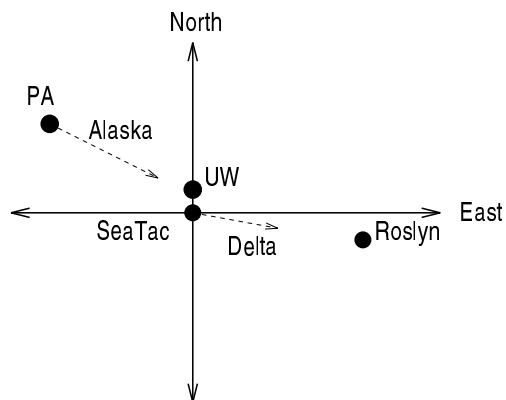


Instructions: You have 20 minutes for this quiz. You **MUST** show work for credit. No credit for answers only. If in doubt, ask for clarification.

Problem (20pts) A Delta airlines jet flying 300 mph passes over SeaTac airport at 1:00pm, heading along a straight line course toward Roslyn, WA. Roslyn is located 65 miles East and 17 miles South of SeaTac. Also at 1:00pm, an Alaska airlines jet flying 400 mph passes over Port Angeles, heading toward the UW along a straight line course pictured. PA is located 62 miles West and 52 miles North of SeaTac and the UW is 15 miles due North of SeaTac.



1. (4pts) Impose a coordinate system with SeaTac as the origin. Label the coordinates of Roslyn, PA, SeaTac and the UW in this coordinate system. (Use units of miles for each axes.)

$$PA = (-62, 52)$$

$$UW = (0, 15)$$

$$SeaTac = (0, 0)$$

$$Roslyn = (65, -17)$$

2. (4pts) Find the equation of the line modeling the path of the Alaska jet. Use two point formula with PA and UW as the two points.

$$y = \frac{(52 - 15)}{(-62 - 0)}(x - 0) + 15 = -0.5968x + 15$$

3. (4pts) ASSUME the flight path of the Delta jet is the line  $y = \frac{-17}{65}x$ . Where do the two flight paths cross? Find the coordinates and label in the picture.

Simultaneously solve  $y = -0.5968x + 15$  and  $y = \frac{-17}{65}x$ . Get

$$-0.5968x + 15 = \frac{-17}{65}x$$

So,  $x = 44.74$

So cross at  $(44.74, \frac{-17}{65}(44.74)) = (44.74, -11.7)$ .

4. (4pts) When does the Delta jet pass over Roslyn?

Find distance Seatac to Roslyn by distance formula:

$$d = \sqrt{(65 - 0)^2 + (-17 - 0)^2} = \sqrt{4514} = 67.186$$

Use fact rate is 300mi/hr to get time:

$$67.186 \text{ miles} / 300 \text{ mi/hr} = 0.224 \text{ hrs} = 13.44 \text{ minutes}$$

So passes over Roslyn at 1:13:26.4 pm.

5. (4pts) Is the Alaska jet located East or West of UW the instant the Delta jet passes over Roslyn?

We need to see how far Alaska jet has traveled in 0.224hrs. Alaska jet goes 400mph, so goes  $(400 \text{ mi/hr})(0.224 \text{ hrs}) = 89.6 \text{ miles}$ .

Distance PA to UW is

$$d = \sqrt{(-62 - 0)^2 + (52 - 15)^2} = \sqrt{5213} = 72.2 \text{ miles}$$

So, Alaska jet has passed over UW and is EAST of the UW.