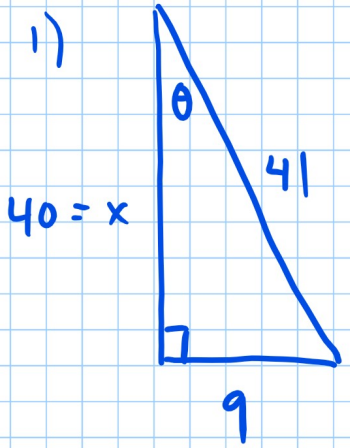
Solutions for Review

1)



$\sin\theta = \frac{9}{41}$ $\quad \csc\theta = \frac{41}{9}$

$\cos\theta = \frac{40}{41}$ $\quad \sec\theta = \frac{41}{40}$

$\tan\theta = \frac{9}{40}$ $\quad \cot\theta = \frac{40}{9}$

$x^2 + 9^2 = 41^2$

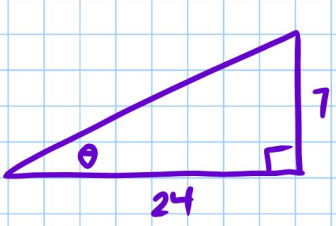
$x^2 + 81 = 1681$

$x^2 = 1600$

$x = 40$

PPP

1)



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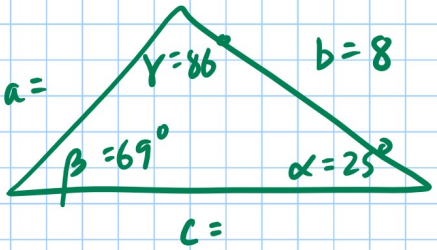
2) $b = 8$

$\alpha = 25°$

$\gamma = 86°$



$\beta = 180 - 25 - 86$

$\frac{\sin 69°}{8} = \frac{\sin 25°}{a}$

$a = \frac{8\sin 25°}{\sin 69°} = 3.62$

$\frac{\sin 69°}{8} = \frac{\sin 86°}{c}$

$c = \frac{8\sin 86°}{\sin 69°}$

$= 8.55$

$\text{Area} = \frac{1}{2}bc\sin\alpha$

$= \frac{1}{2} \cdot 8 \cdot 8.55 \sin 25° = 14.45$

$a = 3.62$

$c = 8.55$

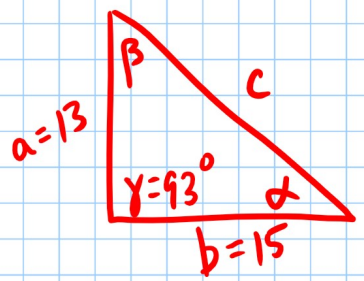
$\beta = 69°$

$\text{Area} = 14.45$

PPP

$a = 16,\ \beta = 34°,\ \alpha = 71°$

3) $a=13,\ b=15,\ \gamma=93^\circ$



$c^2 = 13^2 + 15^2 - 2\cdot13\cdot15\cos93^\circ$

$c^2 = 414.41$

$c = 20.4$

$A = \frac{1}{2}\cdot15\cdot20.4\cdot\sin39.5^\circ = 97.32$

$c = \underline{20.4}$

$\alpha = \underline{39.5^\circ}$

$\beta = \underline{47.5^\circ}$

Area $= \underline{97.32}$

$\frac{\sin93^\circ}{20.4} = \frac{\sin\alpha}{13}$

$\sin\alpha = \frac{13\sin93^\circ}{20.4} = 0.6364$

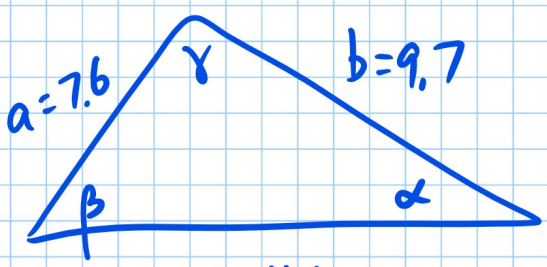
$\alpha = \sin^{-1}0.6364 = 39.5^\circ$

$180 - 39.5 - 93 = 47.5^\circ$

PPP

3) $a=9.3,\ b=40.1,\ c=43.2$

4) $a=7.6,\ b=9.7,\ c=11.1$



$\alpha = \underline{42.2^\circ}$

$\beta = \underline{59.0^\circ}$

$\gamma = \underline{78.8^\circ}$

Area $= \underline{36.16}$

$c = 11.1$

$\frac{a^2+b^2-c^2}{2ab}$

$\cos\gamma = \frac{(7.6^2 + 9.7^2 - 11.1^2)}{(2\cdot7.6\cdot9.7)} = 0.1942$

$\gamma = \cos^{-1}.1942 = 78.8^\circ$

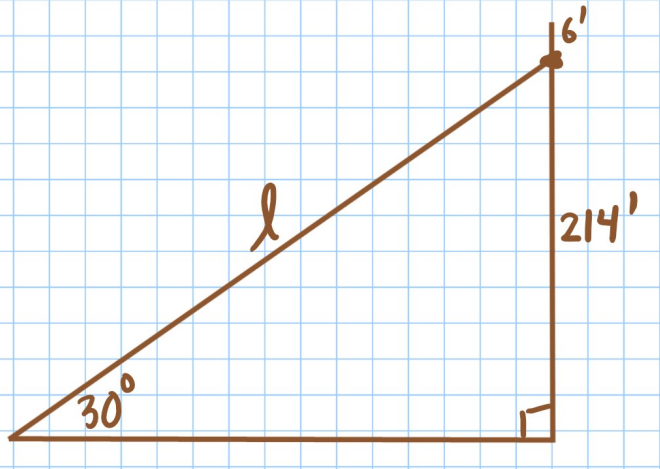
$\alpha = 180 - 59 - 78.8 = 42.2^\circ$

$\cos\beta = \frac{(7.6^2 + 11.1^2 - 9.7^2)}{(2\cdot7.6\cdot11.1)} = .5149$

$\beta = \cos^{-1}.5149 = 59.0^\circ$

Area $= \frac{1}{2}\cdot9.7\cdot11.1\sin42.2^\circ = 36.16$

5)

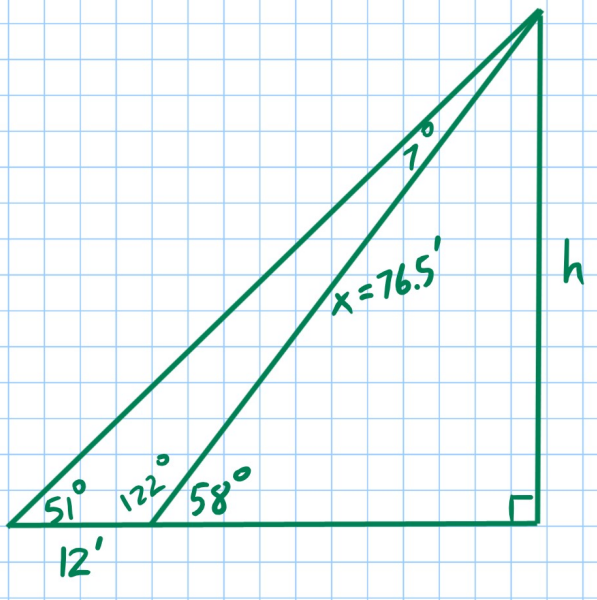


$\sin 30^\circ = \frac{214}{l}$

$l \sin 30^\circ = 214$

$l = \frac{214}{\sin 30^\circ} = 428.0 \text{ ft}$

6)



$\frac{\sin 7^\circ}{12} = \frac{\sin 51^\circ}{x}$

$x = \frac{12 \sin 51^\circ}{\sin 7^\circ} = 76.5$

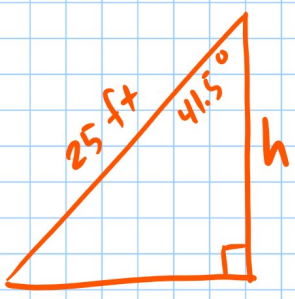
$\sin 58^\circ = \frac{h}{76.5}$

$h = 76.5 \sin 58^\circ = 64.9$

64.9 ft

PPP 4) A person stands away from a monument, looking at the top. The angle of elevation to the top of the monument is 63°. The person walks 101 ft away and measures 58° to the top. How tall is the monument? nearest tenth

7)

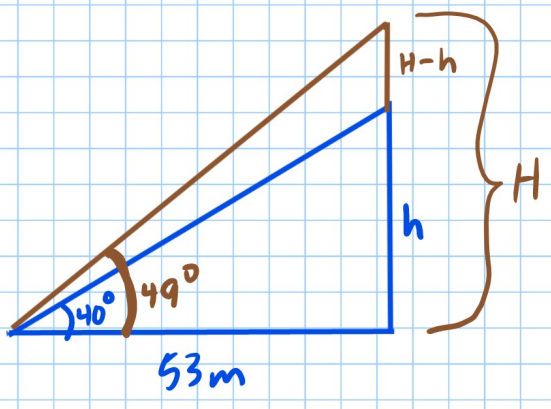


$\cos 41.5^\circ = \frac{h}{25}$

$25 \cos 41.5^\circ = h$

$h = 18.7 \text{ ft}$

8)



$\tan 49^\circ = \frac{H}{53}$ $\tan 40^\circ = \frac{h}{53}$

$53\tan 49^\circ = H$ $53\tan 40^\circ = h$

$H = 60.97\text{m}$ $h = 44.47\text{m}$

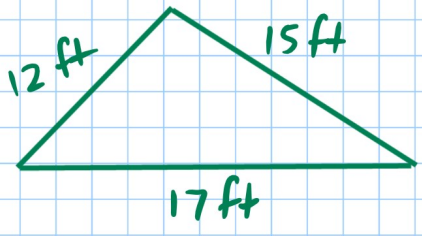
$\text{Tower} = 60.97 - 44.47$

$= 16.5\text{ m}$

PPP

5) An admirer of art is looking at a statue on top of a building. If the admirer is 125m from the building how tall is the statue if the angle of elevation to the bottom of the statue is 73° and to the top is 78°?

9)



$s = \frac{1}{2}(12+15+17) = 22$

$A = \sqrt{22(22-12)(22-15)(22-17)}$

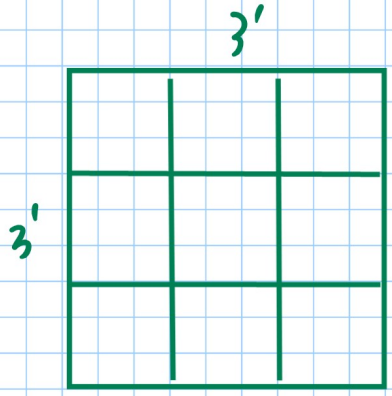
$A = \sqrt{7700} = 87.75\text{ ft}^2$

$\frac{87.75}{9}$

9.75 yd^2

need to buy 10 yd^2

ALWAYS ROUND UP

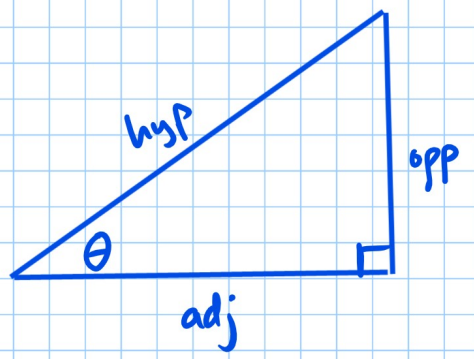


$1\text{ yd}^2 = 9\text{ ft}^2$

$10 \cdot 12 = \boxed{\$120}$

PPP

6) Sonny and Cher are carpeting a weird triangular stage for a performance. The dimensions of the stage are 65 ft by 75 ft by 100 ft. If the carpeting costs $11 per square yard, how much will they spend on carpeting (have to round up, can't buy a fraction of a yard).



$\sin\theta = \frac{opp}{hyp}$ $\quad \csc\theta = \frac{hyp}{opp}$

$\cos\theta = \frac{adj}{hyp}$ $\quad \sec\theta = \frac{hyp}{adj}$

$\tan\theta = \frac{opp}{adj}$ $\quad \cot\theta = \frac{adj}{opp}$

AAS or ASA

Law of Sines

$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$

SAS or SSS

Law of Cosines

To find missing side:

$c^2 = a^2 + b^2 - 2ab\cos\gamma$

$b^2 = a^2 + c^2 - 2ac\cos\beta$

$a^2 = b^2 + c^2 - 2bc\cos\alpha$

To find missing angle:

$\cos\gamma = \frac{a^2+b^2-c^2}{2ab}$

$\cos\beta = \frac{a^2+c^2-b^2}{2ac}$

$\cos\alpha = \frac{b^2+c^2-a^2}{2bc}$

Areas:

$A = \frac{1}{2}ab\sin\gamma$

$A = \frac{1}{2}ac\sin\beta$

$A = \frac{1}{2}bc\sin\alpha$

} SAS

Heron's

$s = \frac{1}{2}(a+b+c)$

$A = \sqrt{s(s-a)(s-b)(s-c)}$

} SSS