

## Formulas

### Area of Triangle

$$K = \frac{1}{2}ab \sin C$$

### Functions of the Sum of Two Angles

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

### Functions of the Difference of Two Angles

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

### Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

### Law of Cosines

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

### Functions of the Double Angle

$$\sin 2A = 2 \sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$\cos 2A = 2 \cos^2 A - 1$$

$$\cos 2A = 1 - 2 \sin^2 A$$

### Functions of the Half Angle

$$\sin \frac{1}{2}A = \pm \sqrt{\frac{1 - \cos A}{2}}$$

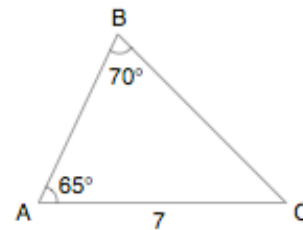
$$\cos \frac{1}{2}A = \pm \sqrt{\frac{1 + \cos A}{2}}$$

1. In  $\triangle BAD$ ,  $b = 3\sqrt{3}$ ,  $a = 6$ ,  $m\angle D = 30^\circ$ . Find the exact value of  $d$ .

2. In  $\triangle GHL$ ,  $m\angle L = 25.3^\circ$ ,  $l = 6.2$ , and  $h = 10.4$ . Find  $m\angle H$  to the nearest tenth of a degree.

3. Two sides of a triangular-shaped pool measure 16 feet and 21 feet, and the included angle measures  $58^\circ$ . What is the area, to the *nearest tenth of a square foot*, of a nylon cover that would exactly cover the surface of the pool?
4. A ship at sea is 70 miles from one radio transmitter and 130 miles from another. The angle between the signals sent to the ship by the transmitters is  $117.4^\circ$ . Find the distance between the two transmitters, to the *nearest mile*.

5. In the accompanying diagram of  $\triangle ABC$ ,  $m\angle A = 65^\circ$ ,  $m\angle B = 70^\circ$ , and the side opposite vertex  $B$  is 7. Find the length of the side opposite vertex  $A$ , and find the area of  $\triangle ABC$ .



6. A ski lift begins at ground level 0.75 mile from the base of a mountain whose face has a  $50^\circ$  angle of elevation, as shown in the accompanying diagram. The ski lift ascends in a straight line at an angle of  $20^\circ$ . Find the length of the ski lift from the beginning of the ski lift to the top of the mountain, to the *nearest hundredth of a mile*.

