How to fly Commercial Maneuvers
360° Steep Power Turns

1. Clear the area
2. Set the power to _____ more may be added if needed.
3. Smoothly roll into a bank of 50° +/-5° increasing backpressure as the bank is increased, trim if desired.
4. Maintain altitude by making small adjustments in pitch and bank. Generally, if the nose of the aircraft is kept on the same position on the horizon, altitude will remain constant.
5. If the aircraft starts to descend, increase pitch and/or decrease bank slightly.
6. If the aircraft starts to climb, decrease pitch and/or increase bank slightly.
7. Turns must be done 360°, in each direction.
8. When approaching the entry heading, (lead rollout by 1/2 the bank angle) smoothly roll out of the bank and release excess backpressure.
9. The bank should be rolled directly from one direction to the opposite direction with no stopping at straight and level.
10. Keep in mind that, due to torque, turns to the left will require less rudder pressure on entry and more corrective opposite aileron (for over-banking tendency) than turns to the right.
11. The power used should keep the airspeed above _____KIAS but do not exceed the RPM redline for the engine.
12. Common errors include a constantly varying altitudes not reducing backpressure/power when rolling out/from one bank to the other bank, and forgetting the entry heading.

1080° Steep Spirals About a Point

1. The maneuver is a constant radius, power off, steep spiral about a point on the ground, the instructor or examiner may request any number of turns, however 3 complete turns is the normal situation.
2. Clear the area and normally be at an altitude of 4000 feet above the ground or higher.
3. Pick an intersection or other prominent point on the ground.
4. Carburetor heat, reduce power to idle and establish a glide at _____KIAS.
5. When abeam of the point, roll into a bank (55° max).
6. Vary the bank in order to maintain a constant radius. The stronger the wind, the greater the bank variance will be. A stronger wind will also result in a greater altitude loss per 360° of turn.
7. Clear the engine each 360° of turn.
8. Roll out on the appropriate heading. Keep in mind a field in case or engine failure.
9. The most common error is starting too far (more than 1/4 mile) away from the point. This error results in the circles becoming increasingly tighter as altitude is lost.

Chandelles

1. The maneuver was originally designed to combine a maximum performance climb with a 180° turn, it is now used to improve planning, orientation, coordination and timing.
2. Clear the area and set power to _____.
3. Lower the pitch and accelerate up to, but do not exceed, maneuvering speed.
4. Roll into a 30° bank with a minimum of heading change. Maintain 30° bank for the first 90° turn.
5. Gradually increase the pitch at a constant rate for the first 90° turn.
6. As the airspeed starts to decrease, smoothly apply full power (fixed pitch prop).
7. Upon reaching the 90° point, smoothly begin to roll out the bank, at a constant rate, so that the wings are leveled just as the 180° point is reached. The airspeed at the 90° point should be approx. the same as your approach speed (1.3 times the stall speed).
8. While turning the last 90°, maintain a constant pitch attitude. If the pitch attitude was attained at the 90° point, and maintained thereafter, the airspeed should be just above stalling speed (i.e. minimum controllable airspeed) at the 180° point.
9. Lower the pitch and return to straight and level.
10. When rolling out of a left turning chandelle, only a very small amount of aileron is needed to roll out of the bank, provided the ball is kept centered.
11. When rolling out of a right turning chandelle, the maneuver must be cross-controlled (i.e. right rudder and left aileron must be held) to keep the maneuver coordinated.
12. It is absolutely essential that the ball be kept centered during all portions of chandelles and lazy 8's. Failure to do so will render the maneuver unacceptable.
13. Common errors in a chandelle include excessive heading change when rolling in the 30° bank, improper pitch attitude at the 90° point, and not rolling the bank out at a uniform rate.

Lazy Eights

1. The maneuver is best described as a climbing turn of ever increasing bank followed by a diving turn of ever shallowing bank until the 180° point is reached where the procedure is immediately repeated in the opposite direction. At no time during the maneuver is the airspeed/attitude/control deflection constant.
2. The maneuver gets its name from the arc the longitudinal axis makes on the horizon during the maneuver i.e. a figure 8 laying on its side, or a "lazy" eight.
3. Prior to starting the maneuver, clear the area.
4. Enter the maneuver from straight and level cruise flight with _____.
5. Simultaneously increase both the pitch and the bank for the first 45° of turn. (45° point) The bank should be 15° at this point.
6. The pitch will be at its highest point at the 45° of turn (heading change per units of time) will be quite slow the first 45° turn.
7. During the second 45° of turn, the pitch decreases, while the bank increases, the altitude continues to increase, and the airspeed continues to decrease. The rate of turn during this portions of the maneuver will be quite fast.

8. At the 90° point, the pitch should be passing through the level flight attitude for that airspeed, altitude is a maximum, bank should be 30°, and airspeed is a minimum, being 5-10 KIAS above a stall.
9. During the third 45° of turn, the rate of turn is still quite fast, requiring a fast response time from the pilot. The pitch continues to decrease to its lowest point at the 135° point, the bank continues to decrease, and the airspeed continues to increase.
10. During the last 45° of turn, the rate of turn is very slow. The pitch continues to increase back to the level flight attitude, bank decrease to zero at the 180° point, altitude continues to descend back to the entry altitude, and airspeed continues to increase, until reaching the 180° point.
11. The altitude gained during the first 90° of turn should equal the altitude lost during the second 90° of turn, so that the aircraft returns to the starting altitude.
12. Upon reaching the 180° point, the procedure is immediately performed in the opposite direction. One complete lazy 8 consists of two 180° turns.}
13. As proficiency level is increased, lazy 8's may be practiced at various bank maximums, up to 60°
14. Common errors include not keeping the ball centered, especially approaching the 90° point when turning to the right, not constantly varying the bank and pitch, and gaining or losing altitude.

Eights-on-pylons or pylon eights

1. This ground reference maneuver involves flying the airplane in circular paths, alternately left and right, in the form of a figure "8" around two selected points or "pylons" on the ground. No attempt is made to maintain a uniform radius from the pylon.
2. The airplane is flown at such an altitude and airspeed that a line parallel to the airplane's lateral axis, and extending from the pilot's eye appears to pivot on each of the pylons.
3. The altitude flown is called the "pivotal altitude" and is governed by groundspeed according to the formula:

   Pivotal altitude = (ground speed) / 11.3
4. For 100 KTAS and no wind, the pivotal altitude is 885 feet AGL, with a 20 knot wind at altitude, the pivotal altitude will vary several hundred feet
5. If effect, when at the proper pivotal altitude, the airplane appears to pivot on the selected point.
6. The pivotal altitude does not vary with the angle of bank.
7. The eight is usually begun by flying diagonally crosswind between the pylons.
8. The pylons MUST be selected such that a straight line between the pylons is perpendicular to the wind and should be entered downwind between the two pylons.
9. As the airplane drifts closer to the pylon, the angle of bank must be increased to hold the reference line on the pylon. If the reference line appears to move ahead of the pylon, the pilot should increase altitude. If the reference line appears to move behind the pylon, the pilot should decrease altitude.
10. There should be a few seconds of straight and level time between pylons.
11. The most common error in attempting to hold a pylon is incorrect use of the rudder.

12. The maximum bank angle should be between 30° and 40°.
13. The distance between the pylons should be about 1 mile for 100 knots of groundspeed.