

## MATH 1112 – Quiz 4 (Version 2) Solutions

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Name \_\_\_\_\_

**Instructions.** Your work on this quiz will be graded according to two criteria: **mathematical correctness** and **clarity of presentation**. In other words, you must know what you are doing (mathematically) and you must also express yourself clearly. In particular, write answers to questions using correct notation and using **complete sentences** where appropriate. Also, you must supply sufficient detail in your solutions (relevant calculations, written explanations of why you are doing these calculations, etc.). It is not sufficient to just write down an “answer” with no explanation of how you arrived at that answer. As a rule of thumb, the harder that I have to work to interpret what you are trying to say, the less credit you will get.

1. Find the remaining angles and side lengths for the triangle with the information given below. (There may be no solution, one solution or two solutions.)

$$A = 32.76^\circ \quad a = 200$$

$$B = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}} .$$

$$C = 21.97^\circ \quad c = \underline{\hspace{2cm}}$$

**Solution:** First we observe that

$$B = 180^\circ - 32.76^\circ - 21.97^\circ \approx 125.27^\circ$$

By the Law of Sines,

$$\frac{b}{\sin(125.27^\circ)} = \frac{200}{\sin(32.76^\circ)}$$

so

$$b = \frac{200 \sin(125.27^\circ)}{\sin(32.76^\circ)} \approx 301.76.$$

Also

$$c = \frac{200 \sin(21.97^\circ)}{\sin(32.76^\circ)} \approx 138.28$$

There is only one triangle that satisfies the given information and the complete information for it is:

$$A = 32.76^\circ \quad a = 200$$

$$B = 125.27^\circ \quad b = 301.76 .$$

$$C = 21.97^\circ \quad c = 138.28$$

2. Find the remaining angles and side lengths for the triangle with the information given below. (There may be no solution, one solution or two solutions.)

$$A = \underline{\hspace{2cm}} \quad a = 17$$

$$B = \underline{\hspace{2cm}} \quad b = 15$$

$$C = \underline{\hspace{2cm}} \quad c = 2.$$

**Solution:** By the Law of Cosines,

$$\cos(A) = \frac{b^2 + c^2 - a^2}{2bc} = \frac{15^2 + 2^2 - 17^2}{2(15)(2)} = -1.$$

If  $\cos(A) = -1$ , then  $A = 180^\circ$  but there is no triangle that has an angle of  $180^\circ$  so this problem has no solution.