

WHICH WAY TO STEER?



WIND, MAGNETIC FIELDS, AND FLIGHT ROUTES

Name _____

Class _____

OBJECTIVE

Demonstrate an understanding of the effect of wind and magnetism on navigation by determining headings, times, and fuel requirements for the scenarios in the questions.

$$TC \pm WCA = TH \quad TH \pm MV = MH \quad MH \pm DEV = CH$$

$$TC \pm MV = MC \quad MC \pm DEV = CH$$

Sample Compass Deviation Card:

For (Magnetic)	N	30	60	E	120	150
Steer (Compass)	0	28	57	86	117	148
For (Magnetic)	S	210	240	W	300	330
Steer (Compass)	180	212	243	274	303	332

Editorial credit: Pilot's Handbook of Aeronautical Knowledge

1. You are taking off out of Topeka Regional Airport (KFOE) in Topeka, Kansas, to visit some friends in Salina, Kansas, about 100 NM to the west. You've also planned to stop for lunch between Topeka and Salina at Emporia Airport (KEMP). The two legs of this flight are plotted on the sectional chart excerpts below.



KFOE to KEMP:

- TC: 209 degrees
- Distance: 45 NM



Editorial credit: SkyVector

PRO



KEMP to KSLN:

- TC: 287 degrees
- Distance: 74 NM



Editorial credit: SkyVector

You plan to fly the entire trip at **110 knots true airspeed**. Your performance charts tell you the fuel burn rate under those conditions will be **10 GPH**. You'll start the trip with **15 gallons of fuel** on board.

As you consider your planned altitude, you decide to choose the altitude that gives you the most favorable winds. When you pull up the winds aloft forecast, you see data for three airports: Wichita (KICT), Salina (KSLN), and Kansas City (KMKC). KICT is southwest of Salina and KMKC is just a few miles east of Topeka.

FT	3000	6000	9000
ICT	1823	1129+04	3524+06
SLN	1923	1124+07	3317+04
MKC	1824	1029+05	3523+02

QUESTIONS

1. Which altitude gives you a tailwind on the leg to Salina?
2. What wind values would you plan to use in your calculations on the first leg? What wind values would you use on your second leg? Why?



NOTE: For the calculations in questions 3, 4, and 5, use a wind value of 110 degrees / 25 knots.

3. Draw a wind triangle to determine the compass heading and groundspeed for the leg from Topeka to Emporia.
4. How long would this leg take? How much fuel would be consumed on the flight to Emporia?
5. How have wind and magnetism affected the planning for this leg?
6. The leg from Emporia to Salina is a true course of 287 degrees. If airspeed is 110 knots, and the wind is from 107 degrees at 25 knots, determine the compass heading and ground speed from KEMP to KSLN.
7. Using the groundspeed from number 6 above, how long would this leg take? How much fuel would be consumed on the leg to Salina?
8. How much fuel will the entire flight use? Will the aircraft have enough fuel on board to make the trip without refueling?



9. Assuming you spend an hour at lunch at Emporia, about how long would the total trip to KSLN take?

10. How have wind and magnetism affected the planning for this leg?

PROPRIETARY