Name

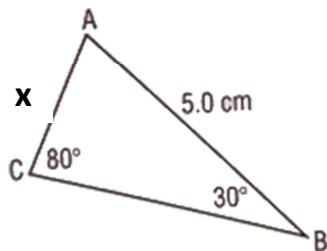| *20.3v13* | 2 | 3 | 4 |
|---|---|---|---|
| **Outcome 2.2:** I can demonstrate understanding of the cosine and sine law, including the ambiguous case. | I can identify which equation to use (primary trig ratios, cos law, sin law) and write the correct form<br><br>I can evaluate variables using the sin law and cos law<br><br>I can sketch and label diagrams. | I can apply sine/cosine law to find unknown values in triangles, including the ambiguous case<br><br><mark>I can solve a non-right angle triangle using primary trig ratios????</mark> | In addition to demonstrating level 3 performance, I am capable of in depth inferences and applications that go **beyond** what was taught in class |

**Level 2**

1. In the following examples, state which equation (in the correct form) should be used to solve for x.  Do not solve!
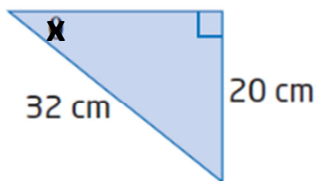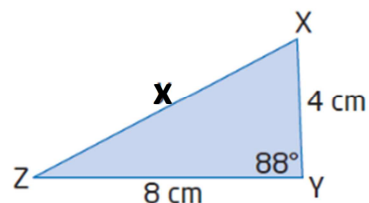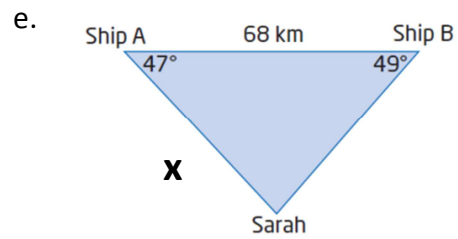
   a.

   

   b.

   

   c.

   

   d.

   

e.



Ship A     68 km     Ship B

47°          49°

X

Sarah
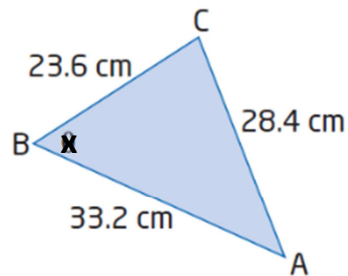
2. Solve for x in the following equations.

a. $\dfrac{x}{Sin\ 63^0} = \dfrac{11}{Sin\ 21^0}$

b. $\dfrac{2.65}{Sin\ 12^0} = \dfrac{3.56}{Sin\ X}$

c. $x^2 = 4^2 + 3^2 - 2(4)(3)Cos\ 34°$

d. $12^2 = 9^2 + 5^2 - 2(9)(5)Cos\ X$

3. Draw a sketch and label the triangle for the following problems but do not solve!

    a. On a 360 yard hole, a golfer's drive of 240 yards is $25°$ off line. If the golfer's second shot is 140 yards , directly towards the pin, how far short of the hole will the ball be?

    b. a = 8, b = 8, $\angle C = 90°$

    c. In order to determine the height of a mountain (WZ) an observer at Y found an angle of elevation to the peak to be $21°$. The observer then backed up 2250m to point X and found the angle of elevation to be $19°$. Based on these readings, determine the height of the mountain.
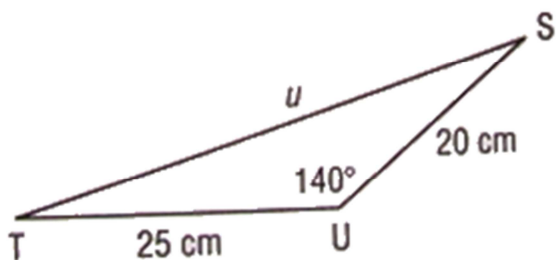
**Level 3**

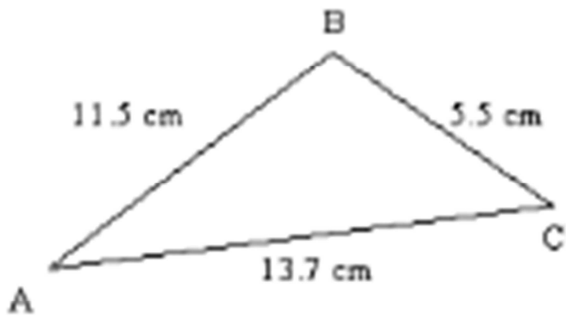4. For the triangle determine the length of AC to the nearest tenth of a centimeter.

A

5.0 cm

C 80°

30°

B
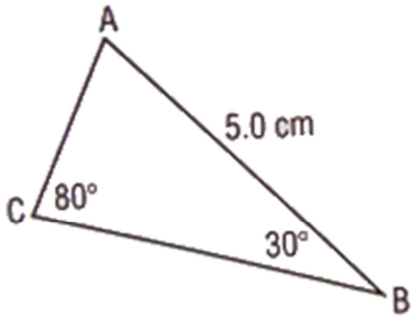
5. Determine the measure of <E to the nearest degree.

D

10 cm

E

7 cm

115°

F
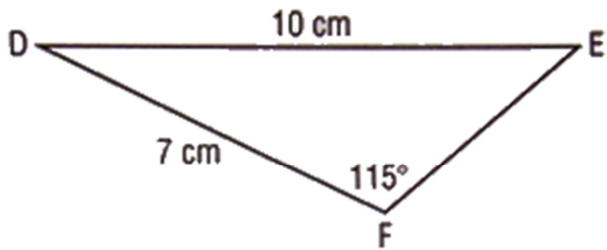
6. Determine the length of u in the triangle below.

S

u

20 cm

140°

T    25 cm    U

7. Given the following triangle, what is the measure of <A.



8. Which measurements describe an ambiguous case for $\Delta XYZ$?
   a) XY = 10 m, XZ = 8 m, $< X = 80°$
   b) XY = 10 m, XZ = 8 m, $< Y = 80°$
   c) XY = 10 m, XZ = 11 m, $< Y = 80°$
   d) XY = 10 m, XZ = 10 m, $< Y = 80°$

9. Solve triangle $\Delta MAT$. Give side lengths and angle sizes to one decimal place. (Remember to check for more than one solution.)   $\angle M = 25°$, t = 15, m = 10

10. A farmer has a field in the shape of a triangle.  Standing at one corner, it is 530 m to the second corner and 570 m to the third corner.  The angle between the lines of sight to the two corners is 53°.  Find the perimeter of the field.

11.  A plane left a northern lake and flew on a course of 222°.  After encountering bad weather the plane changed its course to 350° and landed on another lake 53 km west of the first lake.  How far did the plane fly on the second leg of its trip?  Give your answer to one decimal place.
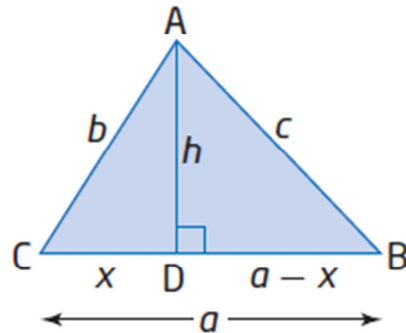
**Level 4**

**12.**  What is the length of each edge of a regular hexagon nut if the distance between a pair of opposite edges is 15mm.  Give your answer to two decimal places.

???

15mm
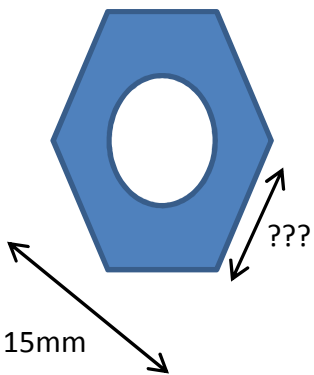
13.

Justify each step of the proof of the cosine law.



| Statement | Reason |
|---|---|
| $c^2 = (a - x)^2 + h^2$ | |
| $c^2 = a^2 - 2ax + x^2 + h^2$ | |
| $b^2 = x^2 + h^2$ | |
| $c^2 = a^2 - 2ax + b^2$ | |
| $\cos C = \dfrac{x}{b}$ | |
| $x = b \cos C$ | |
| $c^2 = a^2 - 2a(b \cos C) + b^2$ | |
| $c^2 = a^2 + b^2 - 2ab \cos C$ | |

**Law of Sine:**   $\dfrac{a}{sinA} = \dfrac{b}{sinB} = \dfrac{c}{sinC}$

**Law of Cosines:**   $a^2 = b^2 + c^2 - 2bc\ cosA$

$b^2 = a^2 + c^2 - 2ac\ cosB$

$c^2 = a^2 + b^2 - 2ab\ cosC$