Lesson 4.3: Solving Non-Right Triangles

Complete the *Practice* below. When you have completed all the questions for *Lesson 4.3 Practice – VI* with your best work, mark your work by first comparing your answers to the solutions provided in *Appendix 2: Solutions*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – VI

1. For each triangle, determine whether there is no solution, one solution, or two solutions.

   a. $\triangle ABC$, $\angle A = 25^\circ$, $a = 40$ m, and $b = 90$ m

   b. $\triangle ABC$, $\angle A = 95^\circ$, $a = 5$ mm, and $b = 7$ mm

   c. $\triangle ABC$, $\angle A = 45^\circ$, $a = 15$ in, and $b = 20$ in

   d. $\triangle ABC$, $\angle A = 145^\circ$, $a = 49$ cm, and $b = 18$ cm

2. For ΔABC, where $\angle A = 35°$ and $b = 100$ cm, determine the range of values of a for which there is (are)

   a. One oblique triangle

   b. One right triangle

c. Two triangles

d. No triangle

3. Solve the following triangles. If more than one solution is possible, give both. Round all answers to the nearest tenth.

   a. $\triangle ABC, \angle A = 30°,\ a = 19 \text{ m},$ and $b = 26 \text{ m}$

b. $\triangle ABC, \angle A = 65^\circ,\ a = 105 \text{ mm, and } b = 85 \text{ mm}$

4. The Fisgard Lighthouse, near Victoria, BC, was the first lighthouse built on Canada's west coast. Its role was to usher ships into the Esquimalt Harbour. (Today, it is an historical site.) Suppose the light on Fisgard Lighthouse reaches a maximum distance of 11 miles.


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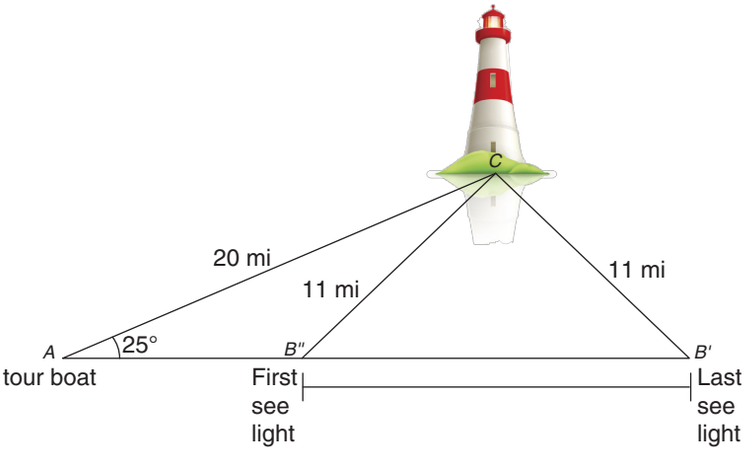
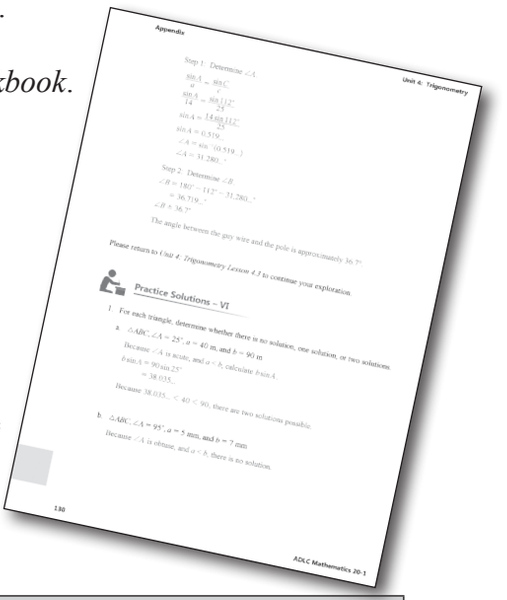
A tourist boat is travelling at an angle of 25° to the lighthouse, 20 miles from the lighthouse. Determine the total distance, to the nearest tenth of a mile, that the tourists will first and last see the light from the lighthouse.



Mark your work for *Lesson 4.3 Practice – VI* using the solutions provided in *Appendix 2: Solutions*. Then, apply the rubric found at the beginning of the *Workbook*.

Transfer your self-assessed mark to the front cover of the *Workbook*.

My self-assessed mark on *Lesson 4.3 Practice – VI* is _____.


Appendix

Unit 4: Trigonometry

Step 1: Determine $\angle A$.

$\frac{\sin A}{30} = \frac{\sin C}{14}$

$\frac{\sin A}{14} = \frac{\sin 112°}{24}$

$\sin A = \frac{14 \sin 112°}{24}$

$\sin A = 0.575...$

$\angle A = \sin^{-1}(0.519...)$

$\angle A = 31.280...°$

Step 2: Determine $\angle B$.

$\angle B = 180° - 112° - 31.280...°$

$= 36.719...°$

$\angle B \doteq 36.7°$

The angle between the grey wire and the pole is approximately 36.7°.

Please return to *Unit 4: Trigonometry Lesson 4.3* to continue your exploration.

Practice Solutions – VI

1. For each triangle, determine whether there is no solution, one solution, or two solutions.

a. $\triangle ABC$: $\angle A = 25°$, $a = 40$ m, and $b = 90$ m

Because $\angle A$ is acute, and $a < b$, calculate h sin A.

$h \sin A = 90 \sin 25°$

$= 38.035...$

Because $38.035... < 40 < 90$, there are two solutions possible.

b. $\triangle ABC$: $\angle A = 95°$, $a = 5$ mm, and $b = 7$ mm

Because $\angle A$ is obtuse, and $a < b$, there is no solution.

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Reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.

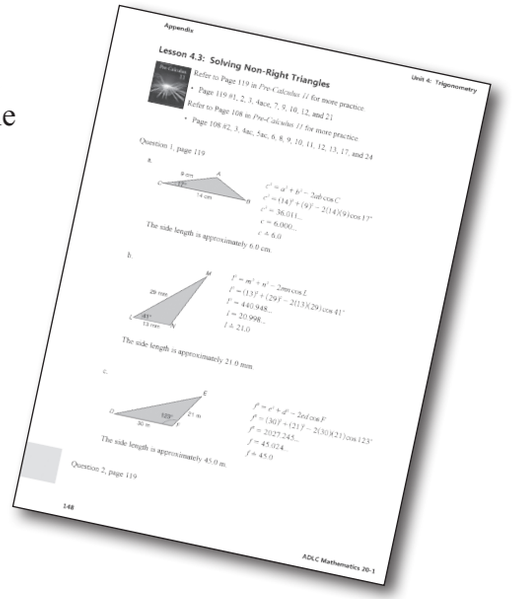
Question Number	Got it!	Almost there…	Need to retry or ask for help.	Similar questions from *Pre-Calculus 11*
1				p. 109 #6
2				p. 109 #9, 24
3				p. 109 #8
4				p. 109 #11, 17

You may proceed to *Explore Your Understanding Assignment* on the next page of this *Workbook*.

Note: Before you complete *Explore Your Understanding*, you may review your skills and get more practice by completing the following problems in *Pre-Calculus 11*.

- Page 119 #1, 2, 3, 4ace, 7, 9, 10, 12, and 21
- Page 108 #2, 3, 4ac, 5ac, 6, 8, 9, 10, 11, 12, 13, 17, and 24

Check your work in *Enhance Your Understanding*.


Appendix

Lesson 4.3: Solving Non-Right Triangles

Unit 4: Trigonometry

Refer to Page 119 in *Pre-Calculus 11* for more practice.

- Page 119 #1, 2, 3, 4ace, 7, 9, 10, 12, and 21

Refer to Page 108 in *Pre-Calculus 11* for more practice.

- Page 108 #2, 3, 4ac, 5ac, 6, 8, 9, 10, 11, 12, 13, 17, and 24

Question 1, page 119

a.

$c^2 = a^2 + b^2 - 2ab\cos C$

$c^2 = (14)^2 + (9)^2 - 2(14)(9)\cos 17°$

$c^2 = 36.011...$

$c = 6.000...$

$c \doteq 6.0$

The side length is approximately 6.0 cm.

b.

$l^2 = m^2 + n^2 - 2mn\cos L$

$l^2 = (13)^2 + (29)^2 - 2(13)(29)\cos 41°$

$l^2 = 440.948...$

$l = 20.998...$

$l \doteq 21.0$

The side length is approximately 21.0 mm.

c.

$f^2 = e^2 + d^2 - 2ed\cos F$

$f^2 = (30)^2 + (21)^2 - 2(30)(21)\cos 123°$

$f^2 = 2025.245...$

$f = 45.024...$

$f \doteq 45.0$

The side length is approximately 45.0 m.

Question 2, page 119

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