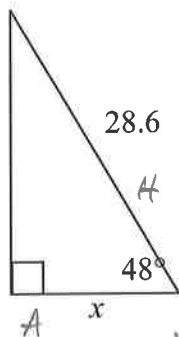


Directions: Solve the following problems. If a drawing is not provided, create and label one and show all work. Be sure to include the correct units for all answers. Round to the nearest tenth. You may use your notes and homework problems.

EVERY PERSON MUST TURN IN HER/HIS PAPER.
ONE PAPER WILL BE RANDOMLY CHOSEN TO BE GRADED.
WORK ON ONE PROBLEM AT A TIME TOGETHER.

C-Level Problems:

1. Solve for x .

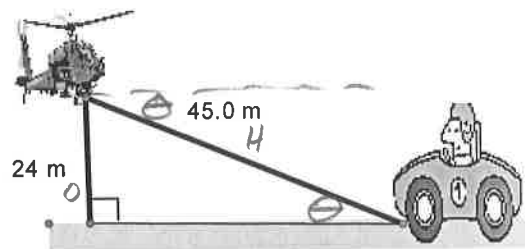


$$\cos 48^\circ = \frac{x}{28.6}$$

$$x = 28.6 \cdot \cos 48^\circ$$

$$\boxed{\approx 19.1}$$

2. A helicopter is hovering above a road at an altitude of 24 m. At a certain time, the distance between the helicopter and a car on the road is 45.0 m. Calculate the angle of depression from the helicopter from the car.



$$\sin \theta = \frac{24}{45}$$

$$\theta = \sin^{-1}\left(\frac{24}{45}\right)$$

$$\boxed{\theta \approx 32.2^\circ}$$

3. A ramp has an angle of elevation of 20° . It has a vertical height of 1.8 m. What is the length of ramp?



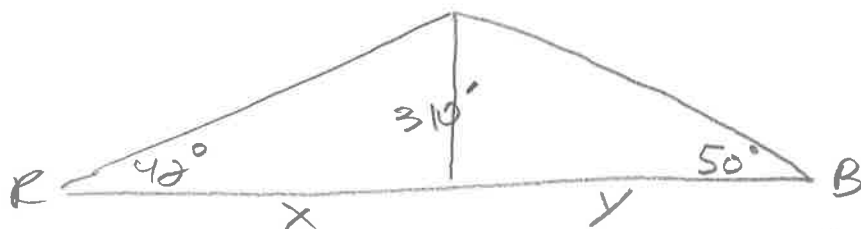
$$\sin 20^\circ = \frac{1.8}{x}$$

$$x = \frac{1.8}{\sin 20^\circ}$$

$$\boxed{\approx 5.3 \text{ m}}$$

B-Level Problems:

4. Cedar Point's *Millennium Force* is 310 feet high. Ralph is sitting on a bench eating an elephant ear and could see the top of *Millennium Force* at an angle of elevation of 42° . Bonnie is standing in line for the ring toss and could see the top of *Millennium Force* at an angle of elevation of 50° . Assuming that Ralph & Bonnie are straight across from each other and *Millennium Force* is between them, how far apart from each other are they?



$$x + y = 344.3 + 260.1$$

$$= 604.4 \text{ ft apart}$$

$$\tan 42^\circ = \frac{310}{x}$$

$$x \approx 344.3$$

$$\tan 50^\circ = \frac{310}{y}$$

$$y \approx 260.1$$

5. Each base angle of an isosceles triangle has a measure of 58° . The base of the triangle has a length of 30 cm. Find the area of the triangle. ($A = \frac{1}{2}bh$)



$$\tan 58^\circ = \frac{h}{15}$$

$$h = 15 \cdot \tan 58^\circ \approx 24$$

$$A = \frac{1}{2} \cdot 30 \cdot 24 = 360 \text{ cm}^2$$

A-Level Problem:

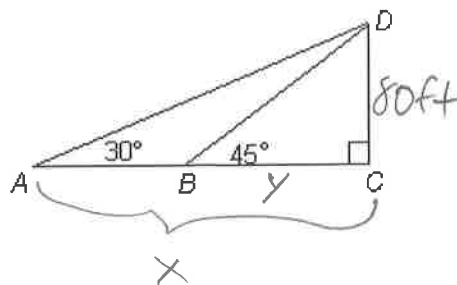
6. A person observes that from point A, the angle of elevation to the top of a cliff at D is 30° . Another person at point B, notes that the angle of elevation to the top of the cliff is 45° . If the height of the cliff is 80.0 m, find the distance between A and B.

$$\frac{AC}{\tan 30^\circ} = \frac{80}{\tan 30^\circ}$$

$$x \approx 138.6$$

$$\frac{BC}{\tan 45^\circ} = \frac{80}{\tan 45^\circ}$$

$$y = 80 \text{ (Isosceles } \Delta)$$



$$AB = AC - BC \approx 138.6 - 80 = 58.6 \text{ m}$$