4.2.1. Find $x$ in the triangle below. Round your answer to two decimal places.

![Triangle 1](image1.png)

**Answer:** 65.87

4.2.2. Find $\ell$ below. Round your answer to two decimal places. *Note: This image is not drawn to scale.*

![Triangle 2](image2.png)

**Answer:** 3.09

4.2.3. Find $y$ in the triangle below. Round your answer to two decimal places.

![Triangle 3](image3.png)

**Answer:** 19.91

4.2.4. Find $z$ in the triangle below assuming that all of the internal angles of the triangle are acute. Round your answer to two decimal places.

![Triangle 4](image4.png)

**Answer:** 8.63

4.2.5. Find $\theta$ in the triangle below. Round your answer to two decimal places.

![Triangle 5](image5.png)

**Answer:** 0.30

4.2.6. Find $\ell$ below given that $\theta = 1.91$ and $\phi = 0.51$. Round your answer to two decimal places.

![Triangle 6](image6.png)

**Answer:** 2.96

4.2.7. Find all three angles in the triangle below. Round your answers to two decimal places.

![Triangle 7](image7.png)

**Answer:** $\alpha = 0.39$, $\theta = 0.57$, and $\phi = 2.28$

4.2.8. Find all of the angles in the triangle below. Round your answers to two decimal places.

![Triangle 8](image8.png)

**Answer:** $\theta = 0.64$, $\gamma = 1.18$, and $\phi = 1.32$

4.2.9. Find all of the angles in the triangle below. Round your answer to two decimal places.

![Triangle 9](image9.png)

**Answer:** $\alpha = 0.48$, $\theta = 0.58$, and $\phi = 2.08$

4.2.10. Verify that the triangle below is a right triangle by finding the missing side and the two missing angles.
4.2.11. A ship leaves the harbor, travels 5 mi north and then turns and travels 2 mi north east. How far is the ship from the harbor at that point (in a straight line)? Round your answer to two decimal places. 
**Hint: What is the angle between north and north east?**
**Answer:** 6.57 mi

4.2.12. Cindy and Katie both leave school at the same time on their bikes and they travel in straight lines which meet at an angle of $\frac{7\pi}{9}$. After ten minutes Cindy is 3 mi from school and Katie is 2.2 mi from school. How far apart are they after ten minutes? Round your answer to two decimal places.
**Answer:** 4.84 mi

4.2.13. I set sail from my dock and head in a straight line for 7 mi. The wind then picks up momentarily and I am forced to change direction by $\frac{5\pi}{36}$. I then sail in a straight line for another 4 mi. At this point, how far am I from the dock? Round to two decimal places.
**Answer:** 10.76 mi

4.2.14. A particular clock has an hour hand with a length of 5 in and a minute hand with a length of 8 in. If the two hands are currently meeting at $\frac{23\pi}{36}$, find the distance between their tips. Round to two decimal places.
**Answer:** 11.08 in

4.2.15. A rope is helping to anchor a tall, thin sign post. The rope is 20 ft long, it is tied to the very top of the post, and it makes an angle of $\frac{2\pi}{9}$ with the ground. An engineer wants to use another rope on the opposite side of the post to add more support. If the second rope is 25 ft long and is also to be tied to the top of the post, find the angle that the rope will make with the ground. Round to two decimal places.
**Answer:** 0.91

4.2.16. A telephone pole is tilted at an angle of $\frac{\pi}{15}$ toward the sun. At a particular moment, the post casts a shadow whose length is 30 m. The line between the tip of the shadow and the tip of the pole makes a $\frac{2\pi}{3}$ angle with the ground. Find the length of the pole. Round to two decimal places.
**Answer:** 31.32 m

4.2.17. Consider the diagram below.

(a) Find $\theta$. Leave your answer in exact form.
**Answer:** $\theta = \frac{\pi}{15}$

(b) Find $d$. Round your answer to two decimal places.
**Answer:** $d = 6.18$

(c) Find $\ell$. Round your answer to two decimal places.
**Answer:** $\ell = 3.81$

4.2.18. Consider the following diagram:

(a) Find $\ell$ and round to two decimal places.
**Answer:** $\ell = 5.39$

(b) Find $\theta$ and round to two decimal places.
**Answer:** $\theta = 1.19$

(c) Find $m$ and round to two decimal places.
**Answer:** $m = 5.1$

(d) Find $\phi$ and round to two decimal places.
**Answer:** $\phi = 0.49$