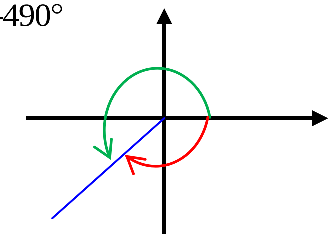
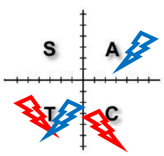
Math 11 **<u>Chapter 2 – Trigonometry Review</u>**

Name: ______________Solution__________________ **Period**: ____________

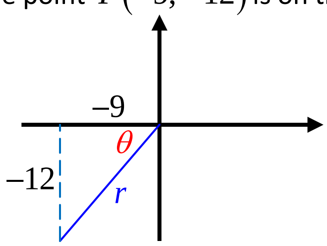
1. Determine two coterminal angles (one positive and one negative) and the reference angle for each given angle.

a. $\theta = 290°$ $\theta = 650°$ $\theta = -70°$ $\theta_r = 70°$	b. $\theta = -200°$ $\theta = 160°$ $\theta = -560°$ $\theta_r = 20°$
c. $\theta = 520°$ $\theta = 160°$ $\theta = -200°$ $\theta_r = 20°$	d. $\theta = -490°$  $\theta = 230°$ $\theta = -130°$ $\theta_r = 50°$

2. Determine the quadrant in which angle x lies.

a. $\sin x < 0$ and $\tan x > 0$  *Quadrant III*	b. $\cos x > 0$ and $\tan x < 0$ *Quadrant IV*

3. The point $P(-9, -12)$ is on the terminal arm of angle θ. Find $\sin\theta$, $\cos\theta$, and $\tan\theta$.



$(-9)^2 + (-12)^2 = r^2$

$81 + 144 = r^2$

$15 = r$

$\sin\theta = \frac{-12}{15} = \frac{-4}{5}$ $\cos\theta = \frac{-9}{15} = \frac{-3}{5}$

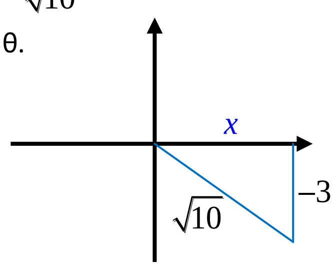
$\tan\theta = \frac{12}{9} = \frac{4}{3}$

4. If point P is on the terminal arm in standard position making angle θ, which is in the fourth quadrant, and $\sin\theta = -\frac{3}{\sqrt{10}}$. Determine the possible coordinates for P, and Find the other two trigonometric ratio for θ.

$x^2 + (-3)^2 = \left(\sqrt{10}\right)^2$

$x^2 + 9 = 10$

$x = 1$

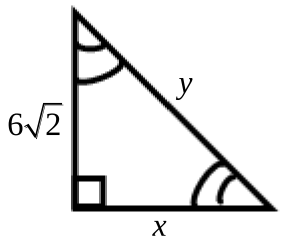


$\cos\theta = \frac{1}{\sqrt{10}}$

$\tan\theta = \frac{-3}{1}$

5. Solve for the missing sides of the triangles. Express your answer in exact value.

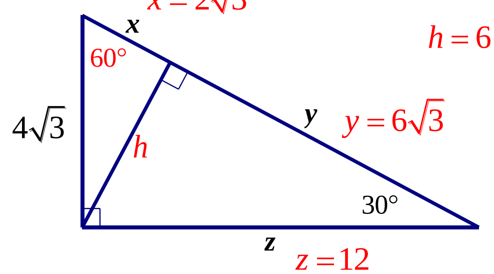
a.



$x = 6\sqrt{2}$

$y = 12$

b.



$x = 2\sqrt{3}$

$h = 2\sqrt{3} \times \sqrt{3}$

$h = 6$

$y = 6\sqrt{3}$

$z = 12$

6. Find the values of θ for $0° < \theta \leq 360°$.

a. $\sin\theta = -\frac{1}{\sqrt{2}}$

$\theta_r = 45°$

$Quadrant\ III: \theta = 225°$

$Quadrant\ IV: \theta = 315°$

b. $\tan\theta = \sqrt{3}$

$\theta_r = 60°$

$Quadrant\ I: \theta = 60°$

$Quadrant\ III: \theta = 240°$

7. Solve for θ to the nearest degree, if $0° \leq \theta < 360°$.

a. $\cos\theta = -0.7515$

$\theta = \cos^{-1}(0.7515)$

$\theta = 41°$

$Quadrant\ II: \theta = 139°$

$Quadrant\ III: \theta = 221°$

b. $\tan\theta = -0.8642$

$\theta = \tan^{-1}(0.8642)$

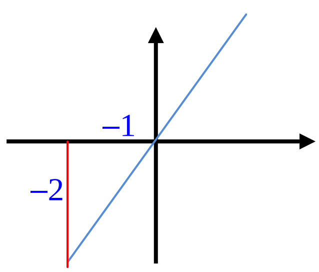
$\theta = 41°$

$Quadrant\ II: \theta = 139°$

$Quadrant\ IV: \theta = 319°$

8. If the terminal arm of an angle θ, lies on the line $4x - 2y = 0$, for $x \leq 0$, determine the exact value of $\sin\theta + \cos\theta$.

$y = 2x$



$(1)^2 + (2)^2 = r^2$

$1 + 4 = r^2$

$\sqrt{5} = r$

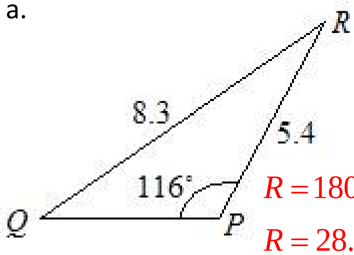
$\cos\theta = \frac{-1}{\sqrt{5}}$

$\sin\theta = \frac{-2}{\sqrt{5}}$

$\therefore \sin\theta + \cos\theta = \frac{-1}{\sqrt{5}} + \frac{-2}{\sqrt{5}} = \frac{-3}{\sqrt{5}}$

9. Solve the triangle.

a.



$R = 180 - (116 + 35.786°)$

$R = 28.214°$

$\frac{\sin 116}{8.3} = \frac{\sin Q}{5.4}$

$\frac{5.4 \sin 116}{8.3} = \sin Q$

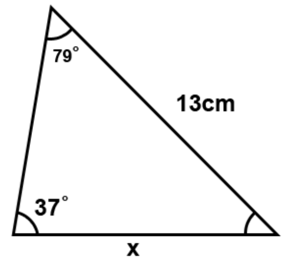
$35.786° = Q$

$\frac{8.3}{\sin 116} = \frac{PQ}{\sin 28.214}$

$\frac{8.3 \sin 28.214}{\sin 116} = PQ$

$4.366 = PQ$

b.



10. Solve for angle C.

a. $\angle A = 48°, a = 4, \text{ and } c = 5$

$\frac{\sin C}{5} = \frac{\sin 48}{4}$

$\sin C = \frac{5 \sin 48}{4}$

$\angle C = 68.269°$

OR

$\angle C = 180 - 68.269$

$\angle C = 111.731°$

- Ambiguous Case

b. $\angle A = 39°, a = 28, \text{ and } c = 41$

$\frac{\sin C}{41} = \frac{\sin 39}{28}$

$\sin C = \frac{41 \sin 39}{28}$

$\angle C = 67.147°$

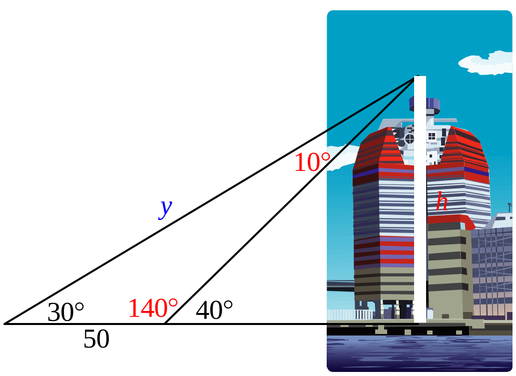
OR

$\angle C = 180 - 67.147$

$\angle C = 112.853°$

- Ambiguous Case

11. An observer on the ground looks up to the top of a building at an angle of elevation of 30°. After moving 50 feet closer, the angle of elevation is now 40°. Find the height of the building.



$\frac{y}{\sin 140} = \frac{50}{\sin 10}$

$y = \frac{50 \sin 140}{\sin 10}$

$y = 185.08$

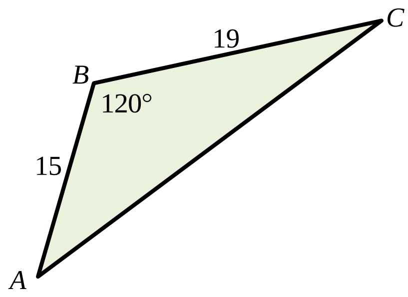
$\sin 30° = \frac{h}{185.08}$

$h = 185.08 \sin 30$

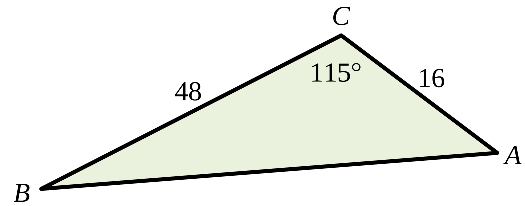
$h = 92.54 \text{ ft}$

12. Solve the triangle.

a.



b.



$c^2 = 48^2 + 16^2 - 2(48)(16)\cos 115°$

$c^2 = 2560 - 1536\cos 115°$

$c = 56.65$

$\frac{\sin 115}{56.65} = \frac{\sin A}{48}$

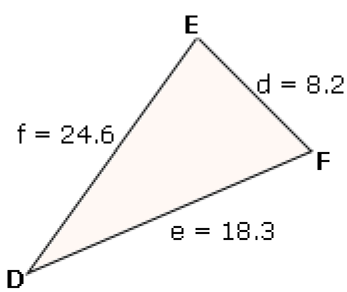
$\frac{48\sin 115}{56.65} = \sin A$

$50.17° = A$

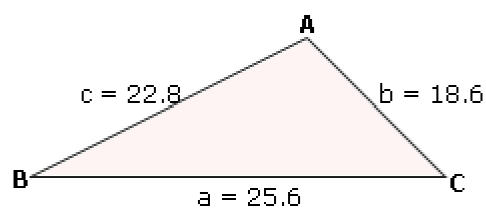
$\angle C = 180 - (115 + 50.17)$

$\angle C = 14.83°$

c.



d.



$25.6^2 = 22.8^2 + 18.6^2 - 2(22.8)(18.6)\cos A$

$655.36 = 865.8 - 848.16\cos A$

$-210.44 = -848.16\cos A$

$0.24811356 = \cos A$

$75.634° = \angle A$

$\frac{\sin 75.634}{25.6} = \frac{\sin B}{18.6}$

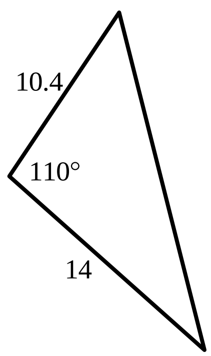
$\frac{18.6\sin 75.634}{25.6} = \sin B$

$44.736° = \angle B$

$\angle C = 180 - (75.634 + 44.736)$

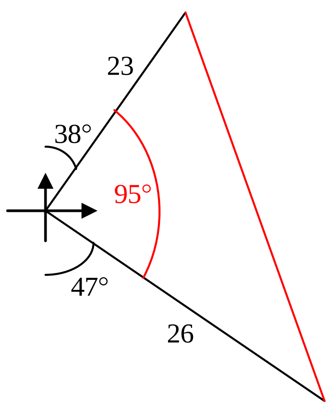
$\angle C = 59.63°$

13. Two people started walking from the same point, at the same time; the walkers diverge at an angle of 110 degree. If one walks at rate 3.5 km/h and the other at 2.6 km/h. Find the distance between them after 4 hours.



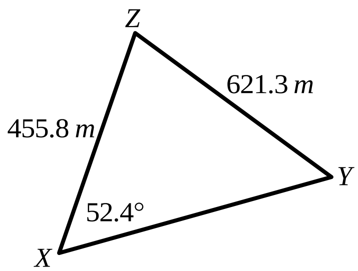
$$c^2 = 14^2 + 10.4^2 - 2(14)(10.4)\cos 110°$$
$$c^2 = 304.16 - 291.2\cos 110°$$
$$c = 20.09\ km$$

14. Two ships leave port at 4 p.m. One is headed at a bearing of N 38 E and is traveling at 11.5 miles per hour. The other is traveling 13 miles per hour at a bearing of S 47 E. How far apart are they when dinner is served at 6 p.m.?



$$c^2 = 23^2 + 26^2 - 2(23)(26)\cos 95°$$
$$c^2 = 1205 - 1196\cos 95°$$
$$c = 36.18\ miles$$

15. A straight line tunnel is to be constructed through a mountain between points X and Y in the diagram below. Naturally, locations X and Y are not visible from each other, and with the mountain in the way, it is impossible to measure the distance between the two points. However, a third point, Z, is located from which both X and Y are visible, and for which the distances and angles indicated in the diagram are measured. Compute the required length of the tunnel.

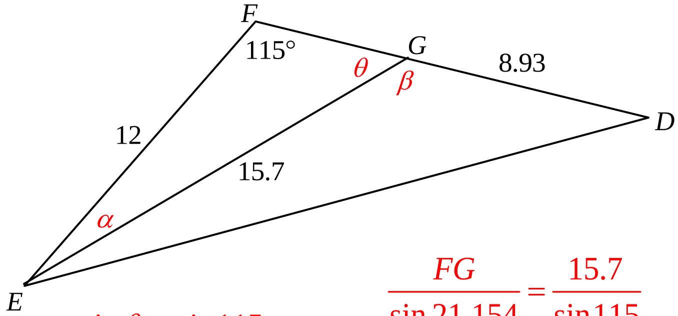


$$\frac{\sin 52.4}{621.3} = \frac{\sin Y}{455.8}$$
$$\frac{455.8\sin 52.4}{621.3} = \sin Y$$
$$35.538° = \angle Y$$

$$\angle Z = 180 - (52.4 + 35.538)$$
$$\angle Z = 92.062°$$

$$\frac{621.3}{\sin 52.4} = \frac{XY}{\sin 92.062}$$
$$\frac{621.3\sin 92.062}{\sin 52.4} = XY$$
$$783.675\ m = \angle Y$$

16. Find the measure of length DE to the nearest unit.



$\angle\beta = 180 - 43.846$

$\angle\beta = 136.1542°$

$c^2 = 15.7^2 + 8.93^2 - 2(15.7)(8.93)\cos 136.1542°$

$c^2 = 326.2349 - 280.402\cos 136.1542°$

$c = 22.99$

$\frac{\sin\theta}{12} = \frac{\sin 115}{15.7}$

$\sin\theta = \frac{12\sin 115}{15.7}$

$43.846° = \angle\theta$

$\frac{FG}{\sin 21.154} = \frac{15.7}{\sin 115}$

$FG = \frac{15.7\sin 21.154}{\sin 115}$

$FG = 6.25$

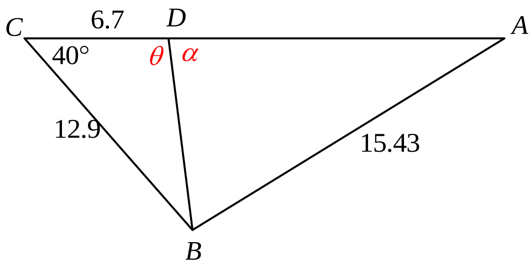
$\angle\alpha = 180 - (115 + 43.846)$

$\angle\alpha = 21.1542°$

$FD = 6.25 + 8.93$

$FD = 15.18$

17. Find the measure of angle A to the nearest tenth.



$BD^2 = 6.7^2 + 12.9^2 - 2(6.7)(12.9)\cos 40°$

$BD^2 = 211.3 - 172.86\cos 40°$

$BD = 8.88$

$\angle\alpha = 180 - 69$

$\angle\alpha = 111°$

$\frac{\sin\theta}{12.9} = \frac{\sin 40}{8.88}$

$\sin\theta = \frac{12.9\sin 40}{8.88}$

$\angle\theta = 69°$

$\frac{\sin A}{8.88} = \frac{\sin 111}{15.43}$

$\sin A = \frac{8.88\sin 111}{15.43}$

$\angle A = 32.5°$