

Visualized Flight Maneuvers Handbook

For Low Wing Aircraft
Third Edition

For Instructors and Students



Aviation Supplies & Academics, Inc.
Newcastle, Washington

*Visualized Flight Maneuvers Handbook
for Low Wing Aircraft
Third Edition*

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None of the material in this handbook supersedes
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operators of the aircraft.

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NORMAL TAKEOFF & CLIMB

(Private, Sport, Commercial, CFI)

Objective: Takeoff and climb out to the downwind leg of the traffic pattern.

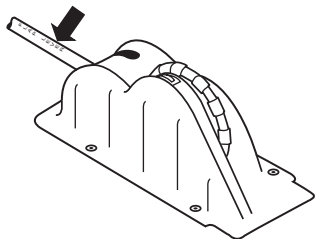
Task: Check Manufacturer Recommendations

1

- Complete preflight inspection (see Page 4)
- Complete starting airplane check (see Page 6)
- Taxi to the upwind runway

2

- Complete before-takeoff check (see Page 6a)
- Wing flaps 0° for normal takeoff



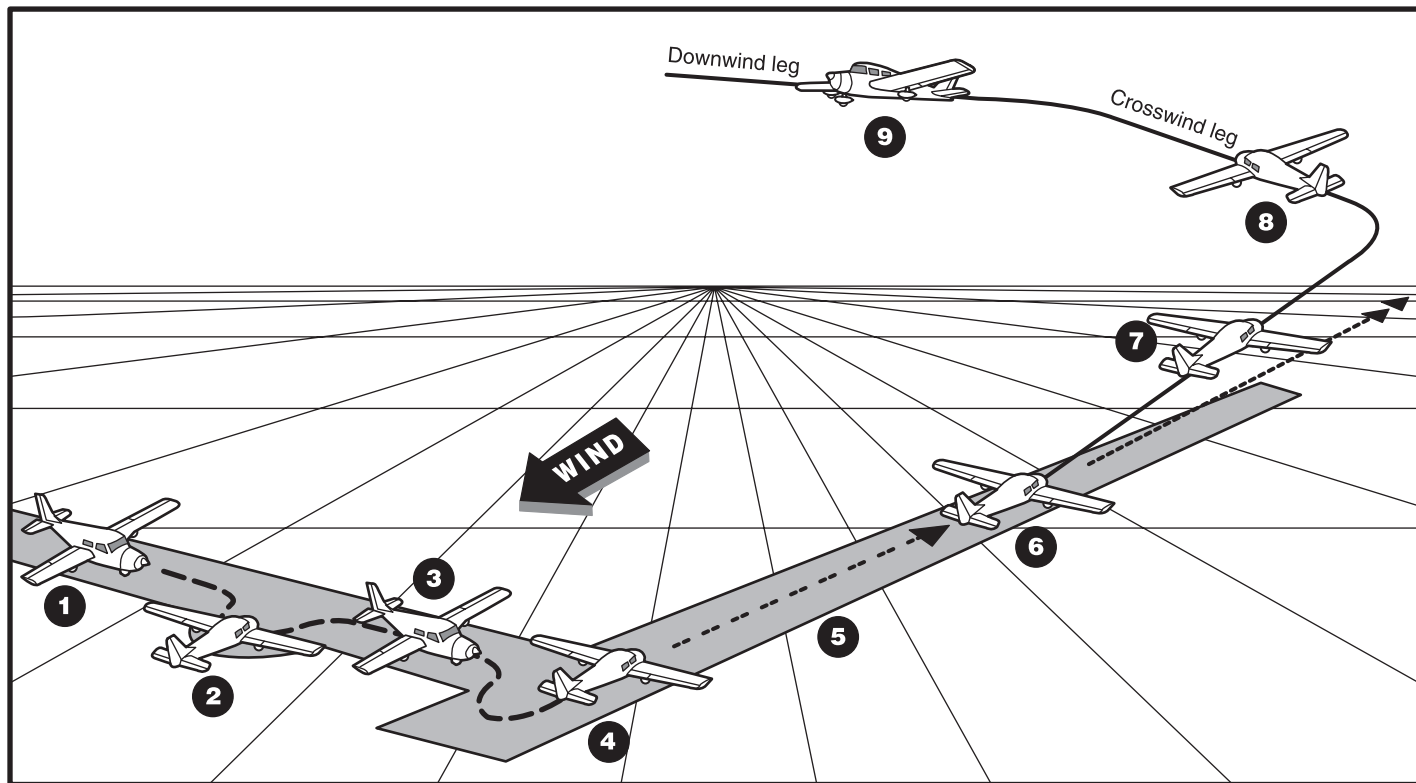
- Know local airport traffic pattern and altitude procedures
- Practice situational awareness and runway incursion avoidance procedures

3

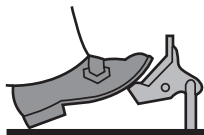
- Obtain takeoff and departure clearances, if required
- Look out and check that runway and approaches are all clear

4

- Line up on runway centerline, nose wheel straight
- Select a reference point straight ahead for tracking



- Keep heels on floor, and toes on rudder pedals, not brakes



- Apply full throttle smoothly and positively

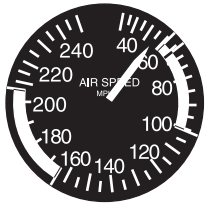


5

- Keep straight with rudder
- Keep wings level with aileron
- Check RPM for full power
- Check engine instruments are in the green arc
- Ease the weight off nose wheel as elevator becomes effective

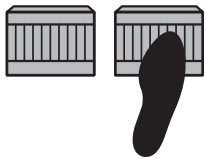
6

- Leave runway at lift-off speed



Manufacturer Recommended lift-off speed _____ knots

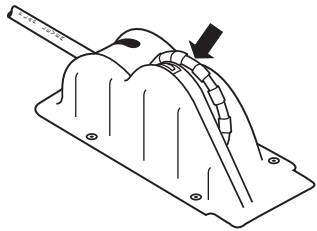
- Use right rudder to offset torque as required



- Keep right hand on the throttle

7

- Establish the attitude that results in V_Y with full throttle
 Manufacturer Recommended V_Y _____ knots
- Trim off any control pressure



- Maintain wings level with aileron, coordinate with rudder



- Retract gear after positive rate of climb is established, and a landing cannot be made on remaining runway
- Scan for traffic
- Maintain a straight track over the extended runway centerline

8

- Beyond end of runway and within 300 feet of traffic pattern altitude, make a climbing turn to crosswind leg (bank angle 20° maximum)
- Allow for wind drift to keep a square pattern
- Maintain climb speed and continue to climb to pattern altitude
- Level off at pattern altitude
- Scan for traffic

9

- Within 1/2 to 1 mile from the runway, make a medium turn to downwind leg (bank angle 30° maximum)
- Scan for traffic
- To depart the traffic pattern, either climb straight out from the upwind leg, or turn 45° beyond the departure end of the runway after reaching pattern altitude

Evaluation:

- Use 0° (normal takeoff) flap setting
- Clear area and align airplane on runway centerline
- Advance throttle smoothly to takeoff power
- Rotate and lift off at the recommended airspeed and accelerate to V_Y
- Establish pitch attitude for V_Y and maintain V_Y during the climb (+10/-5 knots for Private and Sport, ±5 knots for Commercial and CFI)
- Retract landing gear after a positive rate of climb is established
- Maintain takeoff power to a safe maneuvering altitude
- Maintain directional control and proper wind-drift correction throughout takeoff and climb
- Comply with noise abatement procedures
- Complete the appropriate checklist

ELEVATOR TRIM STALLS

(CFI only)

Objective: Demonstrate what can happen when full power is applied for a go-around while not maintaining positive control of the airplane.

Task: Check Manufacturer Recommendations

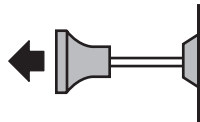
1

- Find practice area where terrain is appropriate for maneuvering, emergency landing area available
- Select an altitude that allows maneuver to be completed no lower than 1,500 feet AGL
- Clear area for other aircraft
- Extend landing gear
- Extend flaps, 1/2 to full
- Trim airplane for level hands-off flight



2

- Carburetor heat on (fully out), or as required



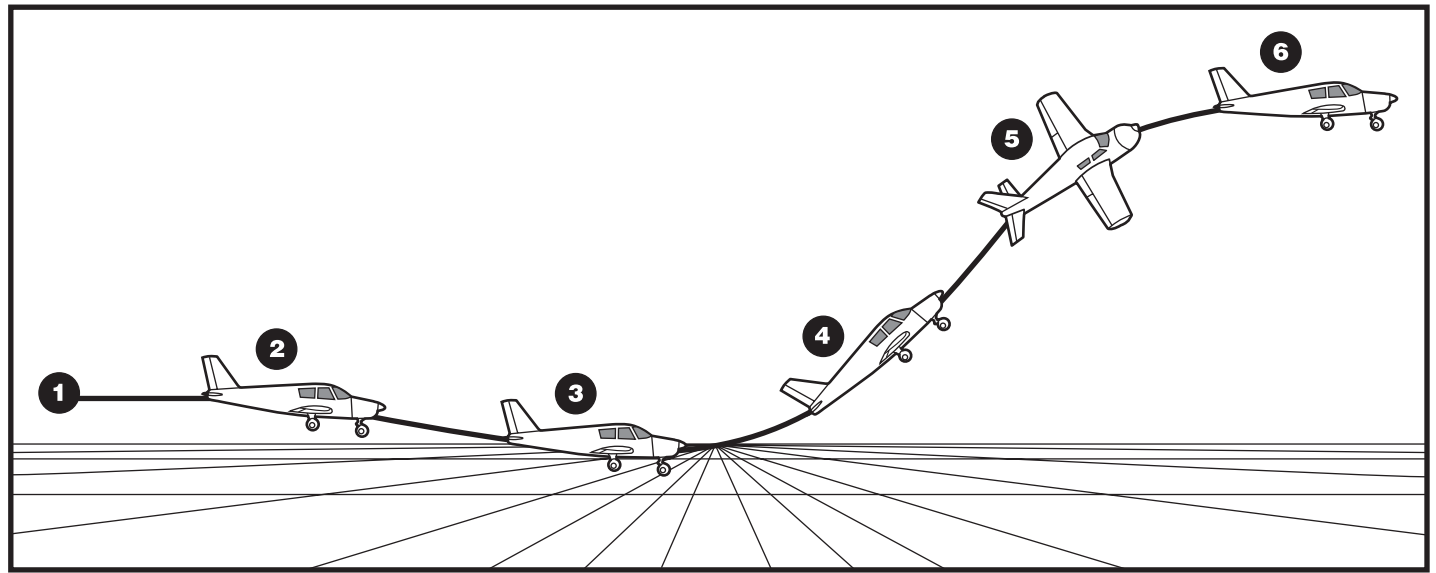
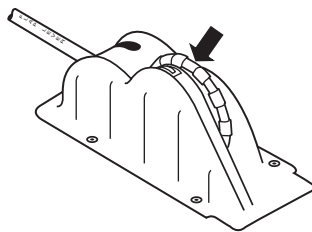
- Power to IDLE (throttle fully out)



- Establish glide attitude and best glide speed

Manufacturer Recommended best glide speed _____ knots

- Re-trim airplane for the glide, as would be done during a landing approach (nose-up trim)

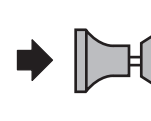


3

- Advance throttle smoothly to maximum power



- Carburetor heat off (fully in)

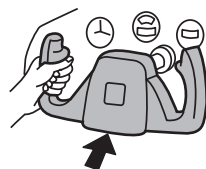


4

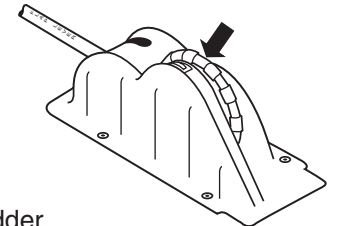
- The combined force of thrust, torque, and back elevator trim cause the nose to rise sharply and turn to the left
- Do not attempt to correct these forces

5

- When pitch attitude increases above the normal climbing attitude, and it is apparent a stall is imminent, apply forward pressure to the control column



- With airplane held in the normal climbing attitude, adjust trim to relieve the heavy control pressures



- Maintain wings-level with coordinated aileron and rudder

6

- Complete normal go-around and level-off procedures
- Retract gear and flaps (in increments) as airspeed reaches V_Y
- Resume normal flight attitude, power, and airspeed with minimum loss of altitude

Evaluation:

- Demonstrate and simultaneously explain elevator trim stalls, in selected landing gear and flap configurations, from an instructional standpoint
- Analyze and correct simulated common errors related to elevator trim stalls in selected landing gear and flap configurations

SECONDARY STALLS

(CFI only)

Objective: Demonstrate what happens when stall recovery is attempted before the airplane has regained sufficient flying speed.

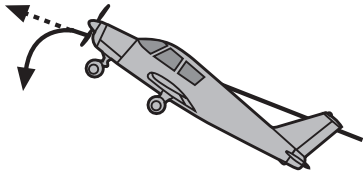
Task: Check Manufacturer Recommendations

1

- Find practice area where terrain is appropriate for maneuvering, emergency landing area available
- Select an altitude that allows maneuver to be completed no lower than 1,500 feet AGL
- Clear area for other aircraft

2

- Perform a stall



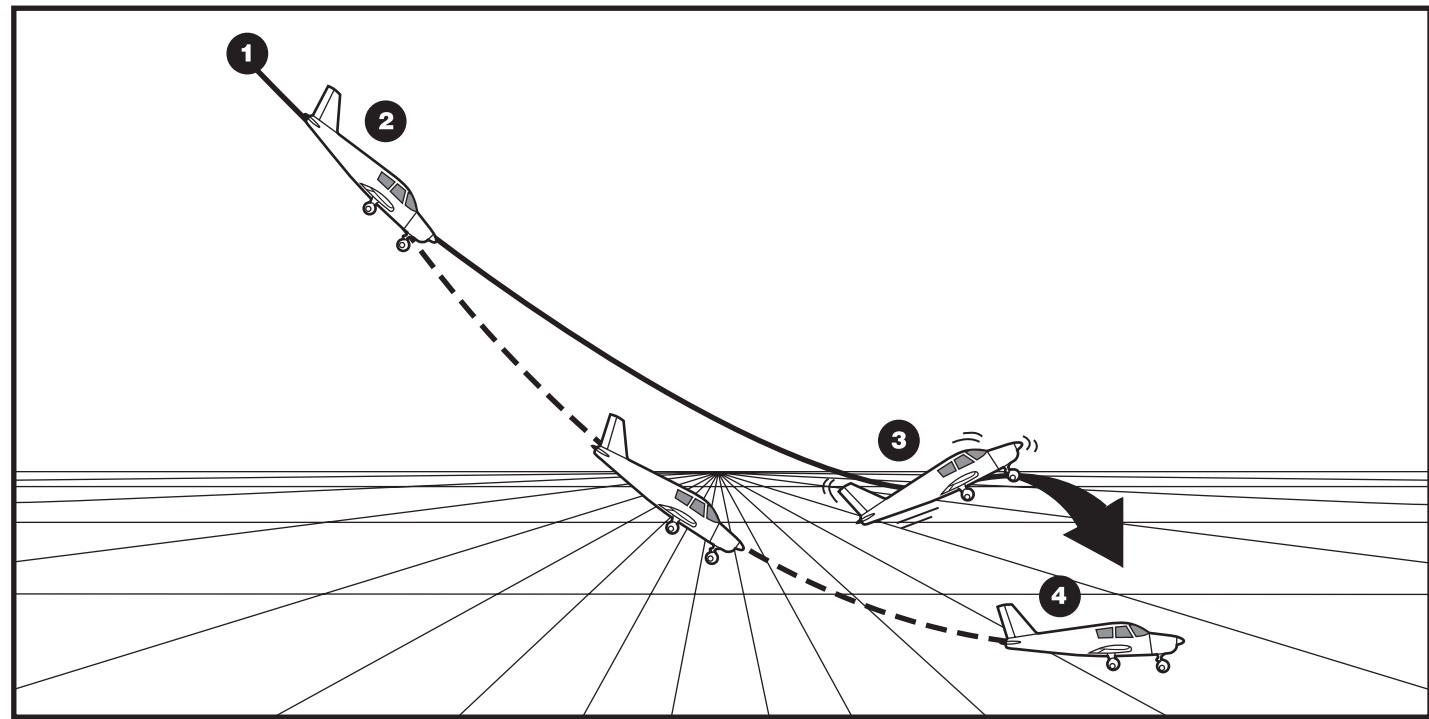
- At full stall, release back pressure

3

- Pull back on the control column before the airplane has regained sufficient flying speed



DO NOT FORGET CLEARING TURNS



- Allow airplane to stall for a second time
- At full stall, release back pressure
- Add full power



4

- Maintain wings-level with coordinated aileron and rudder



- Allow airspeed to build before returning to straight-and-level flight
- Resume normal flight attitude, power, and airspeed with minimum loss of altitude
- Practice from both a power-on and power-off stalled condition

Evaluation:

- Demonstrate and simultaneously explain secondary stalls, in selected landing gear and flap configuration, from an instructional standpoint
- Analyze and correct simulated common errors related to secondary stalls in selected landing gear and flap configurations

LAZY EIGHTS

(Commercial and CFI)

Objective: With constant change in control pressure due to changing combinations of climbing and descending turns at varying airspeeds, experience the full performance range of the airplane while flying a lazy eight pattern.

Task:

1

- Find practice area where terrain is appropriate for maneuvering, emergency landing area available
- Set power to obtain maneuvering speed (V_A), cruise speed, or manufacturer recommended speed (whichever is less)

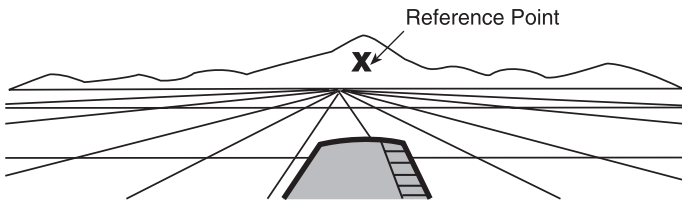
Cruise Speed or Manufacturer Recommended V_A (whichever is less) _____ knots

- Select an altitude that allows maneuver to be performed no lower than 1,500 feet AGL, or manufacturer recommended (whichever is higher)
- Clear area for other aircraft
- Trim airplane for level hands-off flight

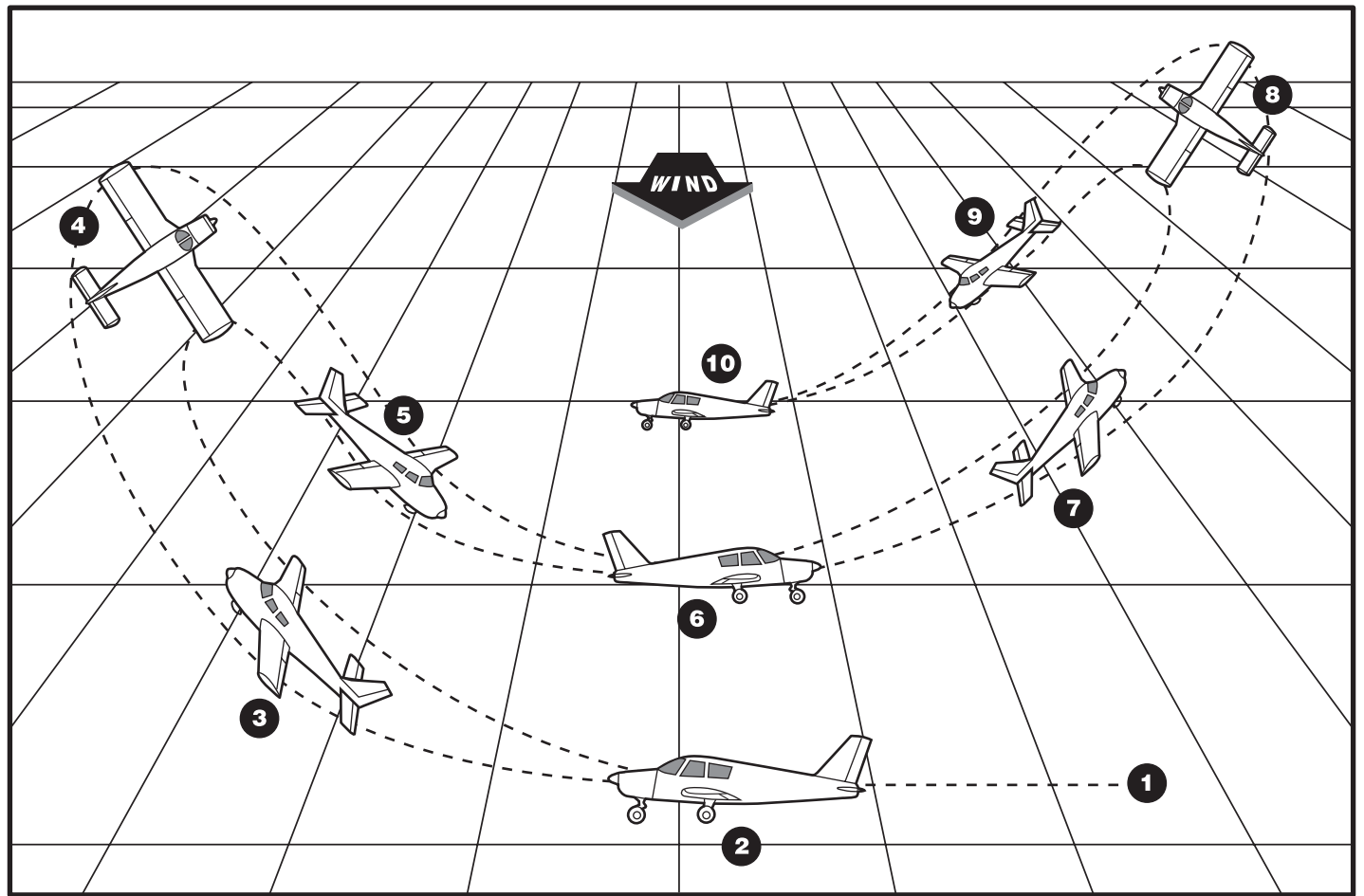


2

- Fly crosswind and select an upwind reference point abeam the wing tip

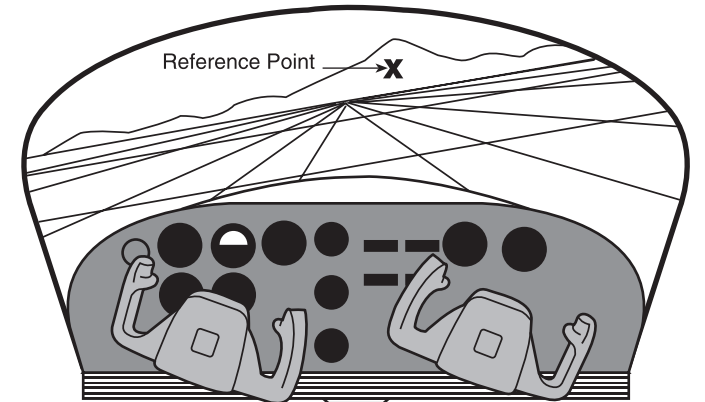


- Raise the nose above the horizon and begin a climb
- Slowly roll in bank, and enter a coordinated climbing turn into the wind



3

- Pass the 45° reference point with maximum nose-up for maneuver
- Increase bank angle through 15°
- Speed is decreasing
- Pitch attitude begins decreasing
- Bank angle continues to increase

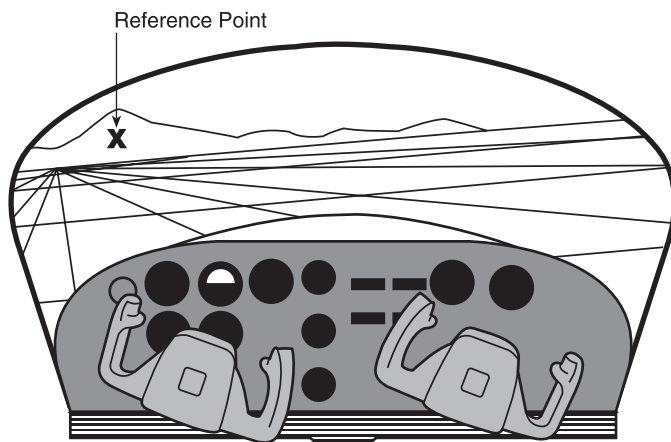


4

- Arrive at maximum bank angle 30° at 90° reference point
- Pitch attitude is momentarily level
- Take note of minimum airspeed
- Take note of maximum altitude
- Pitch continues to decrease
- Bank decreases
- Speed increases

5

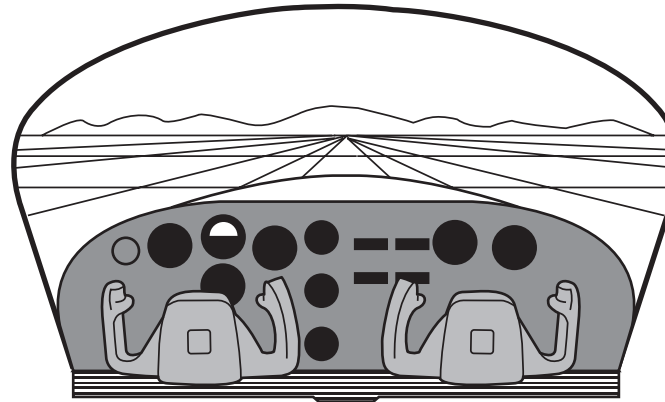
- Pass the 135° reference point with the lowest nose attitude for the maneuver



- Reduce bank angle through 15°
- Speed continues to increase
- Pitch begins increasing
- Bank angle continues to decrease

6

- At the 180° reference point, airplane is momentarily level



- Altitude is same as entry altitude
- Airspeed is same as entry airspeed
- Begin to raise the nose
- Gently roll bank in the opposite direction

7

- Pass the 45° reference point with maximum nose-up for maneuver
- Increase the bank angle through 15°
- Speed is decreasing
- Pitch attitude begins decreasing
- Bank angle continues to increase

8

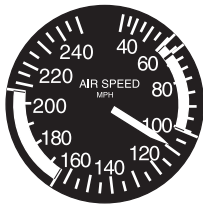
- Arrive at maximum bank angle 30° at 90° reference point
- Pitch attitude is momentarily level
- Take note of minimum airspeed
- Take note of maximum altitude
- Pitch continues to decrease
- Bank decreases
- Speed increases

9

- Pass the 135° reference point with the lowest nose attitude for maneuver
- Reduce bank angle through 15°
- Speed continues to increase
- Pitch begins increasing
- Bank angle continues to decrease

10

- At the 180° reference point, airplane is wings-level
- Altitude is same as entry altitude
- Airspeed is same as entry airspeed
- Resume straight-and-level flight



Evaluation:

- Select an altitude that allows the task to be performed no lower than 1,500 feet AGL or the manufacturer's recommended altitude, whichever is higher
- Select a prominent 90° reference point in the distance
- Establish the recommended entry power and airspeed
- Plan to be and remain oriented while maneuvering the airplane with positive, accurate control, and demonstrate mastery of the airplane
- Achieve the following throughout the task—
 - a. Constant change of pitch, bank, and turn rate
 - b. Altitude and airspeed consistent at the 90°-points, ±100 feet and ±10 knots respectively
 - c. Through proper power setting, attain starting altitude and airspeed at the completion of maneuver, ±100 feet and ±10 knots respectively
 - d. Heading tolerance ±10° at each 180° point
- Continue task through at least two 180° circuits and resume straight-and-level flight
- Maintain coordination throughout maneuver
- Correct for torque effect in right and left turns
- Loops should be symmetrical
- Pitch and bank attitude should have a constant rate of change throughout the maneuver