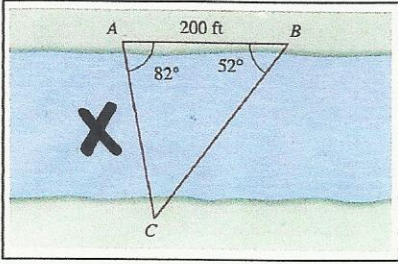
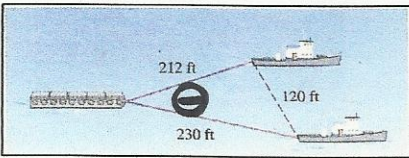
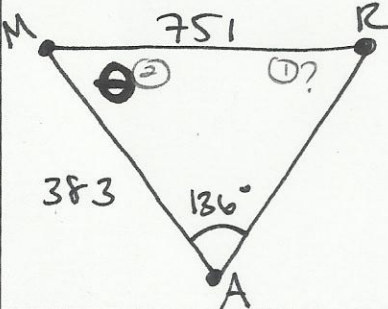
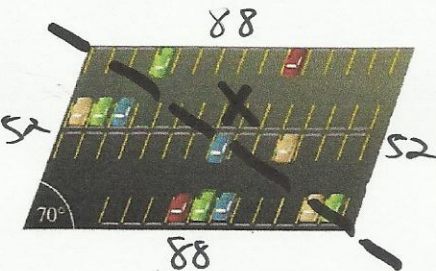
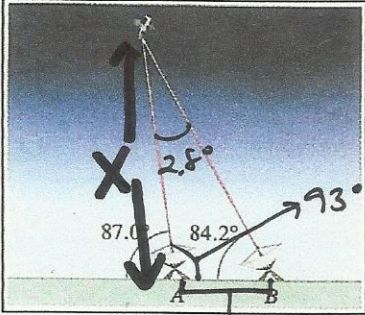


Given Word Problem	Picture (including labels)	Show Work / Put Answer Here
<p>1.) Determine the width of the river opposite of pt B.</p> <p>$X = ?$</p>		$C = 180 - 82 - 52$ $C = 46^\circ$ $\frac{200}{\sin 46^\circ} = \frac{X}{\sin 52^\circ}$ $X \sin 46^\circ = 200 \sin 52^\circ$ $\frac{X \sin 46^\circ}{\sin 46^\circ} = \frac{200 \sin 52^\circ}{\sin 46^\circ}$ $X = 219.1 \text{ ft}$
<p>2.) Find the angle formed by the two cables.</p> <p>$\theta = ?$</p>		$120^2 = 212^2 + 230^2 - 2(212)(230)\cos \theta$ $14400 = 97844 - 97520 \cos \theta$ $-83444 = -97520 \cos \theta$ $\theta = \cos^{-1}\left(\frac{-83444}{-97520}\right)$ $\theta = 31.2^\circ$
<p>3.) Referring to a map of the US: Memphis to Raleigh is 751 miles, Memphis to Atlanta is 383 miles, and the angle formed at Atlanta is 136°. Connecting the three cities to form a triangle, what is the angle formed at Memphis?</p> <p>$M = \theta = ?$</p>		$\frac{751}{\sin 136^\circ} = \frac{383}{\sin \theta}$ $\frac{751 \sin \theta}{751} = \frac{383 \sin 136^\circ}{751}$ $\theta = \sin^{-1}\left(\frac{383 \sin 136^\circ}{751}\right)$ $\theta = 20.7^\circ$ $M(\text{or } \theta) = 180 - 136 - 20.7$ $M = 23.3^\circ$
<p>4.) A parking lot has the shape of a parallelogram. The lengths of the two adjacent sides are 52 meters and 88 meters and the angle between the two sides is 70°. What is the length of the diagonal that joins the two adjacent sides?</p> <p>$X = ?$</p>		$X^2 = 52^2 + 88^2 - 2(52)(88)\cos 70^\circ$ $\sqrt{X^2} = \sqrt{7317.931648}$ $X = 85.5 \text{ meters}$
<p>5.) The stations that a satellite passes directly over are 264,000 feet apart. How far is the satellite from station A in miles?</p> <p>$X = ?$</p>	 <p>$\frac{264000}{5280} = 50 \text{ miles}$</p>	$\frac{50}{\sin 2.8^\circ} = \frac{X}{\sin 84.2^\circ}$ $\frac{X \sin 2.8^\circ}{\sin 2.8^\circ} = \frac{50 \sin 84.2^\circ}{\sin 2.8^\circ}$ $X = 1018.3 \text{ mi}$

Given Word Problem	Picture (including labels)	Show Your Work Here
<p>6.) Two observers A and B sight a helicopter. The observers are 3540 feet apart and the angles of elevation they each measure to the helicopter are 32° and 44°. What is the altitude of the helicopter?</p> <p>$X = ?$</p>		<p>① $\frac{3540}{\sin 12} = \frac{z}{\sin 32}$</p> <p>$\frac{z \sin 12}{\sin 12} = \frac{3540 \sin 32}{\sin 12}$</p> <p>$z = 9022.6$</p> <p>② $\sin 44 = \frac{x}{9022.6}$</p> <p>$x = 9022.6 \sin 44$</p> <p>$x = 6267.6 \text{ ft}$</p>
<p>7.) During an orientation hike, two hikers start at point A and head in a direction Southwest to point B. They hike 6 miles from point A to point B. In a direction Northeast from point B, they hike 4 miles to point C and then from point C back to point A, which is 8 miles from point C. What angle did the hikers leave when they first left for their hike?</p> <p>$\theta = ?$</p>		<p>$4^2 = 6^2 + 8^2 - 2(6)(8) \cos \theta$</p> <p>$16 = 100 - 96 \cos \theta$</p> <p>$-84 = -96 \cos \theta$</p> <p>$\theta = \cos^{-1}(\frac{-84}{-96})$</p> <p>$\theta = 29^\circ$</p>
<p>8.) Find the distance across the lake.</p> <p>$X = ?$</p>		<p>$X^2 = 2.82^2 + 3.56^2 - 2(2.82)(3.56) \cos 40$</p> <p>$\sqrt{X^2} = \sqrt{5.312840209}$</p> <p>$X = 2.3 \text{ miles}$</p>
<p>9.) A 30-ft lamp post tilts towards the sun at an 8° from the vertical. The distance between the top of the lamp post and the tip of its shadow is 34 feet. Find the length of the lamp post's shadow.</p> <p>$X = ?$</p>		<p>① $\frac{34}{\sin 82} = \frac{30}{\sin C}$</p> <p>$\frac{34 \sin C}{34} = \frac{30 \sin 82}{34}$</p> <p>$C = \sin^{-1}(\frac{30 \sin 82}{34})$</p> <p>$C = 60.9^\circ$</p> <p>② $B = 180 - 60.9 - 82$</p> <p>$B = 37.1^\circ$</p> <p>③ $\frac{34}{\sin 82} = \frac{x}{\sin 37.1}$</p> <p>$\frac{x \sin 82}{\sin 82} = \frac{34 \sin 37.1}{\sin 82}$</p> <p>$x = 20.7 \text{ ft}$</p>
<p>10.) A parking lot has the lengths 315 ft, 280 ft, and 125 ft. Find the <u>area</u> of the parking lot.</p> <p>$\text{Area} = ?$ (SSS Δ)</p>		<p>$S = \frac{1}{2}(280 + 315 + 125)$</p> <p>$S = 360$</p> <p>$A = \sqrt{360(360 - 280)(360 - 315)(360 - 125)}$</p> <p>$A = 17451.6 \text{ ft}^2$</p>

Given Word Problem	Picture (including labels)	Show Your Work Here
<p>11.) A soccer player is standing 35 ft from one post of the goal and 40 ft from the other post. Another soccer player is standing 30 ft from one post of the same goal and 20 ft from the other post. If the goal is 24 ft wide, which player has a greater angle to make the shot to the goal?</p> <p>Player #1 / largest angle = ?</p>	<p>Player #1</p>	$24^2 = 35^2 + 40^2 - 2(35)(40)\cos A$ $576 = 2525 - 2800\cos A$ $-2249 = -2800\cos A$ $A = \cos^{-1}\left(\frac{-2249}{-2800}\right)$ <p>A = 36.6°</p>
<p>12.) Because of prevailing winds, a tree grew so that it was leaning with a 4° angle. At a point 35 meters from the tree, the angle of elevation to the top of the tree is 23°. Find the height of the tree.</p> <p>X = ?</p>		$24^2 = 30^2 + 20^2 - 2(30)(20)\cos B$ $576 = 1300 - 1200\cos B$ $-724 = -1200\cos B$ $B = \cos^{-1}\left(\frac{-724}{-1200}\right)$ <p>B = 52.9°</p> <p>Player #2</p>
<p>13.) If a cable car is to be installed from a point 800 ft from the base to the top of the mountain, then find the shortest length of the cable.</p> <p>X = ?</p>		$180 - 23 - 94 = 63^\circ$ $\frac{35}{\sin 63} = \frac{X}{\sin 23}$ $X \sin 63 = \frac{35 \sin 23}{\sin 63}$ <p>X = 15.3 meters</p>
<p>14.) A boy is flying two kites at the same time. He has a 380 ft line out to a blue kite and a 420 ft line out to a yellow kite. If the distance between the two kites is 70 yards, then what is the angle formed at the blue kite?</p> <p>Θ = ?</p>		$\textcircled{1} \sin 74 = \frac{3400}{m}$ $m = \frac{3400}{\sin 74} \rightarrow m = 3537$ $\textcircled{2} X^2 = 800^2 + 3537^2 - 2(800)(3537)\cos 106^\circ$ $\sqrt{X^2} = \sqrt{14710255.92}$ <p>X = 3835.4 ft</p>
<p>15.) In order to avoid a storm, a pilot starts the flight 13° off course. After flying 80 miles in this direction, the pilot turns the plane to head toward the destination. The angle formed by the course of the plane during the first part of the flight and the course during the second part of the flight is 160°. What is the distance of the flight?</p> <p>D = 80 + x → D = ?</p>		$70 \text{ yds} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 210 \text{ ft}$ $420^2 = 380^2 + 210^2 - 2(380)(210)\cos \Theta$ $176400 = 158500 - 159600\cos \Theta$ $-12100 = -159600\cos \Theta$ $\Theta = \cos^{-1}\left(\frac{-12100}{-159600}\right)$ <p>Θ = 85.7°</p>
<p>15.) In order to avoid a storm, a pilot starts the flight 13° off course. After flying 80 miles in this direction, the pilot turns the plane to head toward the destination. The angle formed by the course of the plane during the first part of the flight and the course during the second part of the flight is 160°. What is the distance of the flight?</p> <p>D = 80 + x → D = ?</p>		$180 - 13 - 160 = 7^\circ$ $\frac{80}{\sin 7^\circ} = \frac{x}{\sin 13}$ $\frac{x \sin 7^\circ}{\sin 7^\circ} = \frac{80 \sin 13}{\sin 7^\circ}$ $x = 147.7$ $D = 147.7 + 80$ <p>D = 227.7 miles</p>

Given Word Problem	Picture (including labels)	Show Your Work Here
<p>16.) Find the elevation of the plane.</p> <p>$X = ?$</p>		<p>① $\frac{5}{\sin 100} = \frac{z}{\sin 48}$</p> <p>$\frac{z \sin 100}{\sin 100} = \frac{5 \sin 48}{\sin 100}$</p> <p>$z = 3.8$</p> <p>② $\sin 32 = \frac{x}{z}$</p> <p>$x = 3.8 \sin 32$</p> <p>$x = 2 \text{ mi}$</p>
<p>17.) The distance between Island A and Island B is 6 miles; the distance between Island B and Island C is 7 miles; and the distance between Island C and Island A is 5 miles. Find the <u>supplementary angle</u> formed at Island A.</p> <p>$\theta = ?$</p>		<p>$7^2 = 6^2 + 5^2 - 2(6)(5) \cos A$</p> <p>$49 = 61 - 60 \cos A$</p> <p>$-61 - 61$</p> <p>$-12 = -60 \cos A$</p> <p>$A = \cos^{-1} \left(\frac{-12}{-60} \right)$</p> <p>$A = 78.5^\circ \rightarrow \theta = 180 - 78.5$</p> <p>$\theta = 101.5^\circ$</p>
<p>18.) A pier forms a 85° angle with a straight dock. At a distance of 100 feet from the pier, the line of sight to the tip forms a 37° angle. Find the length of the pier.</p> <p>$X = ?$</p>		<p>$\frac{100}{\sin 48} = \frac{x}{\sin 37}$</p> <p>$\frac{x \sin 48}{\sin 48} = \frac{100 \sin 37}{\sin 48}$</p> <p>$x = 81 \text{ ft}$</p>
<p>19.) The height of the Leaning Tower of Pisa is 184.5 ft. At a distance of 140 ft from the base, the angle of elevation from the ground to the top of the tower is 59°. How far is the tower leaning from the original vertical position?</p> <p>$\theta = ?$</p>		<p>① $\frac{184.5}{\sin 59} = \frac{140}{\sin C}$</p> <p>$\frac{184.5 \sin C}{184.5} = \frac{140 \sin 59}{184.5}$</p> <p>$C = \sin^{-1} \left(\frac{140 \sin 59}{184.5} \right)$</p> <p>$C = 40.6^\circ$</p> <p>② $B = 180 - 59 - 40.6$</p> <p>$B = 80.4^\circ$</p> <p>③ $\theta = 90 - 80.4$</p> <p>$\theta = 9.6^\circ$</p>
<p>20.) Find the angle of inclination of the hill.</p> <p>$\theta = ?$</p>		<p>① $\frac{30}{\sin 8} = \frac{120}{\sin T}$</p> <p>$\frac{30 \sin T}{30} = \frac{120 \sin 8}{30}$</p> <p>$T = \sin^{-1} \left(\frac{120 \sin 8}{30} \right)$</p> <p>$T = 33.8^\circ$</p> <p>② $M = 180 - 8 - 33.8$</p> <p>$M = 138.2^\circ$</p> <p>③ $N = 180 - 138.2$</p> <p>$N = 41.8^\circ$</p> <p>④ $\theta = 90 - 41.8$</p> <p>$\theta = 48.2^\circ$</p>