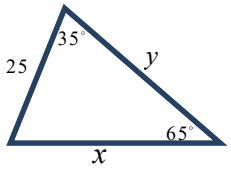
Name:_____ Date:_____

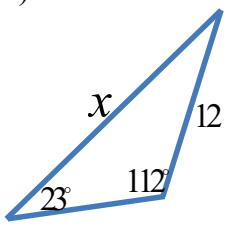
Math 10/11 Honors Section 4.4 Sine Law and Cosine Law

1. Indicate if you are to use the Sine Law or Cosine Law to find the missing side or angle. Then find the indicated side or angle. Show your work and steps:

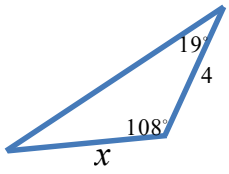
a) $x =$ $y =$



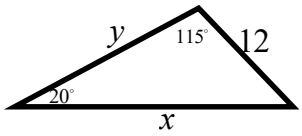
b) $x =$



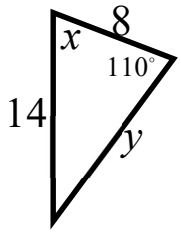
c) $x =$



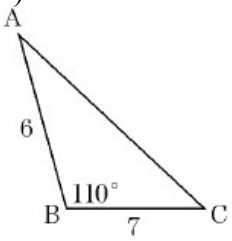
d) $x =$ $y =$



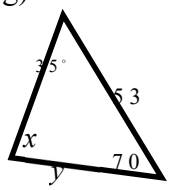
e) $x =$ $y =$



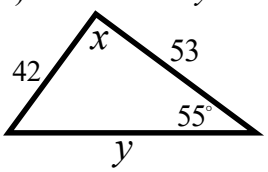
f) BC =



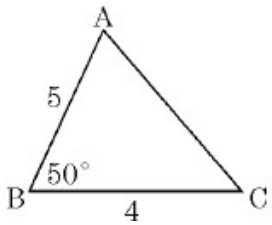
g) $x =$ $y =$



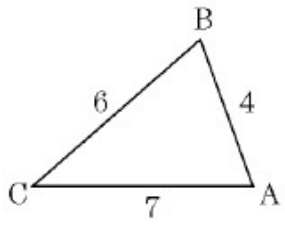
h) $x =$ $y =$

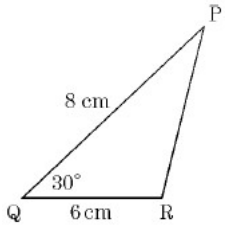
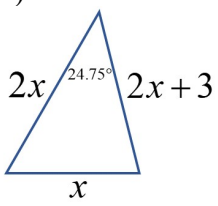
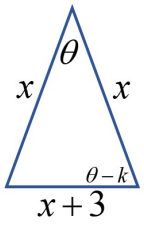
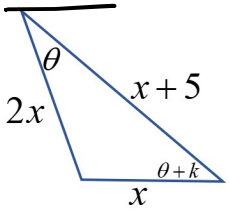


i) AC =

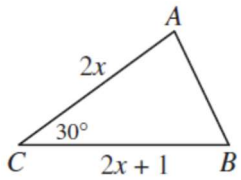


j) $\angle B =$

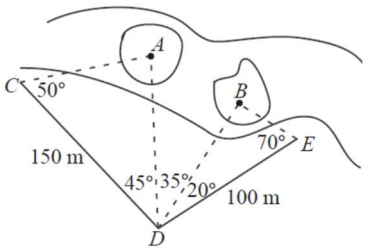


k) PR = 	L) x = ? 
m) $k = 31.6246°$ $x = ?$ $\theta = ?$ 	vn) $k = 46.44324°$ $x = ?$ $\theta = ?$ 

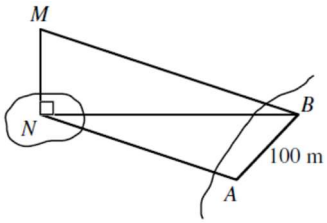
2. In the diagram, $AC = 2x,\ BC = 2x+1$ and $\angle ACB = 30°$. If the area of $\triangle ABC$ is 18, what is the value of "x"?



3. In the diagram, points A and B are located on islands in a river full of rabid aquatic goats. Determine the distance from A to B, to the nearest meter.

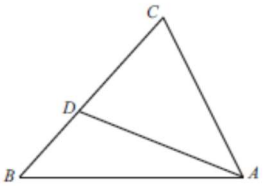


4. In determining the height, MN, of a tower on an island, two points A and B, 100 meters apart, are chosen on the same horizontal plane as "N". If $\angle NAB = 108°$, $\angle ABN = 47°$, and $\angle MBN = 32°$, determine the height of the tower to the nearest meter.

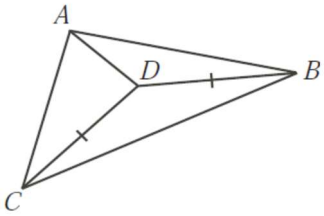


5. In triangle ABC, $\angle ABC = 45°$. Point "D" is on $\overline{BC}$ so that $2 \bullet BD = CD$ and $\angle DAB = 15°$. Find $\angle ACB$.

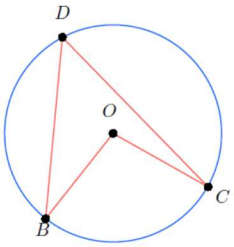
a) $54°$ b) $60°$ c) $72°$ d) $75°$ e) $90°$



6. In the diagram, $DC = DB, \angle DCB = 15°$, and $\angle ADB = 130°$. What is the measure of $\angle ADC$?



7. In the diagram, the circle has radius $\sqrt{7}$ and centre O. Points D, B, and C are on the circle. If $\angle BOC = 120°$ and $DC = DB + 1$, determine the length of DB.

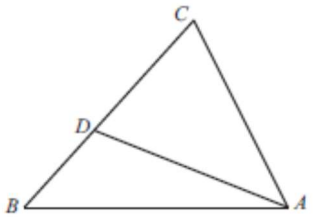


In $\triangle ABC, BC = 4, AB = x, AC = x + 2$, and $\cos(\angle BAC) = \dfrac{x+8}{2x+4}$. Determine all possible values of "x".

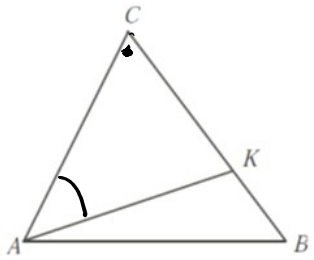
8. In $\triangle ABC$, $BC = a$, $AC = b$, $AB = c$, and $a < \dfrac{1}{2}(b + c)$. Prove that $\angle BAC < \frac{1}{2}(\angle ABC + \angle ACB)$

9. In triangle ABC, $\angle ABC = 45°$. Point "D" is on $\overline{BC}$ so that $2 \bullet BD = CD$ and $\angle DAB = 15°$. Find $\angle ACB$

a) 54° b) 60° c) 72° d) 75° e) 90°



10. Challenge: In the diagram, $2\angle BAC = 3\angle ABC$ and "K" lies on BC such that $\angle KAC = 2\angle KAB$. Suppose that $BC = a$, $AC = b$, $AB = c$, $AK = d$, and $BK = x$ a) Prove that $d = \frac{bc}{a}$ and $x = \frac{a^2 - b^2}{a}$



b) Prove that $\left(a^2 - b^2\right)\left(a^2 - b^2 + ac\right) = b^2c^2$

11. Challenge:

Suppose that $\triangle ABC$ is an equilateral triangle of side length s, with the property that there is a unique point P inside the triangle such that $AP = 1$, $BP = \sqrt{3}$, and $CP = 2$. What is s?

(A) $1 + \sqrt{2}$ **(B)** $\sqrt{7}$ **(C)** $\frac{8}{3}$ **(D)** $\sqrt{5 + \sqrt{5}}$ **(E)** $2\sqrt{2}$