

Private Pilot Exam Preparation Guide – 2012

Section 3.2 – Navigation Questions

Question 85, Page 166

This question asks you to calculate the clearance above a ridge, and provides the following information to you:

Ridge height:	5,000 ft ASL
Indicated altitude:	7,000 ft
Outside Air Temperature:	-20°C
Altimeter setting:	29.42" Hg
Weather station elevation:	3,500 ft

To calculate clearance above the ridge, you need to compare the elevation of the ridge with your **TRUE ALTITUDE**.

DEFINITION

True altitude is your indicated altitude corrected for non-standard temperature between the reporting station elevation and your altitude. You can easily determine true altitude using your electronic flight calculator or circular slide rule (eg. E6B), except most E6B's assume that the weather station elevation is 0 ft. You need to manually compensate for this.

To determine true altitude, the E6B requires the following information:

- True Air Temperature (Use the OAT of -20°C)
- Indicated Altitude ← Use the altitude above the weather station (3,500 ft above the station)
- **Pressure Altitude** ← **You need to calculate this**

Remember, pressure altitude is your indicated altitude corrected for non-standard pressure, and is very easy to determine using the following formula;

$$\begin{aligned}\text{Pressure Altitude} &= (\text{Indicated Altitude}) + ((\text{Standard Pressure} - \text{Actual Pressure}) \times 1000) \\ &= (7,000 \text{ ft}) + (29.92 - 29.42) \times 1000 \\ &= (7,000 \text{ ft}) + (500 \text{ ft}) \\ &= 7,500 \text{ ft}\end{aligned}$$

E6B or CX-2 Flight Calculator

Plugging the values for pressure altitude (7,500 ft), altitude ABOVE THE WEATHER STATION (3,500 ft) and true air temperature (-20°C) into your E6B results in the following true altitude ABOVE THE WEATHER STATION.

$$\begin{aligned}\text{True Altitude above weather station} &= 3,250 \text{ ft} \\ \text{Correction} &= (\text{True Altitude above station}) - (\text{Indicated Altitude above station}) \\ &= 3,250 - 3,500 \\ &= -250 \text{ ft}\end{aligned}$$

So your actual true altitude is:

$$\begin{aligned}\text{True Altitude} &= (\text{Indicated Altitude}) + (\text{True Altitude Correction}) \\ &= (7,000 \text{ ft}) + (-250 \text{ ft}) \\ &= 6,750 \text{ ft}\end{aligned}$$

And your clearance above the ridge is;

$$\begin{aligned}\text{Clearance} &= (\text{True Altitude}) - (\text{Ridge Height}) \\ &= (6,750 \text{ ft}) - (5,000 \text{ ft}) \\ &= (1,750 \text{ ft})\end{aligned}$$

So, answer a) 1,750 ft is correct.

