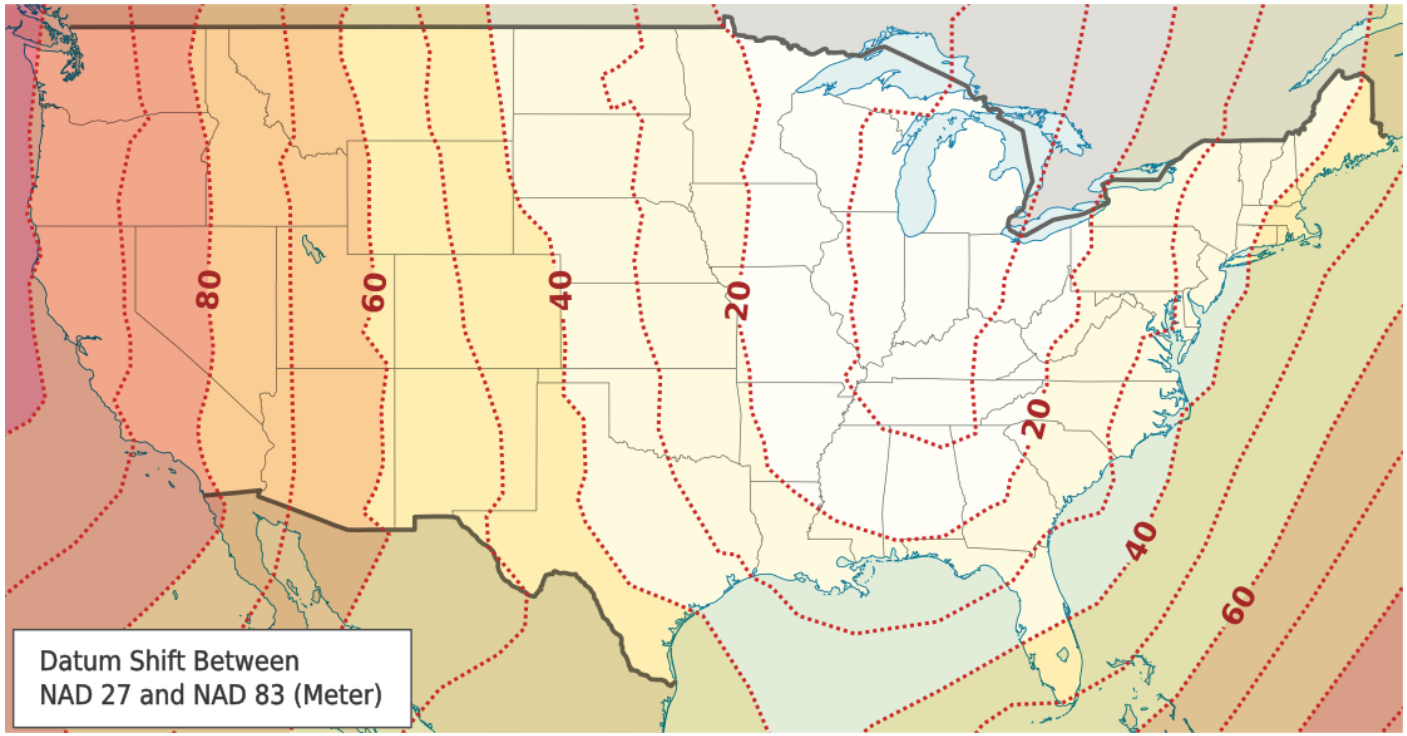
# Positioning

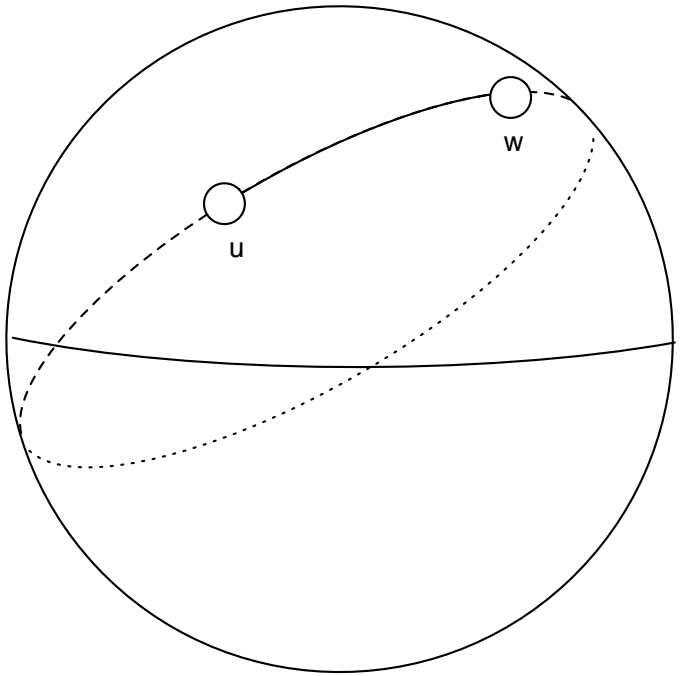
6.S062 Class 2 – 2/8/16

Sam Madden

# NAD27 vs NAD83 (WGS84)



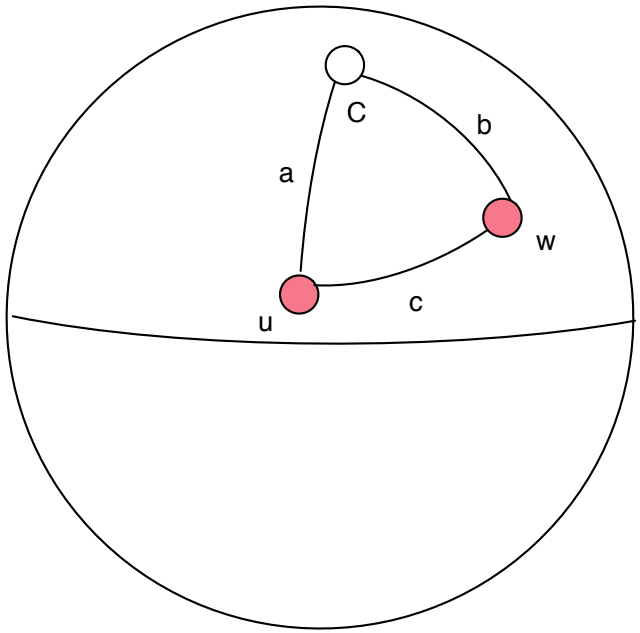
# Finding the Distance Between Two Points



# Law of haversines (hav)

$$\operatorname{hav}(\theta) = \sin^2\left(\frac{\theta}{2}\right) = \frac{1-\cos(\theta)}{2}$$

$$\operatorname{hav}(c) = \operatorname{hav}(a-b) + \sin(a)\sin(b)\operatorname{hav}(C).$$



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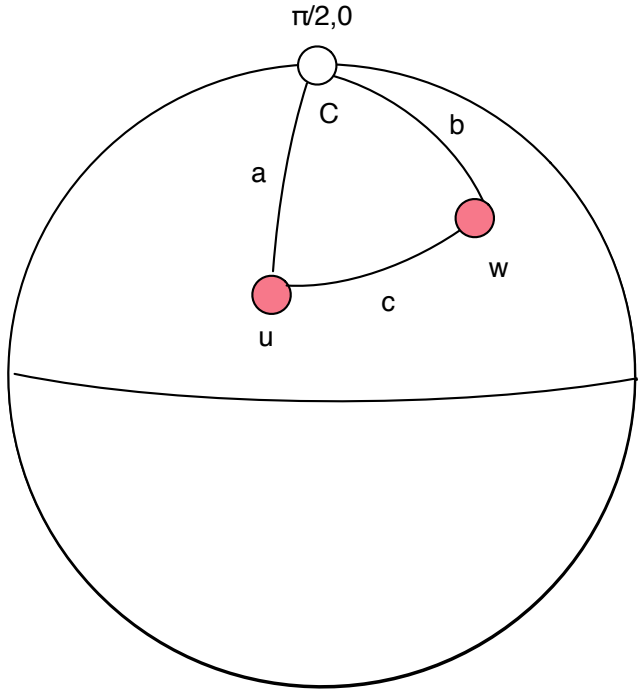

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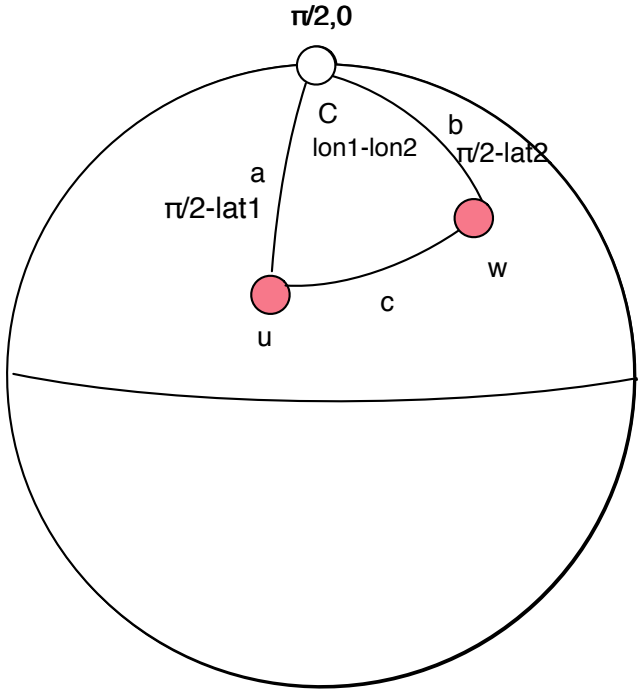

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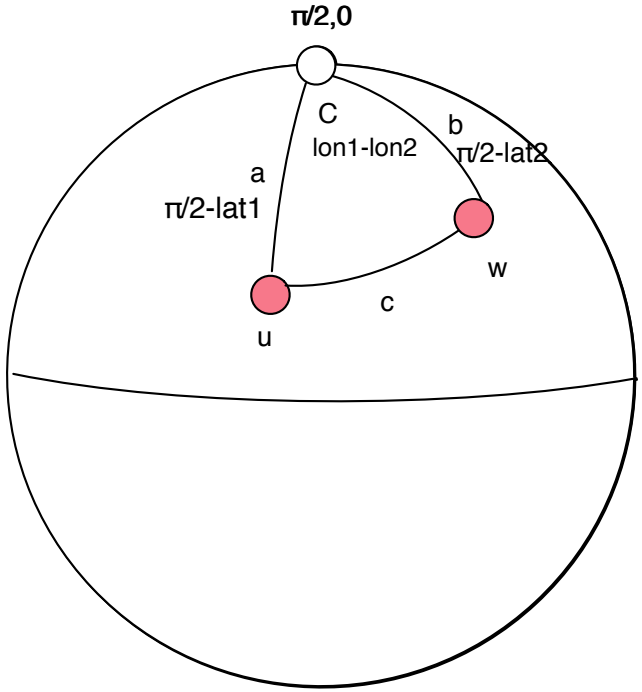
$$\sin(\pi/2-\theta) = \cos(\theta)$$



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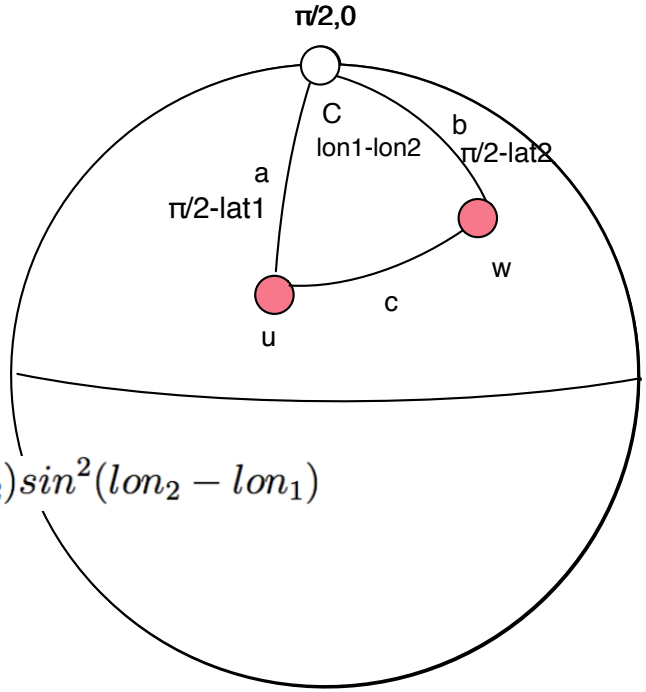


$$\sin^2(c/2) = \sin^2((lat_2 - lat_1)/2) + \cos(lat_1)\cos(lat_2)sin^2(lon_2 - lon_1)$$

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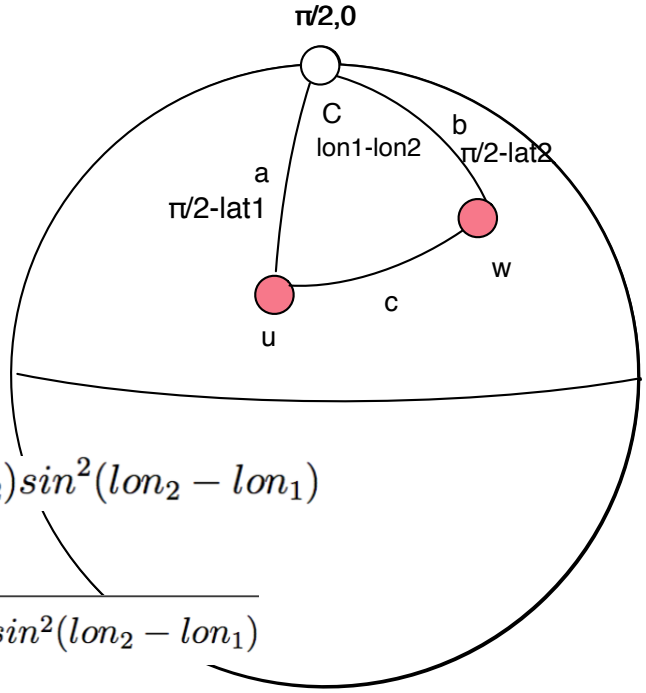


$$\sin^2(c/2) = \sin^2((lat_2 - lat_1)/2) + \cos(lat_1)\cos(lat_2)sin^2(lon_2 - lon_1)$$

$$c = d/R$$

$$d = 2R\arcsin\sqrt{\sin^2((lat_2 - lat_1)/2) + \cos(lat_1)\cos(lat_2)sin^2(lon_2 - lon_1)}$$

# Trilateration in 3D