

Area of Operation **IX** - Task **C**

Chandelles

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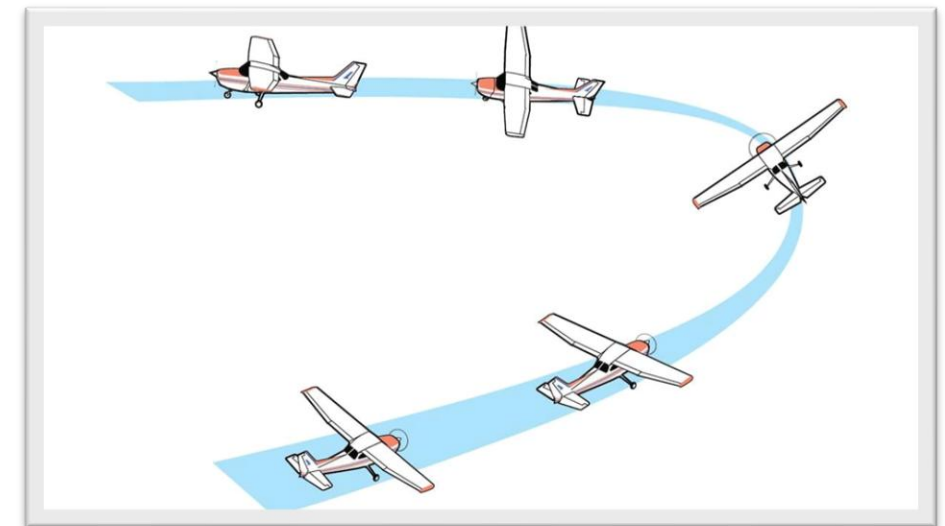
Key References:

- Airplane Flying Handbook
- Commercial Pilot ACS

1. Introduction

- **What:** Maximum performance climbing turn beginning at straight-and-level flight, and ending at the completion of a precise 180° turn in a wings level, nose high attitude at the minimum controllable airspeed
- **Why:** Develops coordination, orientation, planning, and accuracy of control during maximum perf. flight
- **What we are looking for:**
 - Maneuver is entered at V_a or recommended speed → then bank → then **full power**
 - **1st 90° Turn** → **Constand bank** (30°), **increasing pitch** continuously
 - **2nd 90° Turn** → **Constant Pitch** around 15° , **reducing bank** continuously
 - Finish the maneuver **just above stall speed** at the 180°
 - Recover without losing altitude
 - Remain coordinated (**proper correction for torque effect**)
 - Keep looking for traffic, divide attention

- ➡ **Standard (ACS):**
- Entry altitude: **$\geq 1500\text{ft AGL}$**
 - At the 180° point: Airspeed **Just above stall**, Heading **$\pm 10^\circ$**



2. The Maneuver

Rule of the thumb: Bank → Power → Pitch

First 90°

Constant BANK, changing PITCH

1. Turn 30° bank first, then full power
2. Keep increasing pitch until Max Pitch at the 90° point
 - Too fast pitch → plane stalls before 180°
 - Too slow pitch → won't reach stall speed

Second 90°

Constant PITCH, changing BANK

1. At low airspeed, torque effect becomes pronounced and controls less responsive
2. Maintain pitch (it will require more elevator)
3. Reduce bank slowly towards the 180° point
4. Airspeed will be the minimum controllable at the 180
5. Finish: Rollout (1 and 2). Gradually reduce pitch to level flight w/o losing altitude, while gaining airspeed

1

Left Chandelle
(Rollout)

MORE

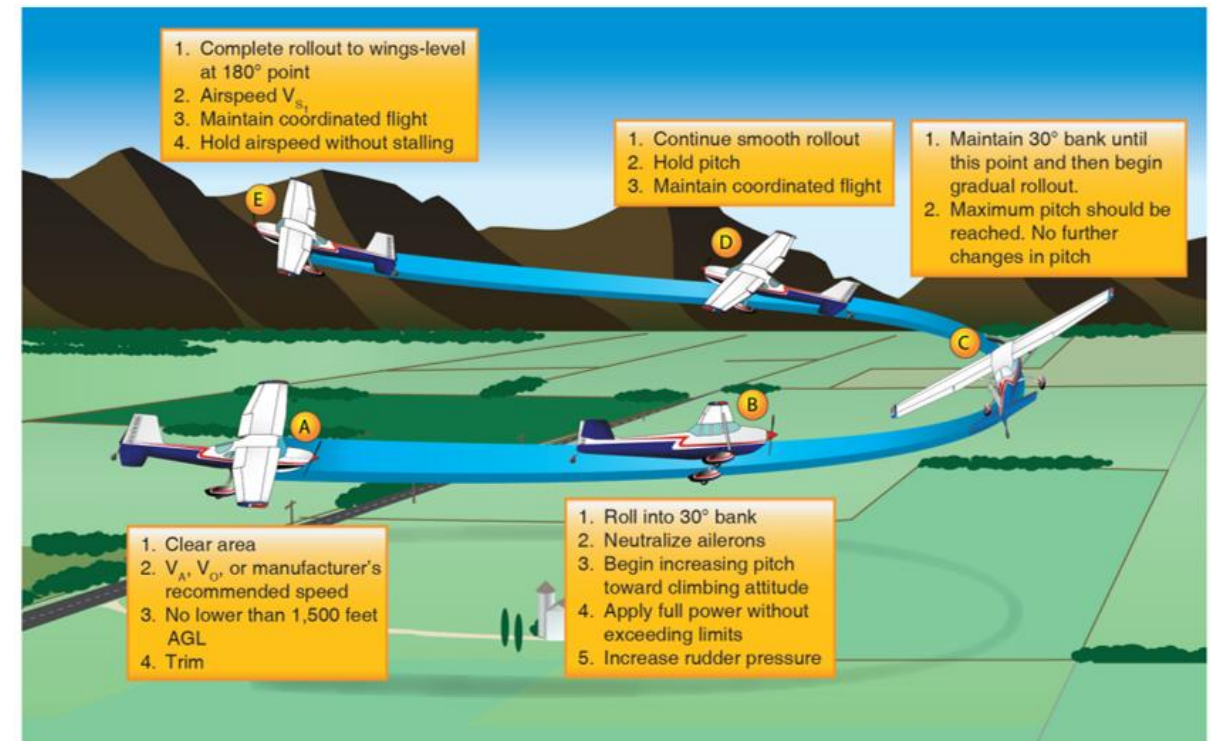
Right Rudder needed
(left turn + adverse yaw)

2

Right Chandelle
(Rollout)

LESS

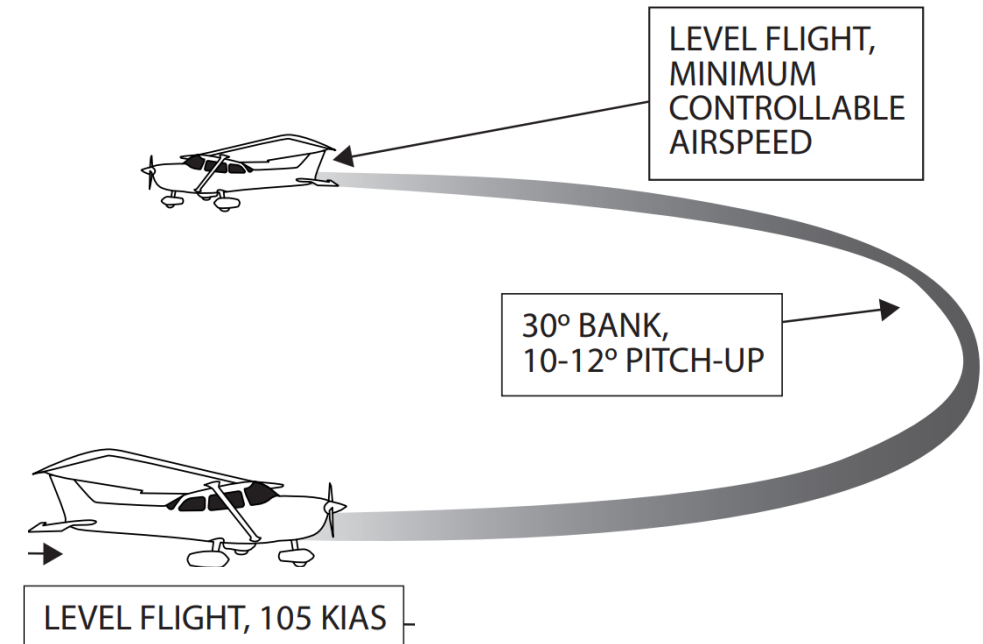
Right Rudder needed
(left turn + adverse yaw)



3. Execution

Performing the maneuver in a C172S

1. Perform two 90° clearing turns
2. 105 KIAS per C172 POH, select and maintain altitude
3. Align wingtip to an outside reference (and bug heading)
4. Clean configuration
5. Establish and **maintain 30° bank**
6. **Full throttle** and gradually increase pitch to $\sim 15^\circ$ at the 90°
7. **90° point:** maintain pitch and gradually reduce bank
8. **180° point:** wings level, minimum controllable airspeed
9. Momentarily maintain the airspeed just above stall
10. Reduce pitch slowly, increasing airspeed w/o losing altitude
11. Cruise Checklist



4. Common Errors

1. Improper pitch, bank and power coordination during entry or completion
2. Uncoordinated use of flight controls
3. Improper planning and timing of pitch and bank attitude changes
4. Factor related to failure in achieving maximum performance
 - *Too high pitch, or too fast, aircraft will stall before the maneuver ends*
 - *Too little pitch and airspeed will be high at the 180 mark*
 - *Too much bank will cause early completion and less altitude gain (too little will cause stall before 180)*
5. A stall during the maneuver

Questions?

