

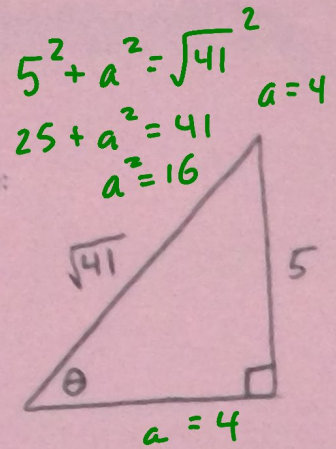
Precalculus Chapter 7 Practice Test

Name: _____

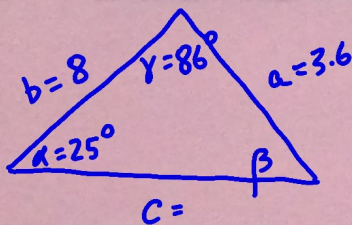
Complete each of the following problems. Show all work.

1. Find the exact six trig function values of θ in the following triangle:

$$\begin{aligned} \sin \theta &= \frac{5}{\sqrt{41}} = \frac{5\sqrt{41}}{41} & \csc \theta &= \frac{\sqrt{41}}{5} \\ \cos \theta &= \frac{4}{\sqrt{41}} = \frac{4\sqrt{41}}{41} & \sec \theta &= \frac{\sqrt{41}}{4} \\ \tan \theta &= \frac{5}{4} & \cot \theta &= \frac{4}{5} \end{aligned}$$



2. Solve the triangle with $b = 8$, $\alpha = 25^\circ$, and $\gamma = 86^\circ$. Find its area.



$$\beta = 180 - 86 - 25 = 69^\circ$$

$$\frac{\sin 86^\circ}{c} = \frac{\sin 69^\circ}{8}$$

$$c = \frac{8 \sin 86^\circ}{\sin 69^\circ} \quad A = \frac{1}{2} \cdot 3.6 \cdot 8 \sin 86^\circ$$

$$\frac{\sin 25^\circ}{a} = \frac{\sin 69^\circ}{8}$$

$$a = \frac{8 \sin 25^\circ}{\sin 69^\circ} = 3.6$$

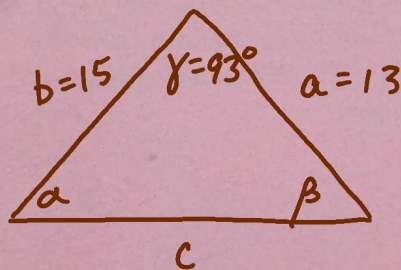
$$a = \underline{3.6}$$

$$c = \underline{8.5}$$

$$\beta = \underline{69^\circ}$$

$$\text{Area} = \underline{14.36}$$

3. Solve the triangle with $a = 13$, $b = 15$, $\gamma = 93^\circ$. Find its area.



$$\frac{\sin \beta}{15} = \frac{\sin 93^\circ}{20.4}$$

$$\sin \beta = \frac{15 \sin 93^\circ}{20.4} = .7343$$

$$\beta = 47.2^\circ$$

$$\beta = \underline{47.2^\circ}$$

$$d = \underline{39.2^\circ}$$

$$c = \underline{20.4}$$

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

$$c^2 = 13^2 + 15^2 - 2 \cdot 13 \cdot 15 \cos 93^\circ$$

$$c^2 = 414.41$$

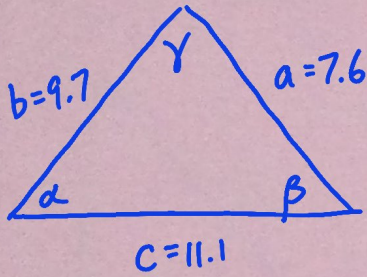
$$c = 20.4$$

$$\alpha = 180 - 93 - 47.2$$

$$\text{Area} = \frac{1}{2} \cdot 15 \cdot 13 \sin 93^\circ$$

$$\text{Area} = \underline{97.37}$$

4. Solve the triangle with $a = 7.6$, $b = 9.7$, and $c = 11.1$. Find its area.



Find largest \angle first

$$\cos \gamma = \frac{a^2 + b^2 - c^2}{2ab} = \frac{7.6^2 + 9.7^2 - 11.1^2}{2 \cdot 7.6 \cdot 9.7}$$

$$\cos \gamma = \frac{28.64}{147.44}$$

$$\gamma = \cos^{-1}(28.64/147.44)$$

$$\gamma = 78.8^\circ$$

$$\alpha = 42.2^\circ$$

$$\beta = 59.0^\circ$$

$$\gamma = 78.8^\circ$$

$$\text{Area} = 36.16$$

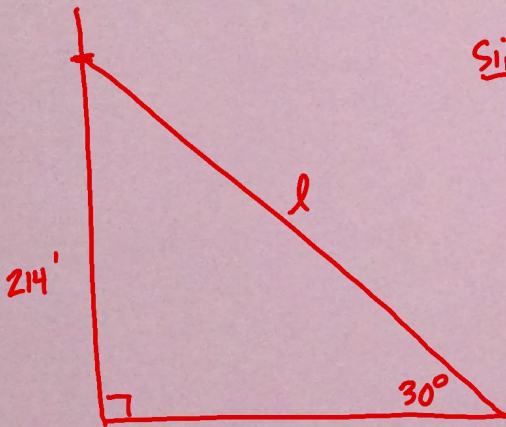
$$\frac{\sin \beta}{9.7} = \frac{\sin 78.8^\circ}{11.1}$$

$$\sin \beta = \frac{9.7 \sin 78.8^\circ}{11.1} \quad \sin^{-1} .8572 = \beta$$

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

$$A = \frac{1}{2} \cdot 7.6 \cdot 9.7 \sin 78.8^\circ$$

5. A radio transmission tower is 220 feet tall. How long should a guy wire be if it is to be attached 6 feet from the top and is to make an angle of 30° with the ground? Give your answer to the nearest tenth of a foot.

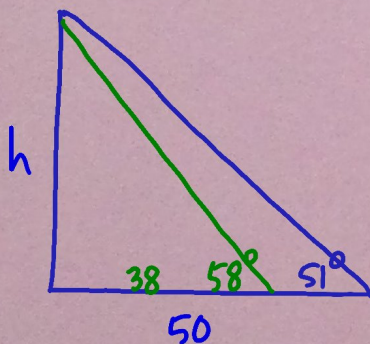


$$\frac{\sin 30^\circ}{1} = \frac{214}{l}$$

$$l \sin 30^\circ = 214$$

$$l = \frac{214}{\sin 30^\circ} = 428 \text{ ft}$$

6. A person is 50 feet from a building. The angle of elevation at ground level to the top of the building is 51° . The person then moves 12 feet closer to the building. At that time the angle of elevation at ground level to the top of the building is 58° . What is the height of the building? Round your answer to the nearest tenth of a foot.



$$\tan 51^\circ = \frac{h}{50}$$

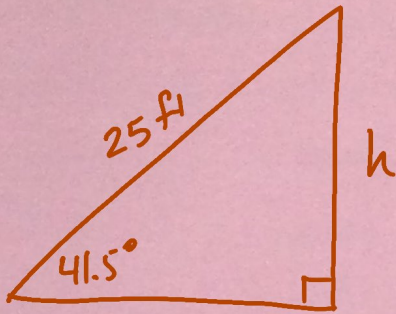
or

$$\tan 58^\circ = \frac{h}{38}$$

$$h = 60.8 \text{ ft}$$

$$h = 61.7 \text{ ft}$$

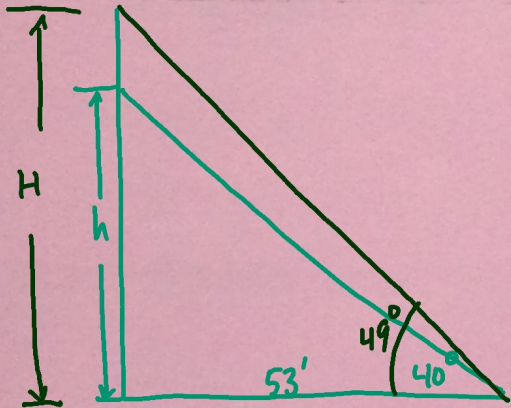
7. A twenty-five foot ladder just reaches the top of a house and forms an angle of 41.5° with the wall of the house. How tall is the house? Round your answer to the nearest tenth of a foot.



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

$$h = 16.6 \text{ ft}$$

8. A surveyor standing 53 meters from the base of a building measures the angle to the top of the building and finds it to be 40° . The surveyor then measures the angle to the top of the radio tower on the building and finds that it is 49° . How tall is the radio tower?



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

$$h = 44.5$$

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

$$H = 61.0$$

$$\text{Tower} = 61 - 44.5$$

$$= 16.5 \text{ m}$$

9. John and Barbara have a weird triangular room in their house. Its sides measure 12 ft, 15 ft, and 17 ft. Carpet costs \$12 per square yard. How much would it cost to carpet this room?

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

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

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

$$A = \sqrt{22 \cdot 10 \cdot 7 \cdot 5} = 87.75 \text{ ft}^2$$

$$87.75 \text{ ft}^2 \div 9 = 9.75 \text{ yd}^2$$

round up to 10

$$\text{Cost} = 12 \times 10 = \$120$$

