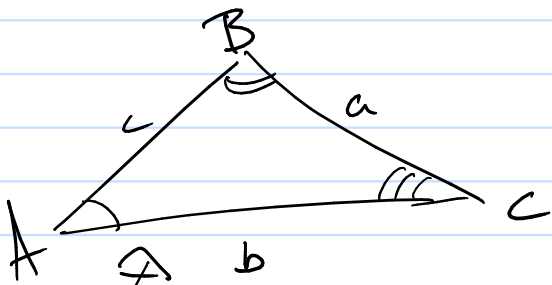


Math 112



Law of Sines / Law of Cosines

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

$$\sin(4x) = \sin(2(2x))$$

Use double angle formula

$$\cos(\pi/2) = \cos((\pi/6)/2)$$

Use 1/2 angle formula

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

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

Area

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

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

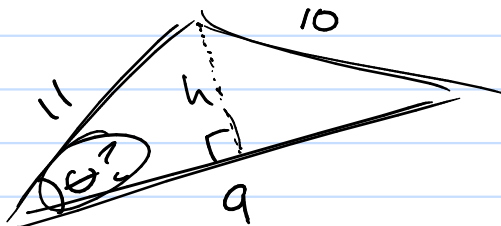
$$\text{Area} = \frac{1}{2} bc \sin A$$

$$\text{Perimeter} = a + b + c$$

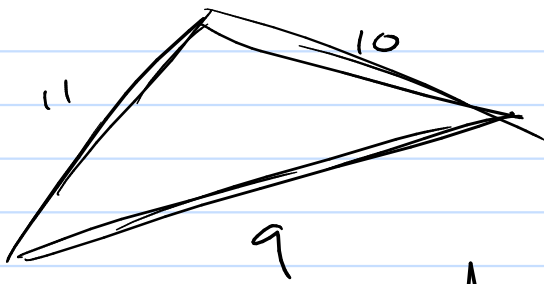
$$\text{Semi-Perimeter} = \frac{a + b + c}{2} = s$$

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

Applications



$$\begin{aligned} A &= \frac{1}{2} (\text{base})(\text{height}) \\ &= \frac{1}{2} (9)(11 \sin \theta) \end{aligned}$$



$$S = \frac{11+9+10}{2} = \frac{30}{2} = 15$$

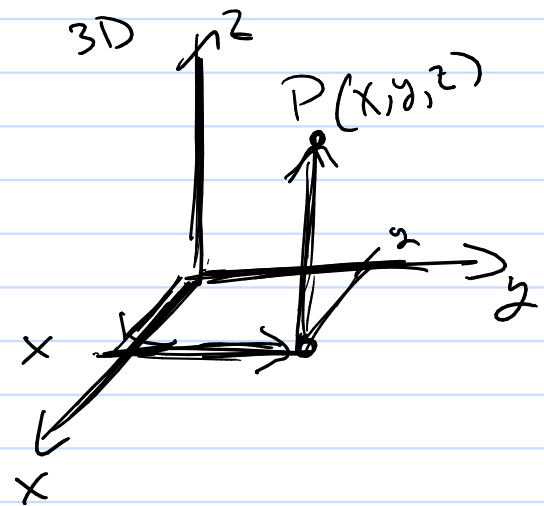
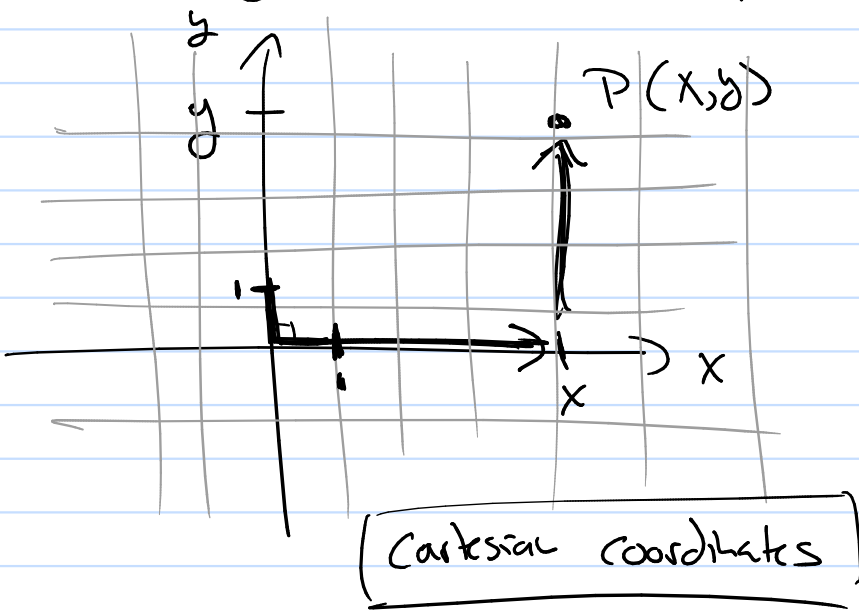
$$A = \sqrt{15(15-11)(15-9)(15-10)}$$

$$A = \sqrt{15(4)(6)(5)}$$

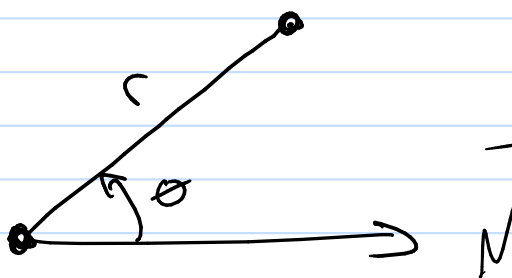
$$= \sqrt{3 \cdot 5 \cdot 4 \cdot 2 \cdot 3 \cdot 5} = 5 \cdot 3 \cdot 2 \sqrt{2}$$

$$= 30\sqrt{2} \approx 42$$

Finding Stuff on a plane (2D)

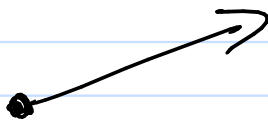


(rs)

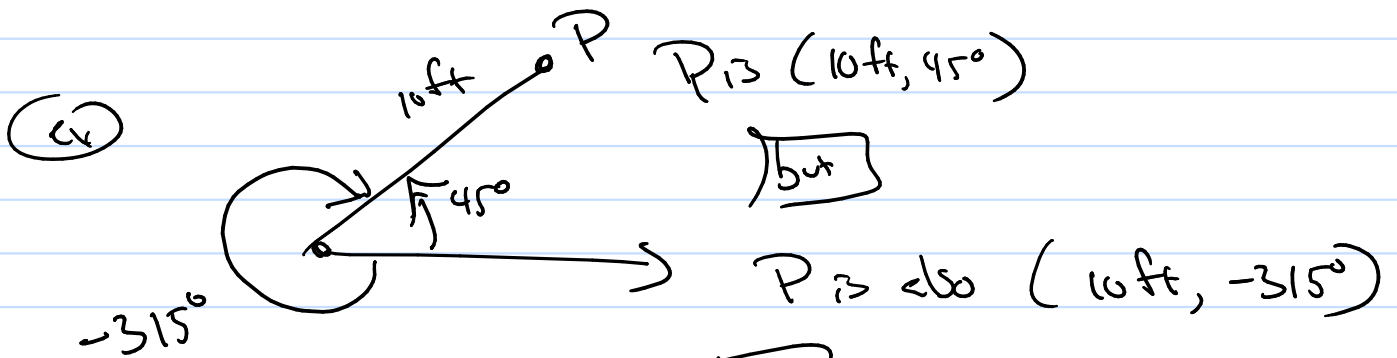
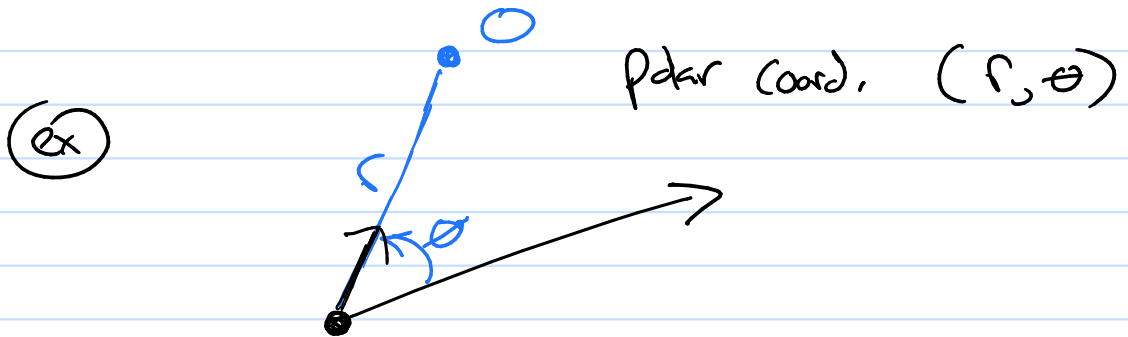


Polar coordinates

Polar Coord.

(1) pole 

(2) use angle and distance to locate objects.



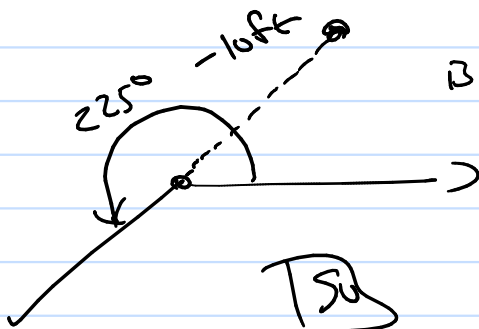
but

P is also $(10\text{ft}, -315^\circ)$

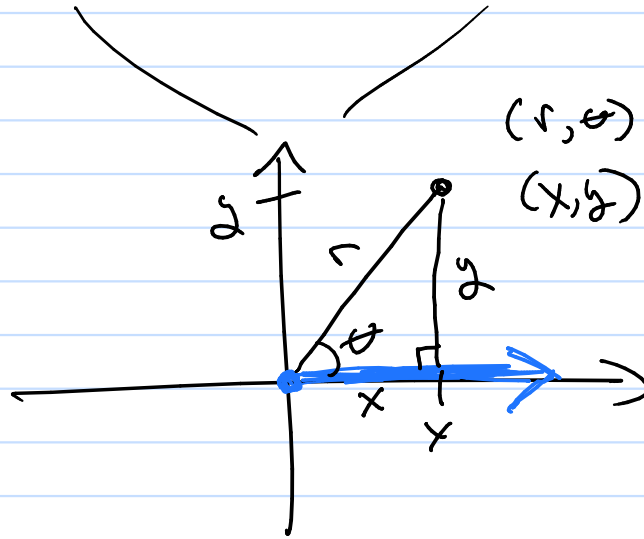
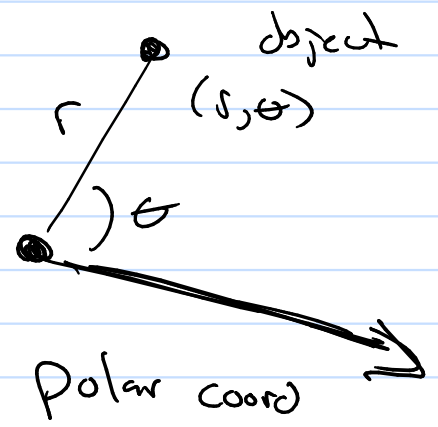
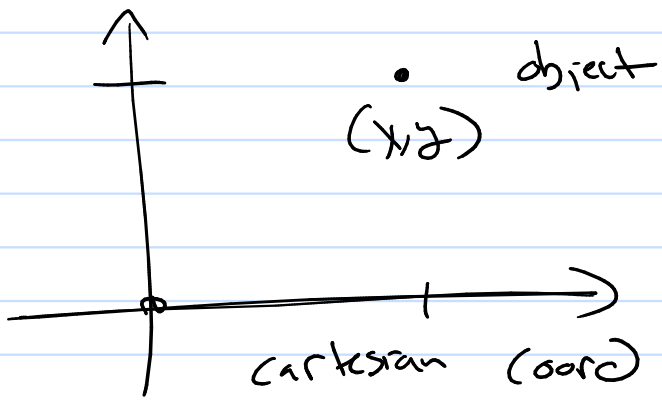
but

P is also $(10\text{ft}, 405^\circ)$

P is also $(-10\text{ft}, 225^\circ)$



So Polar coord. do not have
unique values.



$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$r = ?$$

$$\theta = ?$$