

33. You are in the maintenance hanger and want to help the mechanics compute an aircraft's CG. They put the aircraft on 3 scales and note the following:

Nose Gear: 170 lbs at station 15"
Left Main: 650 kg at station 90"
Right Main: 600 kg at station 90"

What is CG?

- A. 142 cm
B. 206 cm
C. 217 cm
D. 236 cm
34. Pertaining to the previous question, if TEMAC is located at station 114 and the mean aerodynamic chord is 37 inches long, what is the CG in percent MAC?
- A. 21.6%
B. 32.5%
C. 38.6%
D. 78.4%
35. You are climbing 165 meters every 3 sm. You will be leveling off at 9,500 ft. The GPS says it will take 18 minutes to reach altitude. If the departure airport's elevation is 1,500 ft., what is your groundspeed?
- A. 84 kts
B. 149 kts
C. 73 kts
D. 128 kts.

THE FOLLOWING QUESTIONS REQUIRE FILL-IN ANSWERS. BE SURE TO WRITE YOUR ANSWERS ON THE ANSWER SHEET.

36. If OAT is 15°C and pressure altitude is 9000 ft., what is density altitude? (Provide an answer to nearest whole number)
37. 305 statute miles equals how many kilometers? (Provide an answer to nearest whole number)
38. How much does 412 liters of oil weigh in kilograms? (Provide an answer to nearest whole number)
39. A burn rate of 26 gph is how many liters per minute? (Provide an answer to nearest 1/100 liter)
40. If one US gal of water weighs 8.35 lbs, then how much does 300 quarts of water weigh in kilograms?
41. The altimeter setting is 1026.1 millibars. What is this in hectopascals to the nearest 1/10 of a millibar?
42. 113 kmph equals how many meters per second? (Provide an answer to nearest 1/100 m/sec)
43. What is the square root of 538? (Provide an answer to nearest 1/10)
44. Convert 102°F to Celsius. (Provide an answer to nearest 1/10 of a degree Celsius)
45. 5616 minutes is how many days? (Provide an answer to nearest 1/10 of a day)

26. To comply with the runway 15 departure procedure, an aircraft must maintain 350 fpm during the climb. The procedure says to depart runway heading until reaching 8000 ft. Field elevation is 750 ft. Climb TAS is 90 mph. The winds remain a constant 180° @ 30 kts magnetic. Assuming the pilot stays on the assigned heading, what is the minimum climb rate needed to comply?
- A. 525 fpm
 - B. 315 fpm
 - C. 386 fpm
 - D. 456 fpm
27. Refer to the previous problem. Upon liftoff the aircraft begins to drift because of the wind. What is the drift angle the pilot will be experiencing?
- A. 8° R
 - B. 11° L
 - C. 16° L
 - D. 16° R
28. Pertaining to problem #26, how far has the aircraft traveled from the airport when it reaches 8000 ft.?
- A. 16.4 NM
 - B. 25.5 NM
 - C. 20.7 NM
 - D. 30.0 NM
29. Pressure altitude is 9500 feet. OAT is -25°C . If calibrated altitude is 10,000 feet, what is the true altitude?
- A. 12,600 ft.
 - B. 12,150 ft.
 - C. 11,100 ft.
 - D. 9,200 ft.
30. There you are flying along at cruise altitude. Your First Officer decides to ask you, "Say, what amount of temperature rise is the temp probe experiencing?" You know the TAS is 315 knots and the probe's recovery coefficient is 1.0. Your trusty manual flight computer is hanging around your neck. You quickly give it a spin and answer:
- A. 5°C
 - B. 9°C
 - C. 13°C
 - D. I need more information to answer that!
31. Your CAS is 500 knots at FL230. Temperature at altitude is not standard. Taking into account compressibility, what is your mach number?
- A. .8 mach
 - B. .9 mach
 - C. 1.1 mach
 - D. 1.2 mach
32. You fly 1.8 km in 25 seconds. What is your groundspeed?
- A. 236 feet per second
 - B. 438 feet per second
 - C. 380 feet per second
 - D. 523 feet per second

20. You are flying around the OOD VORTAC and note 13 degrees of bearing change in 5 minutes. If your groundspeed is 92 mph, how far from the station are you?
- A. 30.7 NM
 - B. 35.4 NM
 - C. 23.9 NM
 - D. 20.8 NM
21. Refer to the previous problem. How long would it take you to get to OOD if the wind is calm?
- A. 7.7 minutes
 - B. 15.6 minutes
 - C. 23.2 minutes
 - D. 30.8 minutes
22. You are enroute to your grass strip at a cruising altitude of 12,500 ft. where the OAT is -20°C . CAS is 127 knots and the local altimeter setting is 29.42. Fuel on board is 33 gal burning at a rate of 12 gph. Winds are 290° @ 17 knots. Just then you look down and notice the KDAY airport below you. You know KDAY is 110 NM from your grass strip. Assuming you hold a TC of 310° , how far from KDAY will you be when the time to continue to the grass strip equals the time to turn back and fly to KDAY?
- A. 55 NM
 - B. 67 NM
 - C. 61 NM
 - D. 58 NM
23. Refer to the previous problem. If you continued to the grass strip, how much fuel did you burn after passing KDAY? Disregard descent performance changes.
- A. 5.9 gal
 - B. 9.7 gal
 - C. 11.9 gal
 - D. 8.2 gal
24. An airplane is experiencing an 8 degree bearing change every 47 seconds. If it is 26 SM from the station, how long will it take to reach the station?
- A. 4 minutes 36 seconds
 - B. 5 minutes 51 seconds
 - C. 6 minutes 7 seconds
 - D. 35 minutes 20 seconds
25. Two aircraft fly over the same VOR at the same time at different altitudes. Aircraft Alpha flies outbound on the 283° radial and aircraft Bravo flies outbound on the 037° radial. At the time aircraft Alpha is reading 40 DME, aircraft Bravo is reading 35 DME. At this point, how far apart are the aircraft from each other? Disregard slant range error.
- A. 63 NM
 - B. 75 NM
 - C. 53 NM
 - D. 68 NM

14. If your TAS is 100 knots, compass heading is 306°, true course is 300°, magnetic variation is 8E and deviation is +3, then what is your magnetic course?
- A. 295°
 - B. 311°
 - C. 303°
 - D. 292°
15. In the previous problem, what is your crosswind component?
- A. 19 knots
 - B. 11 knots
 - C. 14 knots
 - D. 5 knots
16. You are flying along with a constant TAS of 110 knots. You wish to impress your passengers by estimating actual winds. With your trusty Gatty Drift Indicator you take the following readings:
- On TH of 065° drift is 8°R
 On TH of 110° drift is 4°R
 On TH of 020° drift is 13°R
- What is your best estimate of winds aloft?
- A. 127° @ 21 knots
 - B. 290° @ 28 knots
 - C. 308° @ 22 knots
 - D. 323° @ 16 knots
17. Refer to the previous problem. If you stayed on a TH of 065° and your OAT is -30°C, what is your mach number?
- A. .16 mach
 - B. .18 mach
 - C. .20 mach
 - D. .22 mach
18. You are planning a flight to another airport when you discover a new restricted area has been established. It lies directly in your path, 74 nautical miles away. The area occupies the airspace from ground level up to, but not including, FL290. If the departure airport's field elevation is 2000 ft, will you be able to climb to FL290 without violating the restricted area? Assume no wind.
- Climb capability: Departure airport to 8000': 1500 fpm at 130 KTAS
 8000' to FL180: 900 fpm at 120 KTAS
 FL180 to FL 290: 500 fpm at 110 KTAS
- A. Yes, you'll reach FL290 about 3 NM before the restricted area
 - B. No, you'll reach FL290 about 3 NM after entering the restricted area
 - C. Yes, you'll reach FL290 and cross the lateral limit at the same time
 - D. No, you'll reach FL290 about 12 NM after entering the restricted area
19. You are tracking inbound to the PSI VORTAC on the 090° radial. You turn right to a magnetic heading of 290°. After flying 20 NM you turn the OBS and center the needle. It shows you on the 070° radial. How far from PSI are you? Assume no wind.
- A. 20 SM
 - B. 23 SM
 - C. 26 SM
 - D. Can't be determined

8. Given: Wind: 315° @ 12 kts
TH: 010°
TAS: 116 kts

Find: Groundspeed

- A. 108 kts
- B. 123 kts
- C. 121 kts
- D. 110 kts

9. Using the data from the previous problem, what is your WCA?

- A. 5°L
- B. 5°R
- C. 4°R
- D. 7°L

10. Given: TAS: 143 mph
GS: 120 mph
TC: 130°
TH: 139°

Find: Wind velocity

- A. 189° @ 26 kts
- B. 177° @ 27 kts
- C. 185° @ 28 kts
- D. 177° @ 31 kts

11. Given: Wind: 230° @ 20 kts
TAS: 145 kts
TH: 005°

Find: Groundspeed

- A. 130 kts
- B. 132 kts
- C. 158 kts
- D. 160 kts

12. Given: TAS: 110 mph
TH: 219°
Wind: 055° @ 35 mph

Find: TC

- A. 214°
- B. 223°
- C. 211°
- D. 225°

13. What is your groundspeed in the previous problem?

- A. 232 kmph
- B. 144 kmph
- C. 124 kmph
- D. 177 kmph

1. There you were on a heading of 095° when you realize that you are 11 NM off course to the right. If you have traveled 68 NM up to this point, how many degrees must you turn to parallel your intended course?
 - A. 1°
 - B. 9°
 - C. 12°
 - D. 16°

2. In the previous problem, if you have 195 km left to destination, how many total degrees would you have to turn to intercept the original course 15 SM before your destination?
 - A. 7°
 - B. 12°
 - C. 15°
 - D. 16°

3. You are planning a flight to Grandma's airport, which is 155 SM away. True course is 085° . True airspeed is 127 knots. Winds are $300^\circ @ 17$ knots. If fuel burn is 8.6 gph, how much fuel will you burn flying to Grandma's? Use given data for all phases of flight.
 - A. 8.2 gal
 - B. 9.2 gal
 - C. 9.5 gal
 - D. 10.4 gal

4. You are tracking inbound to the EDY VOR on the 030° radial. At the point you cross over EDY you have 28.5 gal of fuel and are experiencing a 20 knot headwind. Your TAS is 126 knots. Assuming you have a constant burn rate of 11.3 gph, how far can you fly past EDY before having to turn around and cross back over EDY with 1 hour and 15 minutes of fuel left? Winds remain constant.
 - A. 75 NM
 - B. 78 NM
 - C. 116 NM
 - D. 156 NM

5. An aircraft is flying inbound to the ECK VORTAC on the 186° radial. The pilot intercepts the 27 DME arc and flies clockwise. How far has the aircraft traveled on the arc if he departs it at the 310° radial?
 - A. 51 NM
 - B. 170 NM
 - C. 124 NM
 - D. 58 NM

6. Given: Wind: $185^\circ @ 18$ kts
 TC: 285°
 TAS: 125 kts

 Find: Groundspeed
 - A. 123 kts
 - B. 120 kts
 - C. 127 kts
 - D. 125 kts

7. Using the data from the previous problem, what is your TH?
 - A. 285°
 - B. 293°
 - C. 266°
 - D. 277°