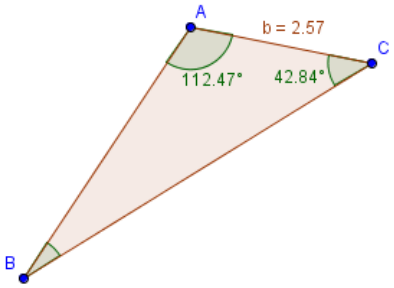
SM3 11.3: Law of Sines

Problems: Find the missing measurements to the nearest hundredth using the Law of Sines:

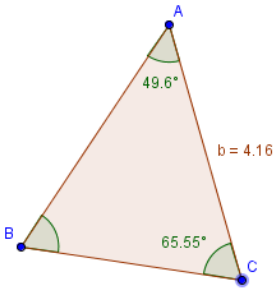
1)

$m\angle B = 24.69°$
$a = 5.69$
$c = 4.18$



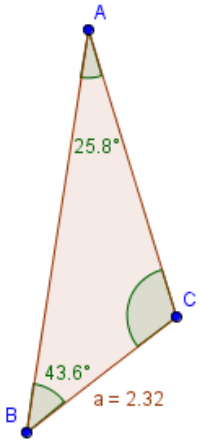
2)

$m\angle B = 64.85°$
$a = 3.5$
$c = 4.18$



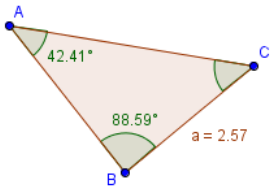
3)

$m\angle C = 110.6°$
$b = 3.68$
$c = 5$

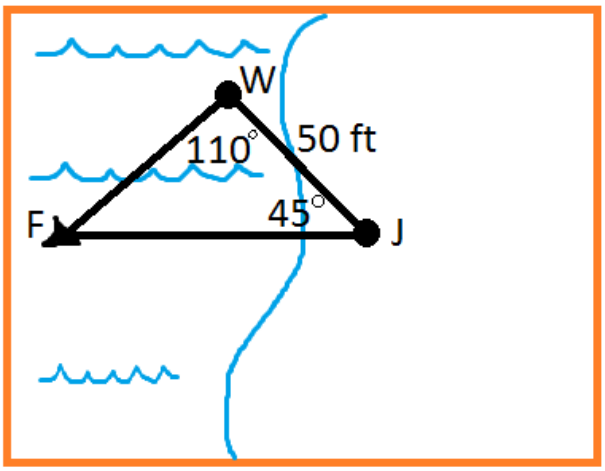


4)

$m\angle C = 49°$
$b = 3.81$
$c = 2.88$



5) Josie, Mckenna, and Whitney take a trip to the California coastline during the summer to enjoy some time at the beach (and to work on their summer calculus homework in a more pleasant environment). Whitney wants to go for a swim, Josie fancies a nap on the beach, and Mckenna decides to study limit notation in their hotel room. Josie and Whitney walk down to the shore and Josie finds a suitable spot to doze off. Whitney runs due northwest from Josie, splashing into the water. As Whitney gets about 50 feet from Josie, Josie notices a rather large fin the in water, due west! Josie screams for Whitney to look out and points toward the fin, and Whitney looks back to Josie then turns 110 degrees clockwise and spots the fin. Whitney is frozen in fear; the perceived shark pauses, anticipating its next move.



- Draw a point in the water that represents Whitney's location.
- Connect Josie's point and Whitney's point with a line segment.
- Draw a fin in the water.
- Connect the fin to the both points with line segments.
- Appropriately label the vertices and sides of the triangle.
- Add known information to the picture.

Use the Law of Sines to determine how far apart the fin and Whitney are.

$j = 83.66ft$

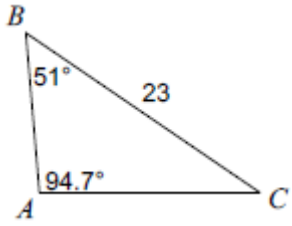
6) Hearing a scream, Mckenna walks onto the patio outside of her well-built hotel room on the 8th floor (approximately 80 feet above the ground). Mckenna sees the fin in the water near her classmate. The angle of depression she can view the fin with is 50 degrees. Mckenna finds a new solution to the question "when will I ever use this?" by summoning superhuman strength and hurling her calculus book from the patio, over the beach, at the base of the fin (assume the textbook travels in a straight line)!

- Sketch the triangular relationship between Mckenna's position, the fin's position, and the base of the hotel.
- Label the points and sides of the triangle. Add known information to the picture.
- Use the Law of Sines to determine how far Mckenna threw the textbook.

$h = 104.43ft$

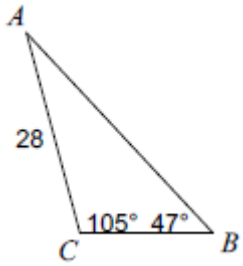
Solve each triangle. Round your answers to the nearest tenth.

7)



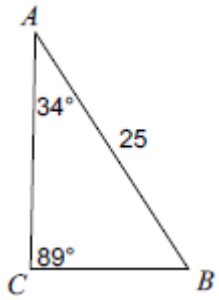
$b = 17.9$
$c = 13$
$\angle C = 34.3°$

8)



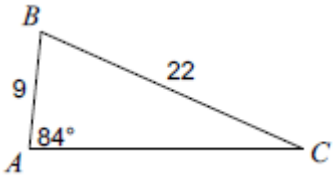
$a = 18$
$c = 37$
$\angle A = 28°$

9)



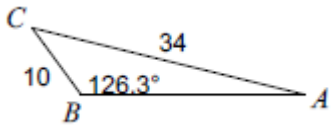
$a = 14$
$b = 21$
$\angle B = 57°$

10)



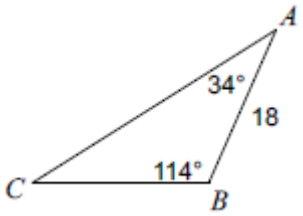
$b = 21$
$\angle B = 72°$
$\angle C = 24°$

11)



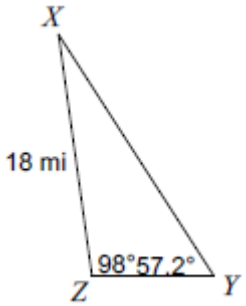
$c = 27.1$
$\angle A = 13.7°$
$\angle C = 40°$

12)



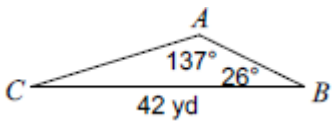
$a = 19$
$b = 31$
$\angle C = 32°$

13)



$x = 9\ mi$
$z = 21.2\ mi$
$\angle X = 24.8°$

14)



$b = 27\ yd$
$c = 18\ yd$
$\angle C = 17°$

15) $m\angle B = 91°, m\angle C = 59°, b = 28$

$a = 14$
$c = 24$
$\angle A = 30°$

16) $m\angle C = 91°, m\angle B = 74°, a = 7$

$b = 26$
$c = 27$
$\angle A = 15°$

17) $m\angle A = 88°, c = 30, a = 34.4$

$b = 17.9$
$\angle B = 31.4°$
$\angle C = 60.6°$

18) $m\angle C = 28°, m\angle A = 7.7°, c = 28.2$

$a = 8$
$b = 35.1$
$\angle B = 144.3°$

19) $m\angle C = 58°, m\angle A = 89.2°, b = 13$

$a = 24$
$c = 20.4$
$\angle B = 32.8°$

20) $m\angle B = 123°, m\angle A = 23°, c = 10$

$a = 7$
$b = 15$
$\angle C = 34°$

21) In $\triangle KHP$, $m\angle K = 22°, m\angle H = 114.4°, p = 25$ cm

$h = 33\ cm$
$k = 13.6\ cm$
$\angle P = 43.6°$

22) In $\triangle STR$, $m\angle S = 100°, m\angle T = 32°, s = 46.4$ km

$r = 35\ km$
$t = 25\ km$
$\angle R = 48°$