

WMU PRECISION FLIGHT TEAM

Manual Flight Computer Practice Test

The following test provides an example of some of the typical problems found on WMU Flight Team E6B tests. These tests are timed, so you'll want to try to complete all 40 questions in 50 minutes or faster. To take this test, all you need is an E6B manual flight computer and a fine-point marker, although a pencil will work. Electronic flight computers and calculators are not allowed. If you don't know how to do a problem, instructions for most of these can be found in the instruction manual that came with your E6B. I do suggest that if you are not familiar with the E6B, you look over the manual before trying this test. If you have any questions about the problems or about the Flight Team in general, feel free to email me at Broncopilot943@hotmail.com.

1. 136 statute miles = _____ nautical miles = _____ kilometers
2. 51 kilograms = _____ pounds
3. 79 U.S. gallons Avgas = _____ pounds = _____ liters
4. 6.5 pounds oil = _____ imperial gallons
5. 20 degrees F = _____ degrees C
6. 10 degrees C = _____ degrees F
7. 18 meters = _____ feet
8. If you are flying at 137 nautical miles per hour, how long will it take to travel 420 nautical miles?
 - a. 42 minutes
 - b. 3:04
 - c. 2:45
 - d. 3:12
9. You traveled 82 miles and it took 1 hour and 14 minutes. How fast were you traveling?
 - a. 66.5 mph
 - b. 59.2 mph
 - c. 50.7 mph
 - d. 69.1 mph
10. You are flying from airport A to airport B. How far apart are the airports if you can get there in 2 hours and 5 minutes at 122 mph?
 - a. 124 miles
 - b. 184 miles
 - c. 234 miles
 - d. 254 miles
11. You are flying your super-jet-turbo-charged Cessna at 742 miles per hour. How long does it take to travel 3.2 miles.
 - a. 13.1 seconds
 - b. 15.5 seconds
 - c. 18.4 seconds
 - d. 24.0 seconds
12. Your aircraft burns 17.6 gallons per hour. How many gallons would you burn if you flew for 4 hours and 23 minutes?
 - a. 103
 - b. 90
 - c. 82
 - d. 77

13. Pressure altitude is 6500 feet. Outside air temperature is 200C. What is your true airspeed if your calibrated airspeed is 119 miles per hour?
- 110 mph
 - 145 mph
 - 135 mph
 - 117 mph
14. You are flying from airport A to airport B. After flying 42 miles you find yourself 5 miles off course because the winds were different than you planned. How many degrees will you have to turn from your present heading to parallel your original course?
- 18.3 degrees
 - 15.7 degrees
 - 7.1 degrees
 - 3.2 degrees
15. From the previous question, if you had 95 miles to go, approximately how many total degrees would you have to turn to proceed directly to airport B?
- 10.3 degrees
 - 3.1 degrees
 - 14.2 degrees
 - 16.5 degrees
16. If it takes you 5 minutes to cross 8 degrees of bearing change of a VOR station, how many minutes are you from the station?
- 32.5 min
 - 37.5 min
 - 40.5 min
 - 44.5 min
17. Indicated altitude is 10400 feet. Altimeter setting is 29.32". Outside air temperature is 250C. What is your true altitude?
- 9600 feet
 - 14000 feet
 - 11600 feet
 - 16200 feet
18. Pressure altitude: 8200 feet, outside air temperature: 450F, what is the density altitude?
- 1400 feet
 - 4500 feet
 - 12000 feet
 - 8900 feet,

19. Climbing out in your airplane at 270 feet per nautical mile, you have a groundspeed of 80 knots. How many feet per minute are you climbing?
- a. 230
 - b. 280
 - c. 330
 - d. 360
20. Wind: 125° at 16 knots
True course: 272°
True airspeed: 130 knots
Find true heading and groundspeed.
- a. 140° , 122 knots
 - b. 268° , 143 knots
 - c. 319° , 156 knots
 - d. 030° , 139 knots
21. True course: 315°
Groundspeed: 93 knots
True heading: 322°
True airspeed: 120 knots
Find wind direction and speed.
- a. 125° at 28 knots
 - b. 344° at 30 knots
 - c. 178° at 12 knots
 - d. 174° at 18 knots
22. True heading: 253°
True airspeed: 140 knots
Wind: 123° at 21 knots
Find true course and groundspeed.
- a. 259° , 154 knots
 - b. 247° , 162 knots
 - c. 299° , 137 knots
 - d. 231° , 166 knots
23. True course: 119°
Groundspeed: 89 knots
Wind: 301° at 32 knots
Find true heading and true airspeed.
- a. 105° , 105 knots
 - b. 328° , 120 knots
 - c. 118° , 57 knots
 - d. 268° , 92 knots

24. True heading: 24°
Groundspeed: 130 knots
Wind: 105° at 10 knots
Find true course and true airspeed.
- a. 020° , 131 knots
 - b. 015° , 120 knots
 - c. 018° , 134 knots
 - d. 025° , 125 knots
25. Magnetic course: 295° , variation: 9°E , deviation: $+5^\circ$, wind correction angle: $+3^\circ$. What is your compass course?
- a. 300°
 - b. 291°
 - c. 303°
 - d. 286°
26. Using the previous question, what is your true heading?
- a. 298°
 - b. 307°
 - c. 303°
 - d. 300°
27. True heading is 047° , variation is 40°W , deviation is -2° , wind correction angle is 8° left. What is your magnetic course?
- a. 051°
 - b. 055°
 - c. 057°
 - d. 059°
28. Compass course: 102° , variation: 6°E , deviation: -4° , wind correction angle: -10° . What is your true heading?
- a. 102°
 - b. 092°
 - c. 086°
 - d. 098°
29. True course: 100° , true airspeed: 95 knots, wind: 100° at 12 knots, useable fuel: 50 gallons, burn rate: 9 gallons per hour. How long can you fly outbound before you must turn back in order to arrive back at your starting point with no fuel left?
- a. 2:50
 - b. 3:08
 - c. 3:16
 - d. 3:24

30. In the previous question, how far did you fly outbound before turning?
- a. 335 nautical miles
 - b. 595 nautical miles
 - c. 260 nautical miles
 - d. 190 nautical miles
31. You are landing on runway 22 and the winds are 172° at 14 knots. What is your crosswind component?
- a. 10
 - b. 12
 - c. 14
 - d. 16
32. In the previous question, what is your headwind component?
- a. 15
 - b. 13
 - c. 11
 - d. 9
33. Temperature: -36°C , mach number: 1.4, what is your true airspeed?
- a. 823 knots
 - b. 845 knots
 - c. 676 knots
 - d. 588 knots
34. After flying 47 miles you notice you are 14° off course. How many miles off course are you?
- a. 3
 - b. 11
 - c. 7
 - d. 14
35. When you fly a heading of 140° you drift 6° to the left. When you fly a heading of 210° you drift 9° to the right. Your true airspeed is 126 knots. What are the winds?
- a. 169° at 23 knots
 - b. 142° at 28 knots
 - c. 345° at 19 knots
 - d. 351° at 32 knots
36. You are planning a flight that is 200 statute miles long. Your groundspeed is 77 knots. How much fuel will you burn if your burn rate is 8 gallons per hour?
- a. 8 gallons
 - b. 13 gallons
 - c. 15 gallons
 - d. 18 gallons

37. Distance: 515 miles, true airspeed: 130 mph, wind: 50° at 10 mph, true course: 100° , fuel burn: 14 gallons per hour. How long will it take to complete this flight?
- a. 144 minutes
 - b. 3:20
 - c. 4:09
 - d. 4:55
38. Pressure altitude: 5000 feet, temperature: 25°C , calibrated airspeed: 114 knots, true course: 303° , wind: 275° at 8 knots. What is your groundspeed?
- a. 120 knots
 - b. 129 knots
 - c. 113 knots
 - d. 111 knots
39. In question 38, what is your true airspeed?
- a. 165 kilometers per hour
 - b. 181 kilometers per hour
 - c. 236 kilometers per hour
 - d. 249 kilometers per hour
40. Outside air temperature: -5°F , pressure altitude: 6000 feet, true altitude: 8300 feet. What is your calibrated altitude?
- a. 6400 feet
 - b. 8600 feet
 - c. 9100 feet
 - d. 7600 feet

The End!

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ANSWER KEY

This key contains the correct answer, or the letter of the correct answer, as well as the type of problem, in case you want to look it up in your instruction manual.

Questions I - 10 - conversion problems

- 1) 118 nm, 219 km
- 2) 112 lbs
- 3) 475 lbs, 299 liters
- 4) 0.72 imperial gallons
- 5) -7 degrees Celsius
- 6) 50 degrees Fahrenheit
- 7) 59 Feet

Questions 8-12 - Time, Speed, Distance, and Fuel problems

- 8) B
- 9) A
- 10) D
- 11) B
- 12) D

- 13) C - CAS to TAS conversion
- 14) C - Off course / drift
- 15) A - Off course / drift
- 16) B - Time to a VOR station
- 17) C - Indicated Altitude - True Altitude conversion
- 18) D - Density Altitude
- 19) D - Rate of Climb

Problems 20-24 are wind problems. Some are normal, some backwards, and some ask you to find the winds. It is very important that you understand how to recognize and answer each type.

- 20) B - Normal wind
- 21) B - Find wind
- 22) A - Backwards wind
- 23) C - Normal wind

- 24) A - Backwards wind

Questions 25-28 are very simple, and are completed only by addition and subtraction. The E6B is not needed. Just remember that Course + Wind Correction = Heading. (So Heading - Wind Correction = Course). True + Variation Magnetic, and Magnetic + Deviation = Compass. Obviously just subtract to go the other way. These are also found on the top of the wind side of your E6B.

- 25) A
- 26) B
- 27) D
- 28) A

- 29) B - Radius of Action
- 30) C - Radius of Action
- 31) A - Crosswind computation
- 32) D - Headwind computation
- 33) B - Mach number
- 34) B - Off course / drift
- 35) A - Double drift

Questions 36-39 deal with time, speed, distance, fuel and CAS-TAS conversions, just as you've seen them earlier in this test. They are combination problems that require more than one step, but are no more difficult than earlier questions.

- 36) D
- 37) C
- 38) A
- 39) C

- 40) C - Calibrated Altitude - True Altitude conversion