Unit 3 Review

1) Convert the angle measure of 82.45° to degrees/minutes/seconds notation

$82^\circ 27'$

2) Convert the angle measure 124° 47' and 38" to decimal degrees notation

124.793889°

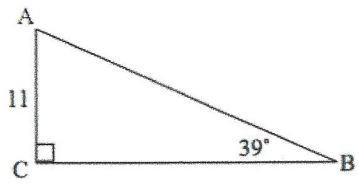
3A) Subtract the following Angle measures: (96° 31' 12") - (42° 54' 45")

$$\begin{array}{ccc} \cancel{96}^{95} & \cancel{31}^{60}30 & \cancel{12}\,72 \\ 42 & 54 & 45 \\ \hline 53^\circ & 36' & 27'' \end{array}$$

3B) Convert your answer to 3A to decimal degrees notation

53.6075°

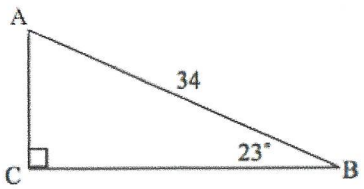
4) Solve each right triangle for all missing sides/angles



AB = 17.5

CB = 13.6

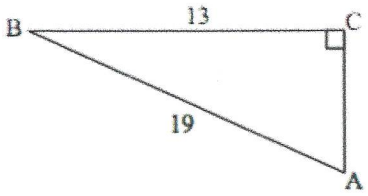
$\angle A$ = 51°



AC = 13.3

CB = 31.3

$\angle A$ = 67°



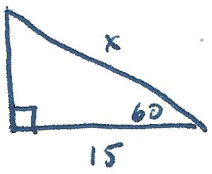
AC = 13.9

$\angle A$ = 43.2°

$\angle B$ = 46.8°

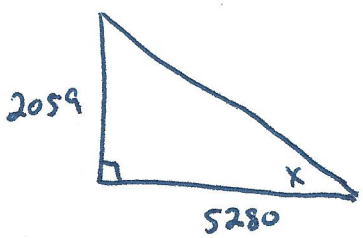
Unit 3 Review

A damsel is in distress and is being held captive in a tower. Her knight in shining armor is on the ground below with a ladder. When the knight stands 15 feet from the base of the tower and looks up at his precious damsel, the angle of elevation to her window is 60 degrees. How long does the ladder have to be?



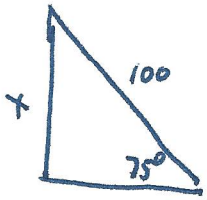
$\cos 60 = \frac{15}{x}$ $\quad x = 30ft$

The tallest television transmitting tower in the world is in North Dakota, and it is 2059 feet tall. If you are on level ground exactly 5280 feet (one mile) from the base of the tower, what is your angle of elevation looking up at the top of the tower?



$\tan^{-1}\left(\frac{2059}{5280}\right) = 21.3^\circ$

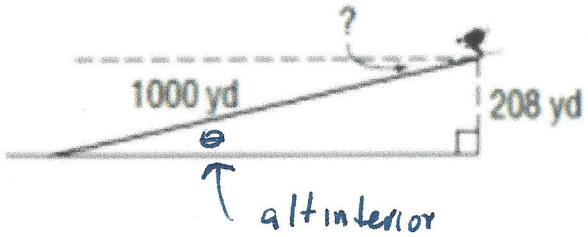
Suppose you're flying a kite, and it gets caught at the top of the tree. You've let out all 100 feet of string for the kite, and the angle that the string makes with the ground is 75 degrees. Instead of worrying about how to get your kite back, you wonder. "How tall is that tree?"



$\sin 75 = \frac{x}{100}$

$x = 96.6$

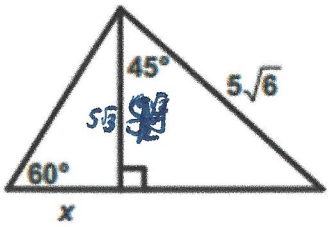
A ski run is 1,000 yards long with a vertical drop of 208 yards as represented in the diagram below. Determine the angle of depression from the top of the ski run to the bottom.



$\sin^{-1}\left(\frac{208}{1000}\right) = 12^\circ$

Unit 3 Review

Solve the following for x

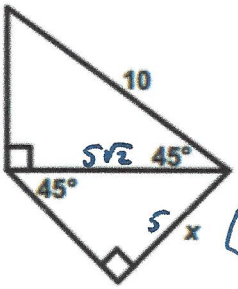


$\frac{5\sqrt{6}}{\sqrt{2}} = \frac{5\sqrt{12}}{2}$

$= \frac{10\sqrt{3}}{2}$

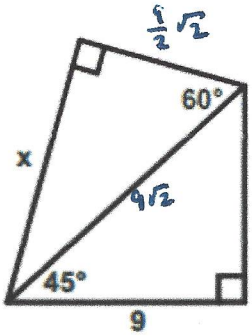
$= 5\sqrt{3}$

$x = \frac{5}{2}\sqrt{3}$

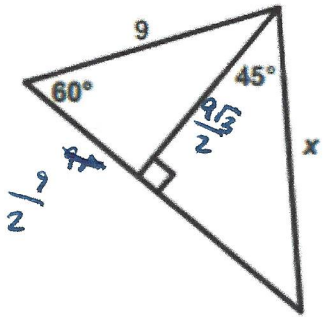


$\frac{10}{\sqrt{2}} = 5\sqrt{2}$

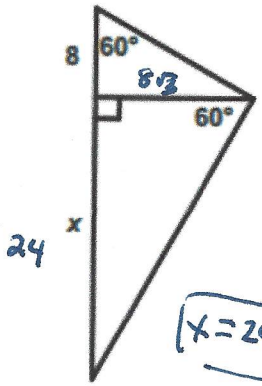
$x = 5$



$x = \frac{9\sqrt{6}}{2}$

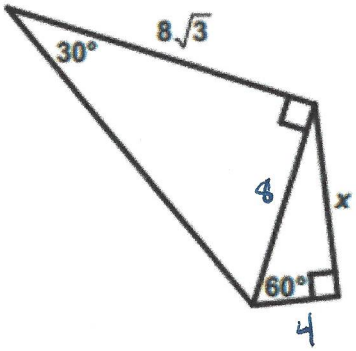


$x = \frac{9\sqrt{6}}{2}$



$8\sqrt{3} \cdot \sqrt{3} = 24$

$x = 24$



$x = 4\sqrt{3}$

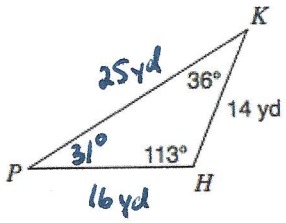
Unit 3 Review

Find the area of a triangular garden that has side lengths of 32 ft, 48 ft and 60 ft

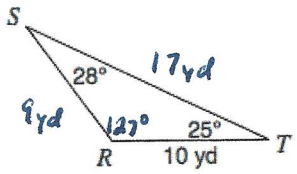
$s = \frac{32+48+60}{2} = 70 \rightarrow \sqrt{70(70-32)(70-48)(70-60)} = 765.6\,ft^2$

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

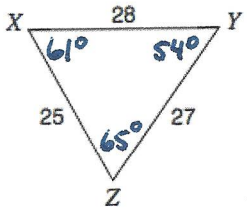
13)



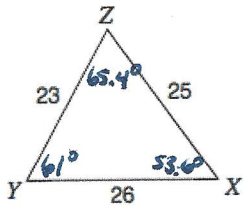
14)



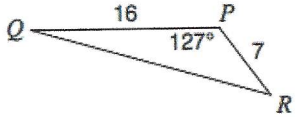
11)



12)



13)

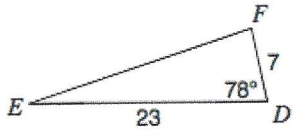


$\measuredangle Q = 15.5^\circ$

$\measuredangle R = 37.5^\circ$

$QR = 21$

14)



$\measuredangle F = 84.5^\circ$

$\measuredangle E = 17.5^\circ$

$EF = 22.6$

Unit 3 Review

Determine the number of possible triangles that exist given the following information: **a = 35, b = 20 and A = 33°**. If more than one triangle exists, solve for missing sides/angles for both triangles.

One triangle

$\measuredangle B = 18.13°$

$\measuredangle C = 128.87°$

$c = 50.04$

Determine the number of possible triangles that exist given the following information: **a = 10, b = 20 and A = 28°**. If more than one triangle exists, solve for missing sides/angles for both triangles.

Two Triangles: $h = 9.34$

$h < a < b$

$\measuredangle B_1 = 69.88°$ $\quad$ $\measuredangle B_2 = 110.12°$

$\measuredangle C_1 = 82.12°$ $\quad$ $\measuredangle C_2 = 41.88°$

$c_1 = 21.1$ $\quad$ $c_2 = 14.2$

Determine the number of possible triangles that exist given the following information: **a = 18, b = 32 and A = 65°**. If more than one triangle exists, solve for missing sides/angles for both triangles.

No Triangles $\quad a < b \quad h = 29$

$a < h$

Unit 3 Review

Find the component form of $\overrightarrow{AB}$. Then find the magnitude of $\overrightarrow{AB}$.

1. A (2, 4), B (-1, 3)
2. A (4, -2), B (5, -5)
3. A (-3, -6), B (8, -1)

$\langle -3, -1 \rangle \quad \|\overrightarrow{AB}\| = \sqrt{10}$ $\langle 1, -3 \rangle \quad \|\overrightarrow{AB}\| = \sqrt{10}$ $\langle 11, 5 \rangle \quad \|\overrightarrow{AB}\| = \sqrt{146}$

Given vector **v** = ⟨**3, -6**⟩ and vector **u** = ⟨**7, -4**⟩, determine

2u - 3v

$2u - 3v$

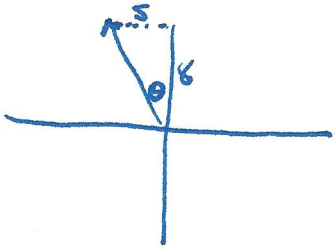
$\langle 14, -8 \rangle - \langle 9, -18 \rangle = \boxed{\langle 5, 10 \rangle}$

5v + 4u

$5v + 4u$

$\langle 15, -30 \rangle \quad \langle 28, -16 \rangle = \langle 43, -46 \rangle$

What is the direction angle and magnitude of the vector **u** = ⟨**-5, 8**⟩



$\|u\| = 5^2 + 8^2$

$= \sqrt{25 + 64}$

$\boxed{\|u\| = \sqrt{89}}$

$\theta = \tan^{-1}\left(\frac{5}{8}\right) = 32°$

$+ 90$

$\boxed{\text{Direction angle} = 122°}$

Find the direction angle of each vector.

12. u = 2i – 5j
13. u = -3i - 7j
14. u = 6i – 2j

$291.8°$ $246.8°$ $341.57°$

Find the component form of each vector.

15. || u || = 20, angle = 150°
16. || u || = 10, angle = 315°

$\langle -17.32, 10 \rangle$

or

$\langle -10\sqrt{3}, 10 \rangle$

$\langle 7.07, -7.07 \rangle$

or

$\left\langle \frac{10\sqrt{2}}{2}, \frac{10\sqrt{2}}{2} \right\rangle$