.) Two airplanes leave an airport at the same time. The first flies 330 km/h in a direction of  $N40^\circ W$ . The second flies 270 km/h in a direction of  $S80^\circ E$ . After 4 hours, how far apart are the planes?

5. Use half-angle identity to evaluate

a) (6 pts.)  $\sin(-22.5^\circ)$  exactly.

b) (6 pts.)  $\cos\left(-\frac{3\pi}{8}\right)$  exactly.

6. Given that  $\cos \theta = \frac{2}{3}$  and the terminal side is in quadrant **IV**, find:

a) (4 pts.)  $\sin 2\theta =$

b) (4 pts.)  $\cos 2\theta =$

c) (4 pts.)  $\sin \frac{\theta}{2} =$

7. Use a sum or difference identity to find

a) (5 pts.)  $\sin 165^\circ$  exactly.

b) (5 pts.)  $\tan \frac{19\pi}{12}$  exactly.

8. Consider the function  $y = -\frac{1}{3}\cos(2x - \frac{\pi}{2}) + 2$ .

a) (2 pts.) Find the amplitude;

b) (2 pts.) Find the period;

c) (2 pts.) Find the phase shift;

d) (6 pts.) Sketch a graph of the function (without using a calculator).