

GEOMETRY

The Complete Course

Lesson Twenty Two

Applications Of Trigonometry In Geometry

KA8422

Worksheet

Instructors may duplicate the worksheets as needed

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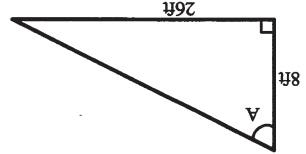
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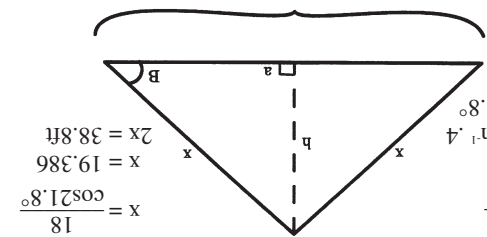
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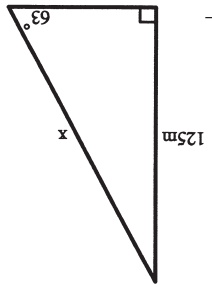
6. $\tan A = \frac{8}{26}$
 $\tan A = 3.25$
 $A = \tan^{-1} 3.25$
 $A = 72.9^\circ$



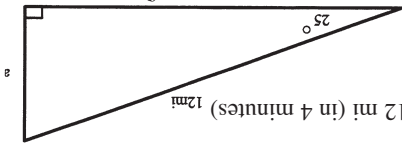
7. $\frac{h}{a} = \frac{5}{2}$
 $\tan B = \frac{a}{h} = \frac{2}{5}$
 $\tan B = .4$
 $B = \tan^{-1} .4$
 $B = 21.8^\circ$



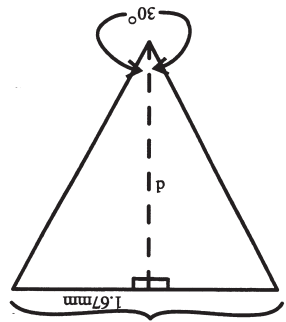
8. $\sin 63^\circ = \frac{x}{125}$
 $x \sin 63^\circ = 125$
 $x = \frac{125}{\sin 63^\circ}$
 $x = 140.3 \text{ m}$



9. $\frac{180 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = \frac{3 \text{ mi}}{\text{min}}$
 $\frac{3 \text{ mi}}{\text{min}} \cdot 4 \text{ min} = 12 \text{ mi (in 4 minutes)}$
 $\cos 25^\circ = \frac{12}{\frac{g}{12}}$
 $10.9 = g$

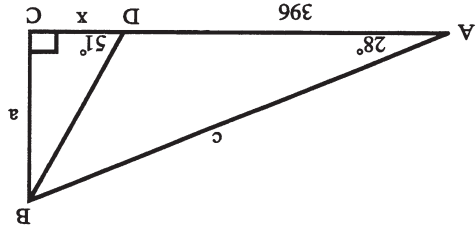


10. $\sin 25^\circ = \frac{12}{a}$
 $5.1 \text{ mi} = a$
 11. $\tan 30^\circ = \frac{1.67}{d}$
 $d = \frac{1.67}{\tan 30^\circ}$
 $d = 2.89 \text{ mm}$



1-3.

$$\tan 28^\circ = \frac{396+x}{a} \quad \tan 51^\circ = \frac{x}{a}$$



$$\tan 28^\circ (396+x) = x \tan 51^\circ$$

$$.5317 (396+x) = 1.2349x$$

$$210.55 + .5317x = 1.2349x$$

$$210.55 = .7032x$$

$$299.4 = x$$

$$\tan 51^\circ = \frac{x}{a}$$

$$1.2349 = \frac{x}{a}$$

$$299.42 = \frac{1.2349a}{a}$$

$$369.8 = a$$

$$c^2 = a^2 + (396+x)^2$$

$$c^2 = (396.75)^2 + (396+299.42)^2$$

$$c^2 = 136715.063 + 483608.976$$

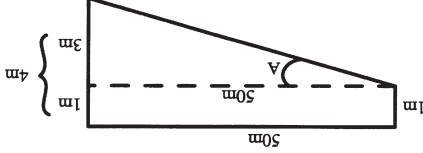
$$c = 787.6$$

$$\tan A = \frac{50}{3}$$

$$\tan A = .06$$

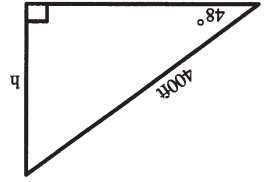
$$A = \tan^{-1} .06$$

$$A = 3.4^\circ$$



$$\sin 48^\circ = \frac{400}{h}$$

$$297.3 \text{ ft} = h$$

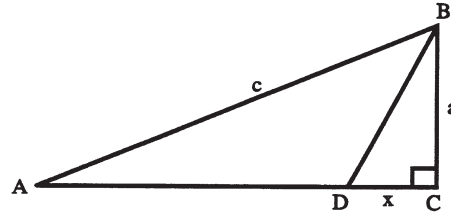


I. VIDEOTAPE FOLLOW-UP QUESTIONS

- I. Introduction.
 - A. Review of trigonometric ratios
 - B. Review of Pythagorean Theorem
- II. Definitions.
 - A. Angle of depression
 - B. Angle of elevation
- III. Airplane Problems.
 - A. Distance problem
 - B. Drift angle problem
- IV. Depth Problems.
 - A. Submarine problem
 - B. Mine shaft problem
- V. Height Problems.
 - A. Firetruck rescue problems
 - B. Leaning Tower of Pisa
- VI. Tool and Die Application.
- VII. Grade Applications.
 - A. Roof problem
 - B. Dam problem

II. SUPPLEMENTARY EXERCISES

1-3 Given right triangle ABC , $\angle A = 28^\circ$, $\angle BDC = 51^\circ$, $AD = 396$.



1. $x = \underline{\hspace{2cm}}$
2. $a = \underline{\hspace{2cm}}$
3. $c = \underline{\hspace{2cm}}$
4. A swimming pool is 50 meters long. It is one meter deep at one end and slopes gradually downward to a depth of 4 meters at the other end. What is the angle of depression made by the bottom of the pool?
5. A person flying a kite has let out 400 feet of string and tied the end of the string to the stake driven into the ground. The angle of elevation of the kite is 48° when the string is stretched straight. How high above the ground is the kite?
6. A security camera is to be mounted on a bank wall 8 feet above the floor. The camera needs to be positioned so the lens is centered on the head teller whose station is 26 feet away from the camera wall. At what angle from the wall should the camera be mounted?
7. A roof grade on a house is 2:5. If the house is 36 feet wide, what is the total length of the roof line that is to be shingled?
8. A television tower is supported by a guy wire attached at a point 125 meters above the ground making an angle of 65° with the ground. How long is the guy wire?

9. An airplane climbs steadily at an angle of 25° with the ground upon take-off and averages 180 mph for the first 4 minutes before leveling off. What is the ground distance that the plane covered before reaching the planned flight altitude?
10. In no. 9 above, what is the flight altitude?
11. Threads of a bolt have to be cut exactly so they are 3.34 millimeters apart. If the angle of the groove between the threads is 60° , what does the depth of the groove have to be?