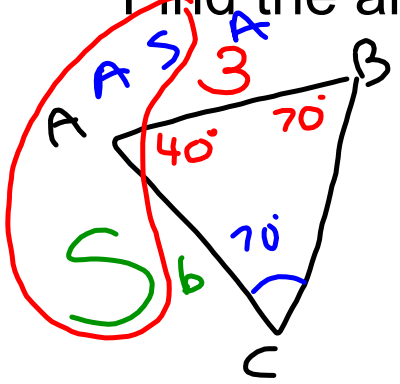
Warm-up

May 4, 2017

SSS
SAS

Find the area of the triangle.



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

$\frac{b \cdot \sin(70)}{\sin(70)} = \frac{3 \cdot \sin(70)}{\sin(70)}$

$b = 3$

SSS

$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{(a+b+c)}{2}$$

SAS

$$\text{area} = \frac{1}{2}ab\sin(C)$$

$$= \frac{1}{2}bc\sin A$$

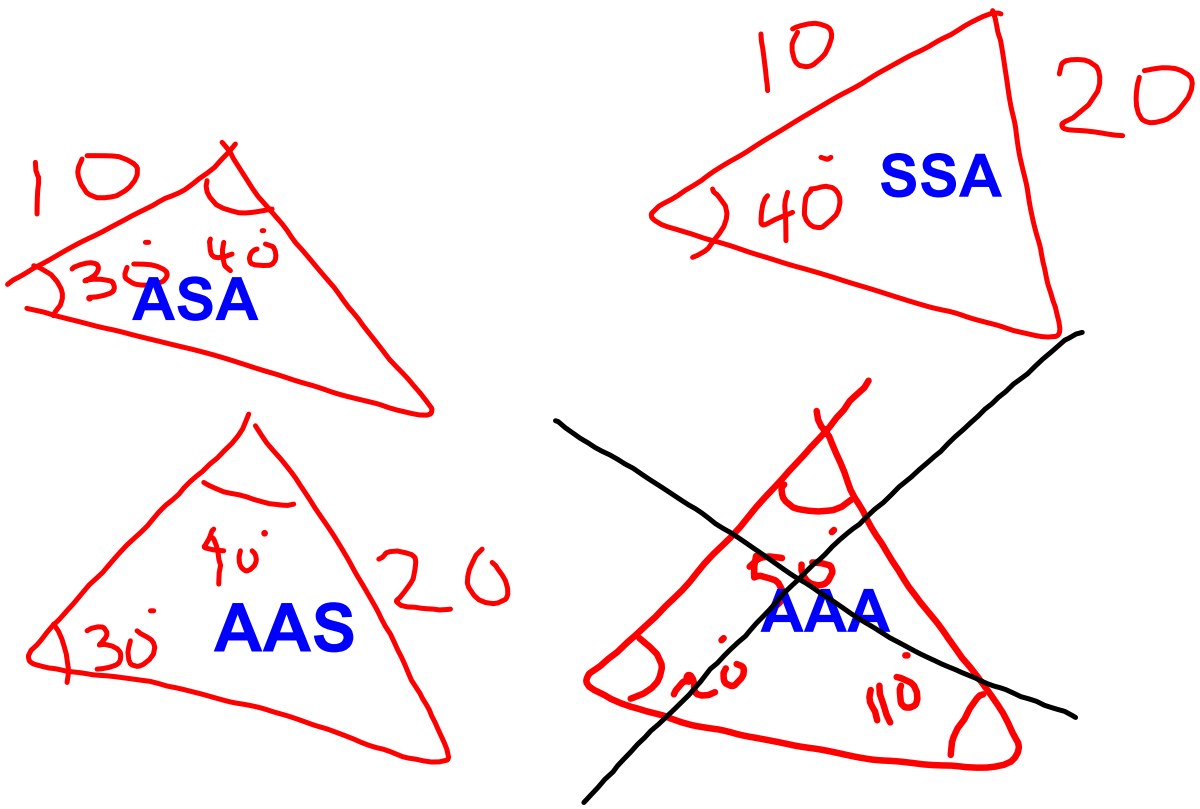
$$= \frac{1}{2}(3)(3)\sin(40)$$

$$= 2.89 \text{ sq. units}$$

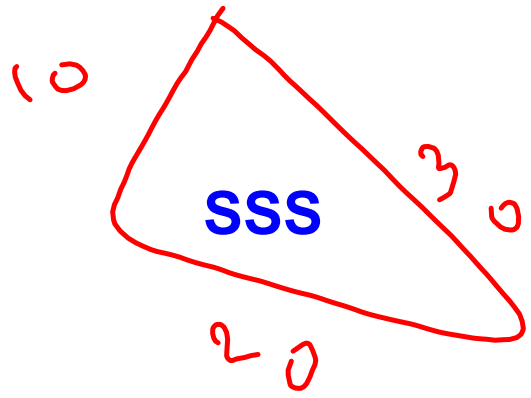
Warm-Up

May 4, 2017

Law of Sines



Law of Cosines



Law of Sines

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

Donkey Case SSA

Acute

Given a, b, A

height $= b \sin A$

$a < h$	0 solutions
$a = h$	1 solution
$h < a < b$	2 solutions
$b < a$	1 solution

Obtuse

$a < b$	0 solutions
$a > b$	1 solution

Law of Cosines

$$a = \sqrt{(b^2 + c^2 - 2bc \cdot \cos(A))}$$

$$A = \cos^{-1}\left(\frac{(b^2 + c^2 - a^2)}{(2bc)}\right)$$

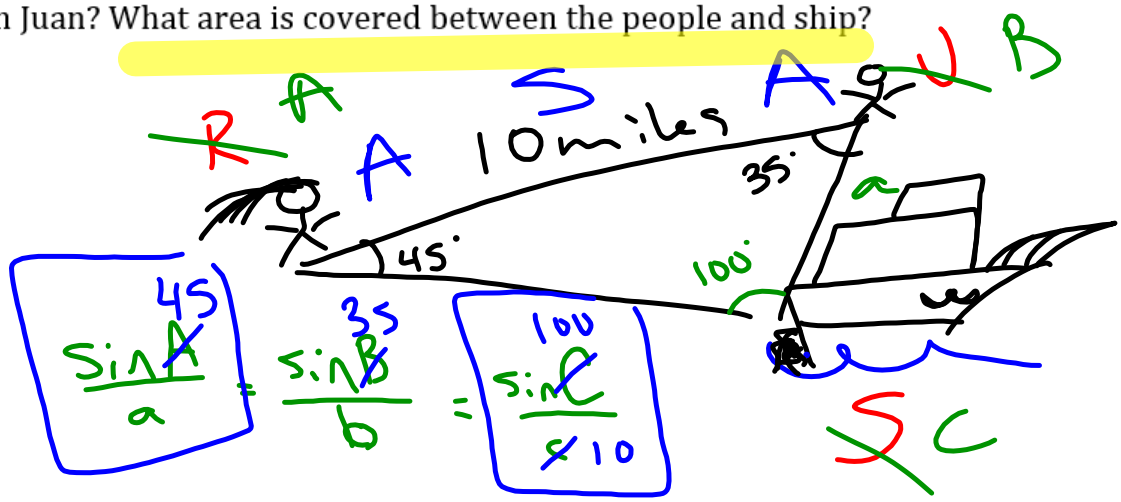
Area

$$\text{Area}_{\Delta} = \frac{1}{2}ab\sin C$$ SAS

$$\text{Area}_{\Delta} = \sqrt{(s(s-a)(s-b)(s-c))}$$ SSS

$$\text{semi-perimeter} = s = \frac{(a+b+c)}{2}$$

Juan and Romella are standing at the seashore 10 miles apart. The coastline is a straight line between them. Both can see the same ship in the water. The angle between the coastline and the line between the ship and Juan is 35 degrees. The angle between the coastline and the line between the ship and Romella is 45 degrees. How far is the ship from Juan? What area is covered between the people and ship?

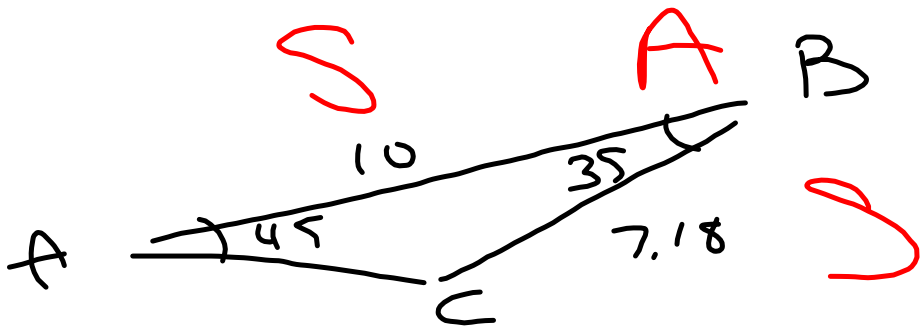


$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

$\frac{\sin 45}{a} = \frac{\sin 100}{10}$

$\frac{10 \cdot \sin(45)}{\sin(100)} = \frac{a \sin(100)}{\sin(100)}$

$a = 7.18$ mi



SSS

SAS Area $= \frac{1}{2} ac \sin B$

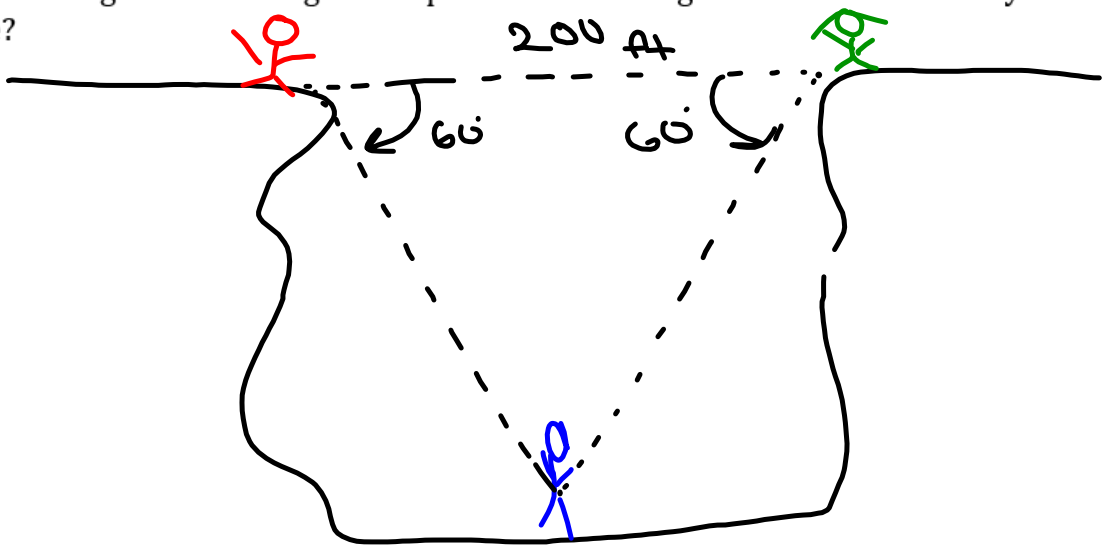
$= \frac{1}{2}(7.18)(10)\sin(35)$

$= 20.60 \text{ mi}^2$

$$\text{Area} = \frac{1}{2}(10)(7.18)\sin(35)$$

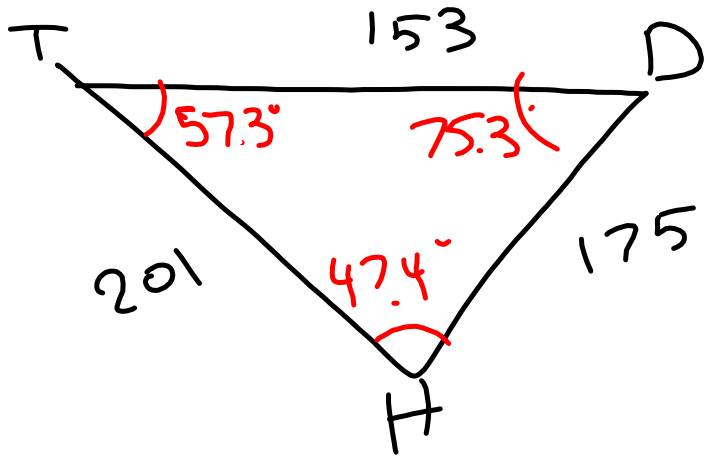
$$= 20.60 \text{ mi}^2$$

Jack is on one side of a 200-foot-wide canyon and Jill is on the other. Jack and Jill can both see the trail guide at an angle of depression of 60 degrees. How far are they from the trail guide?



Tom, Dick, and Harry are camping in their tents. If the distance between Tom and Dick is 153 feet, the distance between Tom and Harry is 201 feet, and the distance between Dick and Harry is 175 feet, what is the angle between Dick, Harry, and Tom? Then find the area.

SSS



$180 - 47.4 - 57.3 = 75.3$

$$H = \cos^{-1}\left(\frac{(201^2 + 175^2 - 153^2)}{(2 \times 201 \times 175)}\right)$$

$$H = 47.4°$$

SSS

$$s = \frac{(t + h + d)}{2} = \frac{(175 + 153 + 201)}{2}$$

$$= 264.5$$

$$\text{Area} = \sqrt{(264.5(264.5-201)(264.5-175)(264.5-153)}$$

$$\text{Area} = 12,946.4 \text{ ft}^2$$

$$s = \frac{(153 + 175 + 201)}{2}$$

$$= 264.5$$

$$A = \sqrt{(264.5)(264.5-153)(264.5-175)(264.5-201)}$$

$$= 12,946 \text{ ft}^2$$