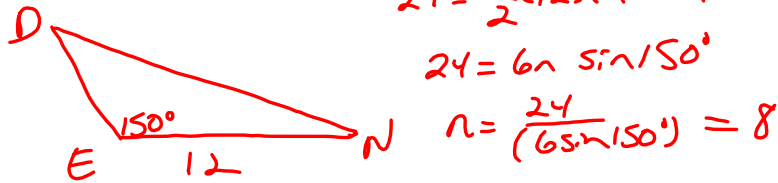**Review for Laws Of Trigonometry Test**

Review: Law of Sines, Law of Cosines, Area of a Triangle,

1. If the area of $\triangle END$ is 24 square inches, $m\angle E = 150$, and d measures 12 inches, the length of side n is how many inches?
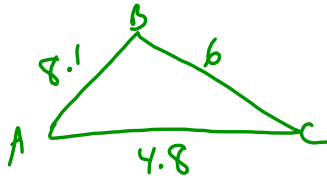
$$24 = \frac{1}{2}(12)(n) \sin 150°$$

$$24 = 6n \sin 150°$$

$$n = \frac{24}{(6\sin 150°)} = 8$$

2. In triangle ABC, a = 6, b = 4.8, and c = 8.1. The value of cos C is
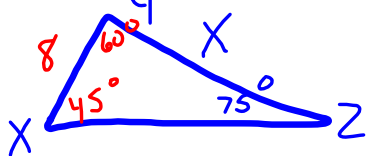
$$\cos C = \frac{(8.1^2 - 6^2 - 4.8^2)}{(-2(6)(4.8))}$$

$$\cos C = \frac{6.57}{-57.6} = -.1141$$

3. In triangle XYZ, $m\angle X = 45$, $m\angle Y = 60$, and XY = 8. Find the measure of the shortest side to the nearest tenth.

$$180 - 45 - 60 = 75$$
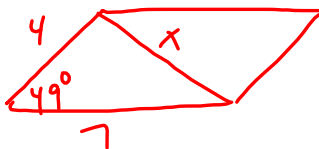
$$\frac{x}{\sin 45°} = \frac{8}{\sin 75°}$$

$$x = \frac{8 \sin 45°}{\sin 75} = 5.856 \approx 5.9$$

4. A parallelogram has sides of lengths 4 and 7. The acute angle between the two sides is 49°. Find the length of the shorter diagonal to the nearest tenth.
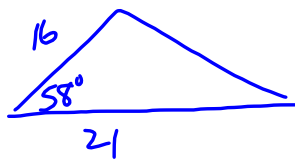
$$x^2 = 4^2 + 7^2 - 2(4)(7) \cos 49°$$

$$x^2 = \sqrt{28.26069\ldots}$$

$$x = 5.31 \approx 5.3$$

5. Two sides of a triangular-shaped pool measure 16 feet and 21 feet, and the included
    angle measures 58°. What is the area, to the nearest tenth of a square foot, of a
   nylon cover that would exactly cover the surface of the pool?

16

58°

21

$K = \frac{1}{2}(16)(21)\sin 58°$

$K = 8(21)\sin 58°$

$K = 142.47 \approx \boxed{142.5 \text{ sq. feet}}$

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6. Two straight roads, Elm Street and Pine Street, intersect creating a 40° angle, as
    shown in the accompanying diagram. John's house (J) is on Elm Street and is 3.2 miles
    from the point of intersection. Mary's house (M) is on Pine Street and is 5.6 miles
    from the intersection. Find, to the nearest tenth of a mile, the direct distance
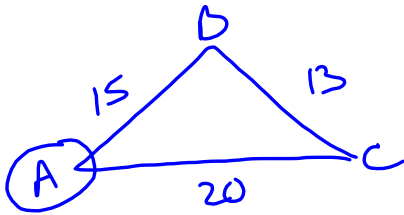   between the two houses.

Pine Street

J 3.2

X

40°

M 5.6

Elm Street
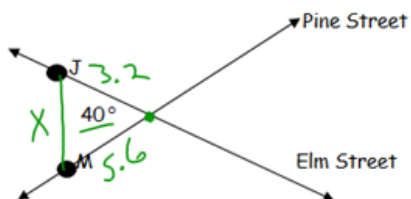
$X^2 = 3.2^2 + 5.6^2 - 2(3.2)(5.6)\cos 40°$

$\sqrt{X^2} = \sqrt{14.14...}$

$X = 3.76 \approx \boxed{3.8 \text{ miles}}$

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2

7. A machine part is in the shape of a triangle ABC with a = 13, b = 20, and c = 15. Find the measure of the smallest angle of the triangle to the nearest ten minutes.

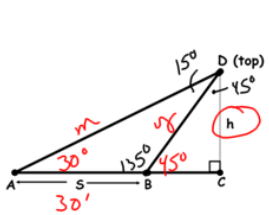$$\cos A = \frac{(13^2 - 15^2 - 20^2)}{(-2(15)(20))} = \frac{19}{25} = .76$$

$$A = \cos^{-1}(.76) = 40.535$$

$$DMS = 40°32'8.88''$$

$$\approx 40°30'$$

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8. A ship at sea heads directly toward a cliff on the shoreline. The accompanying diagram shows the top of the cliff, D, sighted from two locations, A and B, separated by distance S. If m∢DAC = 30°, m∢DBC = 45°, and S = 30 feet, what is the height of the cliff, to the nearest foot?

① $\dfrac{m}{\sin 135°} = \dfrac{30}{\sin 15°}$

$m = \dfrac{30 \sin 135°}{\sin 15°}$

$m = 81.96$

② $\dfrac{81.96}{\sin 90°} = \dfrac{h}{\sin 30°}$

$h = \dfrac{81.96 \sin 30°}{\sin 90°}$

$h = 40.98 \approx 41'$

[OR]

① $\dfrac{y}{\sin 30°} = \dfrac{30}{\sin 15°}$

$y = \dfrac{30 \sin 30°}{\sin 15°} = 57.96$

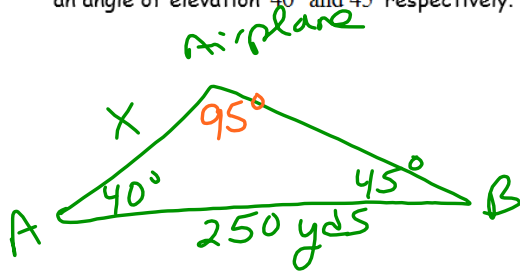② $\dfrac{57.96}{\sin 90°} = \dfrac{h}{\sin 45°}$

$h = \dfrac{57.96 \sin 45°}{\sin 90°}$

$h \approx 41'$

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3

9. Ali and Brynn are standing 250 yds apart. Both girls site an airplane between them with an angle of elevation 40° and 45° respectively. How far from the plane is Ali?

Airplane

X   95°

A   40°   250 yds   45°   B

$180 - 40 - 45 = 95$

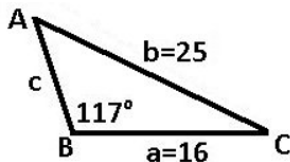$$\frac{X}{\sin 45°} = \frac{250}{\sin 95°}$$

$$X = \frac{250 \sin 45°}{\sin 95°} = 177.451\ldots$$

$$\boxed{X \approx 177.5 \text{ yds}}$$

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10. Solve the triangle by finding all of the missing side lengths to the nearest integer and angle measures to the nearest degree and find the area of the triangle.

∠A, ∠C, Side C, Area

A

b=25

c

117°

B   a=16   C

① ∠A $\dfrac{25}{\sin 117°} = \dfrac{16}{\sin A}$

$\sin A = \dfrac{16 \sin 117°}{25} = .57024 \ldots$

$A = \sin^{-1}(.57024\ldots) = 34.7672$

$\boxed{A \approx 35°}$

② $C = 180 - 117 - 34.7672\ldots = 28.2327\ldots$

$\boxed{C \approx 28°}$

③ Side C $\dfrac{c}{\sin 28.23\ldots} = \dfrac{25}{\sin 117}$

$C = \dfrac{25 \sin 28.23\ldots}{\sin 117°} = 13.273\ldots$

$\boxed{C \approx 13}$

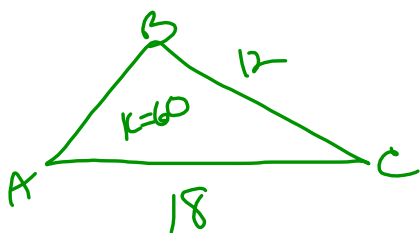④ $K = \frac{1}{2}(16)(13.273\ldots)\sin 117°$

$K = 94.6108\ldots$

$\boxed{X \approx 95 u^2}$

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4

11. Acute triangle ABC has an area of 60 sq. units, with a = 12 and b = 18. Find the measure of the angle between sides a and b to the nearest degree.

$$60 = \frac{1}{2}(12)(18)\sin C$$

$$60 = 108 \sin C$$

$$\sin C = \frac{60}{108} = \frac{5}{9}$$

$$C = \sin^{-1}\left(\frac{5}{9}\right) = 33.74 \approx 34°$$

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Dec 13-1:27 PM