

Math 154 Practice Test Ch 7 & 8.1 **Answer Key** (Answers in RED)  
 Solve the triangle and find the area using the given information. Note – some problems may have 2 solutions, and others may have none.

*Problems 1-5 & 9 use law of sines. For problems 6-8 & 10, start with the law of cosines.*

*Number 5 has 2 solutions.*

*Number 9 has no solution.*

*Your answers may vary slightly due to rounding or approach (sine vs. cosine).*

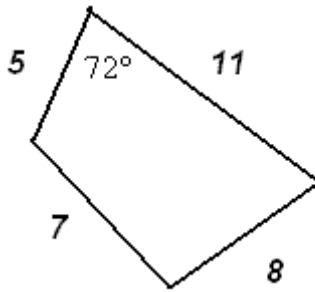
| Problem | A      | B      | C      | a     | b    | c    | Area   |
|---------|--------|--------|--------|-------|------|------|--------|
| 1.      | 95°    | 45°    | 40°    | 5     | 3.55 | 3.23 | 5.70   |
| 2.      | 20°    | 70°    | 90°    | .34   | .94  | 1    | .16    |
| 3.      | 165°   | 5°     | 10°    | 5     | 1.68 | 3.35 | .73    |
| 4.      | 109.0° | 29.0°  | 42°    | 40.96 | 21   | 29   | 287.91 |
| 5.      | 35°    | 49.9°  | 95.1°  | 6     | 8    | 10.4 | 23.9   |
|         | 35°    | 130.1° | 14.9°  | 6     | 8    | 2.7  | 6.2    |
| 6.      | 39.8°  | 80.2°  | 60°    | 2     | 3    | 2.6  | 2.60   |
| 7.      | 36.3°  | 26.4°  | 117.3° | 4     | 3    | 6    | 5.33   |
| 8.      | 49.9°  | 55°    | 75.1°  | 4     | 4.2  | 5    | 8.19   |
| 9.      |        |        | 50°    | 2     |      | 1    |        |
| 10.     | 41.4°  | 41.4°  | 97.2°  | 10    | 10   | 15   | 49.6   |

11. An equilateral triangle has two equal sides of length 17 inches and a base of 24 inches. Find the measure of the two equal angles. **45.1 degrees**

12. Two sensors are spaced 700 feet apart along the approach to a small airport. When an aircraft is nearing the airport, the angle of elevation from the first sensor to the aircraft is 20°, and from the second sensor to the aircraft is 15°. How high is the aircraft at this time? **711.0 ft**

13. Jon measures the angle of elevation from the ground where he is standing to the top of an obelisk to be 65°. He then walks 25 feet further from the obelisk, and measures the angle of elevation to be 44°. How tall is the obelisk? **43.9 ft**

14. Find the area of the given quadrilateral. **54.15 ft**



15. A man walks 4 km in the direction  $N32^\circ W$ , then turns and walks 3 km in the direction  $S50^\circ W$ . How far is he from his starting point, and what is his bearing from the starting point. **4.65 km,  $N71.7^\circ W$**

16. A triangular lot has sides of 87 ft, 190 ft, and 173 ft. Find the area of the triangle, as well as the **angle** between the 87 ft side and the 190 ft side. **7517.4,  $65.4^\circ$**

Let  $\mathbf{U} = 7\mathbf{i} + 8\mathbf{j}$  and  $\mathbf{V} = 2\mathbf{i} - 3\mathbf{j}$ . Find the following.

17.  $|\mathbf{U}|$                       18.  $-2\mathbf{U} + 5\mathbf{V}$                       19.  $|3\mathbf{U} - \mathbf{V}|$                       20.  $\mathbf{U} \cdot \mathbf{V}$   
 **$\sqrt{113} \approx 10.6$**                        **$-4\mathbf{i} - 31\mathbf{j}$**                        **$\sqrt{1090} \approx 33.0$**                        **$-10$**

21. Find the angle between  $\mathbf{U}$  and  $\mathbf{V}$ .  
 **$105.1^\circ$**

22. Use the dot product to show that  $\mathbf{U} = 10\mathbf{i} - 6\mathbf{j}$  and  $\mathbf{V} = 9\mathbf{i} + 15\mathbf{j}$  are perpendicular.

**$\mathbf{U} \cdot \mathbf{V} = (10)(9) + (-6)(15) = 90 - 90 = 0$**

23. Find the value of  $b$  so that  $\mathbf{U} = 7\mathbf{i} + 3\mathbf{j}$  and  $\mathbf{V} = b\mathbf{i} + 10\mathbf{j}$  are perpendicular.

**$-30/7$**

Simplify.

24.  $\sqrt{-50}$                       25.  $(9 - 4i) - (7 - 10i)$                       26.  $(7 - 6i)(7 + 6i)$   
 **$5i\sqrt{2}$**                        **$2 + 6i$**                        **$85$**   
 27.  $(8 + 3i)^2$                       28.  $\frac{2 + 3i}{5 + 4i}$                       29.  $i^{75}$   
 **$55 + 48i$**                        **$\frac{22}{41} + \frac{7}{41}i$**                        **$-i$**

30. Find  $x$  and  $y$  so that the equation  $x^2 - 3x + 16i = 10 + 8yi$  is true.

**$x = 5$  or  $x = -2$ ,  $y = 2$**