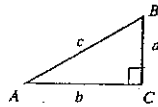


Unit #4: Introduction to Trigonometry

Lesson #6: Solving Right Triangles

I. Solve each triangle. Give length and angle measures to nearest tenth. Show your equations. Box final answers.



1. $\angle A = 36.2^\circ, c = 68$

$\angle A = 36.2^\circ$ $a = 40.2$
 $\angle B = 53.8^\circ$ $b = 54.9$
 $\angle C = 90^\circ$ $c = 68$

2. $\angle B = 15.8^\circ, c = 12.2$

$\angle A = 74.2^\circ$ $a = 11.7$
 $\angle B = 15.8^\circ$ $b = 3.32$
 $\angle C = 90^\circ$ $c = 12.2$

3. $a = 230, c = 320$

$\angle A = 46^\circ$ $a = 230$
 $\angle B = 44^\circ$ $b = 222$
 $\angle C = 90^\circ$ $c = 320$

4. $a = 52.5, b = 28.0$

$\angle A = 61.9^\circ$ $a = 52.5$
 $\angle B = 28.1^\circ$ $b = 28$
 $\angle C = 90^\circ$ $c = 59.5$

5. $\angle B = 58^\circ 10', c = 420$

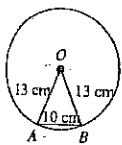
$\angle A = 31^\circ 50'$ $a = 222$
 $\angle B = 58^\circ 10'$ $b = 357$
 $\angle C = 90^\circ$ $c = 420$

6. $\angle A = 15^\circ 30', a = 4.50$

$\angle A = 15^\circ 30'$ $a = 4.5$
 $\angle B = 74^\circ 30'$ $b = 16.2$
 $\angle C = 90^\circ$ $c = 16.8$

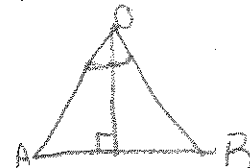
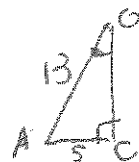
II. Solve each problem using a trig equation.

7. The radius of a circle O is 13 cm and the length of \overline{AB} is 10 cm. Find the measure of $\angle AOB$.



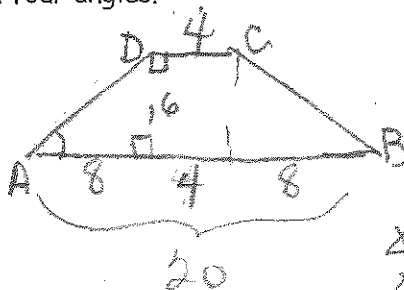
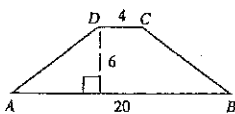
$\angle AOC:$

$\sin x = \frac{5}{13}$
 $\sin^{-1}\left(\frac{5}{13}\right) = x = 22.62$



$22.62 \times 2 = \boxed{45.24^\circ}$

8. The height of an isosceles trapezoid is 6 units and the bases have lengths 4 units and 20 units. Find the measures of all four angles.



$\angle A:$
 $\tan A = \frac{6}{8}$
 $\tan^{-1}\left(\frac{6}{8}\right) = 36.9^\circ$

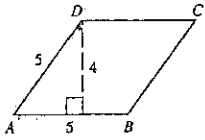
$\angle A = 36.9^\circ$
 $\angle B = 36.9^\circ$

$\angle D:$
 $180^\circ - (90^\circ + 36.9^\circ)$
 $= 180^\circ - 126.9^\circ$
 $= 53.1^\circ$

$53.1^\circ + 90^\circ = \boxed{143.1^\circ}$

$\angle A \cong \angle B$
 $\angle D \cong \angle C$

9. A rhombus has sides 5 units long and its height is 4 units. Find the measure of its angles.



$$\angle A = \angle C$$

$$\angle B = \angle D$$



$$\angle A:$$

$$\sin A = \frac{4}{5}$$

$$\sin^{-1}\left(\frac{4}{5}\right) = A$$

$$53.1^\circ = A$$

$$\angle A = \angle C = 53.1^\circ$$

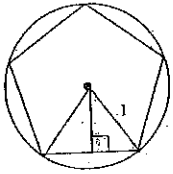
$$360^\circ - (A + C)$$

$$= 360^\circ - 106.2^\circ$$

$$= 253.8^\circ / 2$$

$$\angle D = \angle B = 106.9^\circ$$

10. Find the perimeter of a regular pentagon inscribed in a unit circle.



$$\sin 36^\circ = \frac{x}{1}$$

$$.5878 = x$$

$$\frac{x \cdot 10}{1}$$

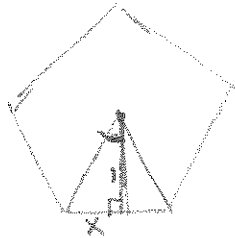
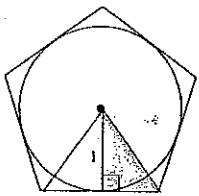
$$5.88$$

$$5.88$$

$$\theta = \frac{360^\circ}{5} = 72^\circ$$

$$\frac{72^\circ}{2} = 36^\circ$$

11. Find the perimeter of a regular pentagon circumscribed about a unit circle.



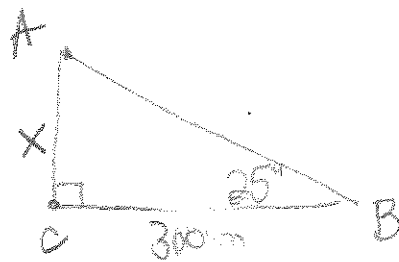
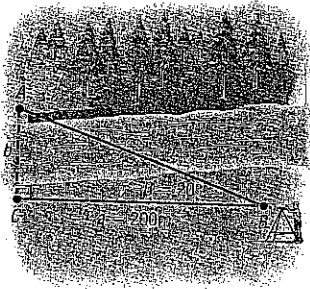
$$\theta = 36^\circ$$

see above problem

$$\tan 36^\circ = \frac{x}{1}$$

$$x = 7.265 \times 10 = 7.27$$

12. A surveyor can measure the width of a river by setting up a transit (an instrument used in surveying to measure angles) at a point C on one side of the river and taking a sighting of a point A on the other side. After turning through an angle of 90° at C, the surveyor walks a distance of 300 meters to point B. Using the transit at B, the angle β is measured and found to be 25° . What is the width of the river?

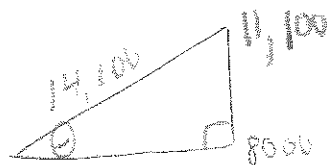
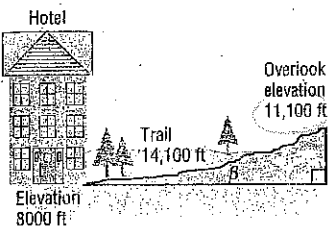


$$\tan 25^\circ = \frac{x}{300}$$

$$139.89 = x$$

$$139.89 \text{ m}$$

13. A straight trail with a uniform inclination leads from the Alpine Hotel, elevation 8,000 ft, to a scenic overlook, elevation 11,000 ft. The length of the trail is 14,100 ft. What is the angle of elevation of the trail?



$$\sin \theta = \frac{3100}{14,100}$$

$$\sin^{-1}\left(\frac{3100}{14,100}\right) = 12.70^\circ$$