

# Farmhall Aviation Training

## Commercial Pilot Groundschool

### Navigation Threshold Knowledge Test

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## 1 Basic Navigation

Midland (Huron) airport is located at N44 41 W79 56. Arnstein is located at N45 56 W79 56. You are to fly over Midland and then directly over Arnstein at an airspeed of 130 knots. The wind at your altitude is from the East at 50 knots.

**Exercise 1** Without using a map, ruler or calculator with a stored database, determine the distance from Midland to Arnstein.

**Exercise 2** Draw the wind triangle and, without using an E6B or other aviation calculator, determine your groundspeed.

**Exercise 3** Using an E6B and without recourse to an electronic calculator, determine the time en route between Midland and Arnstein.

## 2 Latitude and Longitude

**Exercise 4** What is the latitude and longitude of the north pole?

**Exercise 5** Using the Toronto VNC and without using the CFS, determine the latitude and longitude of Smith Falls airport.

**Exercise 6** The latitude and longitude of Medicine Hat airport are given in the CFS as N50 01 08 W110 43 15. Your GPS requires you to enter latitudes and longitudes in degrees and decimals of a degree. How would you enter Medicine Hat?

**Exercise 7** What is the difference between an isogonal and an agonic line?

**Exercise 8** What airport is at N44 21 53 W78 47 02?

**Exercise 9** Rockcliffe airport is located at N45 27 37 W75 38 46. When the time is 23:00Z what is the correct local time in Rockcliffe?<sup>1</sup>

## 3 Radio Navigation

**Exercise 10** Which of the following best describes the Global Positioning System? Signals are transmitted from a number of ----- and are received by equipment in the aircraft. By measuring the ----- of the incoming signals, the equipment can calculate and display its precise position.

1. geostationary satellites, time delays
2. ground stations, wavelength
3. non-geostationary satellites, time delays
4. ground stations, frequency

**Exercise 11** You have tuned and identified the Ottawa VOR (YOW). You are 20 miles due south west (Magnetic) of the VOR heading north eastwards towards it. Using the OBS, you have selected a bearing of 180° at the top of the VOR display. The TO/FROM flag shews ----- and the needle is -----.

1. TO, deflected to the left
2. FROM, deflected to the right

<sup>1</sup>The answer is neither 18:00 nor 19:00.

3. FROM, deflected to the left
4. TO, deflected to the right
5. TO, centred

## 4 VNC Maps

The questions in this section require a Toronto VNC.

**Exercise 12** What type of projection is a VNC map? What does a straight line on the map represent on the ground? What other types of projection are commonly used on maps?

**Exercise 13** V145 runs from the Ottawa VOR (YOW) to the Watertown VOR (ART). The radial out of YOW is  $199^\circ$  and the radial out of ART is  $017^\circ$ . Since these two bearings represent the two ends of a line, why is the difference between them not  $180^\circ$ ?

**Exercise 14** What is the meaning of the circle centred on Ottawa International Airport and having a radius of 45nm?

**Exercise 15** What is the precise meaning of the symbols  $0^9$  printed on the map some 13 nm South East of Smiths Falls airport?

**Exercise 16** Just to the west of Smith's Falls airport there are two towers. What is the height of the ground at the base of each tower?

**Exercise 17** In the Lake Nipissing area (near North Bay), the symbol for Arnstein airport is a circle. The symbol for North Monetville Skypark is a "ship's wheel". What difference do these two symbols indicate? North Monetville Skypark is labelled with an (R) after its name. What is the significance of the (R)?

**Exercise 18** What is the meaning of the term F1 6 sec on Main Duck Island 18nm south of Kingston airport?

**Exercise 19** Consider the box describing Kingston Airport. What is the significance of:

- the box around the name being dashed rather than solid?

- the line reading 305 L 50M122.5?

**Exercise 20** Which isogonal line shown on the map is closest to Rockcliffe?

**Exercise 21** Approximately 15 nm south of the Ottawa VOR on the  $199^\circ$  radial there is a small triangle labelled ASHTN. What is this?

**Exercise 22** Due north of Rochester, New York, in Lake Ontario is an area labelled MISTY 3 MOA. What is an MOA? How would you determine whether or not it is active at the time of your flight? If you wished to enter the area covered by the MOA, what actions would you need to take?

**Exercise 23** The text describing Trenton includes the acronym PAR. What does this mean? When and how would you make use of the service?

**Exercise 24** The text describing Muskoka airport includes the acronym VDF. What does this mean? When and how would you make use of the service?

**Exercise 25** If flying into Muskoka airport, whom would you contact and on what frequency? Where are they located?