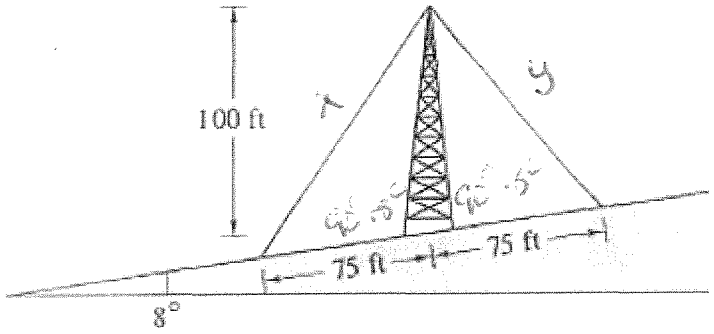
Name _____ Date _____

Math 112: #39 A/B/C/D

A) A 100*ft* vertical tower is built on the side of a hill with an 8° incline. Find the length of the two guide wires that are anchored 75*ft* uphill and downhill from the base of the tower.



$x^2 = 75^2 + 100^2 - 2 \cdot 75 \cdot 100 \cos 98°$

$= 17,712.6$

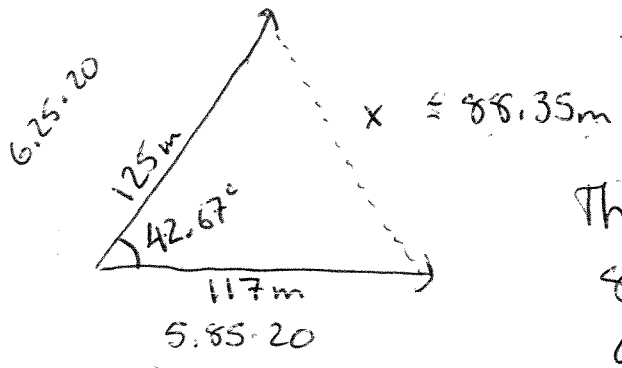
$x = 133.1$ ft

$y^2 = 75^2 + 100^2 - 2 \cdot 75 \cdot 100 \cos 82°$

$= 13,537.4$

$y = 116.35$ ft

B) A cat herder is herding two cats. At one point, the cats run off in straight lines with an angle between them of 42°40'. One cat is running at 6.25 meters per second. The second cat is running at 5.85 meters per second. After 20 seconds, how many meters apart, to two decimal places, are the cats?



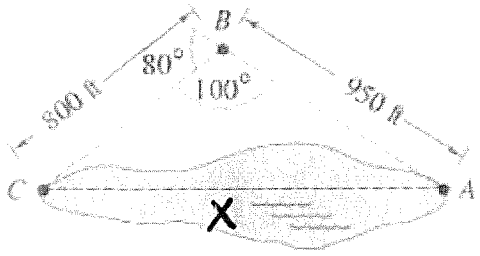
The cats will be 88.35m apart after 20sec.

$x^2 = 125^2 + 117^2 - 2 \cdot 125 \cdot 117 \cos 42.667$

$x^2 = 7806.212$

$x = 88.35$m

C) To find the length of a swamp, a surveyor walks 950*ft* from point *A* to *B*. Next he turns 80° and walks 800*ft* to point *C*. Find the length of the swamp.



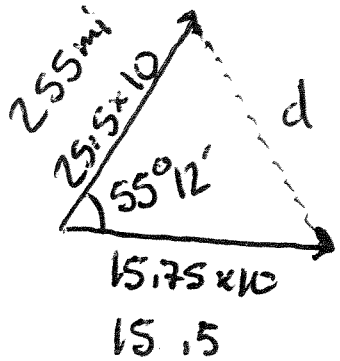
$x^2 = 800^2 + 950^2 - 2 \cdot 800 \cdot 950 \cdot \cos 100^\circ$

$x^2 = 1{,}806{,}445.23$

$x = 1344$ ft

D) Two ships leave port at the same time and sail in a straight line. The angle between their paths measures 55°12'. One ship sails at 25.5 mph and the other sails at 15.75 mph. After ten hours, how many miles apart, to two decimal places, are the ships?

$55 + \frac{12}{60}^\circ = 55.2^\circ$



$d^2 = 255^2 + 157.5^2 - 2 \cdot 255 \cdot 157.5 \cdot \cos 55.2^\circ$

$d^2 = 43{,}976.965$

$d = 209.73$ miles apart