

Maneuvers Guide: Stage 1 of Private–Airplane (SEL)

Note: Procedures are for Cessna 172R or Cessna 172N/P models.

(Extract from *Pilot Task Analyses: Private/Commercial–Airplane (SEL)*.)

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Steep Turns

Basic Steps	<ol style="list-style-type: none"> 1. Climb to ≥ 1500 AGL (pick a convenient altitude) 2. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 3. Establish 95 KIAS 4. Pick visual heading reference point and note entry altitude, airspeed, and heading 5. Roll into a coordinated 45° bank turn 6. Add power to maintain entry airspeed ± 10 KIAS 7. Use pitch and bank to keep entry altitude ± 100 ft, but maintain bank $\pm 5^\circ$ 8. Continue to scan for traffic throughout maneuver 9. Lead rollout heading by 25° 10. Roll out quickly and use significant stick forward to prevent balloon, maintain entry altitude ± 100 ft, wings level at entry heading $\pm 10^\circ$ 11. Reduce power, maintain entry altitude ± 100 ft and entry airspeed ± 10 KIAS
Variant Scenarios	<ul style="list-style-type: none"> — Continue for 720° — Continue rollout as a roll into another turn in opposite direction
Instructional Augmentation	<ul style="list-style-type: none"> — Call out altitude, airspeed, and bank deviations or OK when checked
Standards	<ul style="list-style-type: none"> — Establish 95 KIAS — Roll into a coordinated 360° steep turn with at least a 45° bank — Divide attention between airplane control and orientation — Maintain the entry altitude ± 100 ft, airspeed ± 10 KIAS, bank $\pm 5^\circ$, and roll out on the entry heading $\pm 10^\circ$
Common Errors	<ul style="list-style-type: none"> — Improper pitch, bank, and power coordination during entry and rollout — Uncoordinated use of flight controls — Improper procedure in correcting altitude deviations — Loss of orientation

Maneuvering During Slow Flight

Basic Steps	<ol style="list-style-type: none"> 1. Climb to ≥ 1700 AGL 2. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 3. Pick visual heading reference point and note entry altitude, airspeed, and heading 4. (172N/P) Carb heat—On 5. Power—Reduce to 1500 rpm 6. Pitch—Maintain altitude, speed will decay 7. Flaps—As specified <p>Just before stall warning horn activation:</p> <ol style="list-style-type: none"> 8. Add power to maintain altitude, approx. (172R) 1800/(172N/P) 2000 rpm flaps up or approx. (172R) 2100/(172N/P) 2300 rpm full flaps 9. Perform straight-and-level flight, turns, climbs, and descents. Remain coordinated and keep horn form sounding. <p>Recovery:</p> <ol style="list-style-type: none"> 10. Power—<i>Smoothly</i> advance to full 11. (172N/P) Carb heat—Cold 12. Pitch—55 KIAS 13. Flaps—Retract to 20° 14. At 55 KIAS: Flaps—Retract to 10° 15. Pitch—Continuously reduce to maintain altitude, speed will build up 16. At 60 KIAS: Flaps—Up <p>At cruise airspeed:</p> <ol style="list-style-type: none"> 17. Power—Cruise (approx. (172R) 2200/(172N/P) 2400 rpm)
Variant Scenarios	— Configurations (flaps up or down)
Instructional Augmentation	— Call out all recovery procedure steps as executed
Standards	<ul style="list-style-type: none"> — Complete ≥ 1500 AGL — Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in a stall warning — Accomplishes coordinated straight-and-level flight, turns, climbs, and descents with flap configurations specified — Divide attention between airplane control and orientation — Maintain the specified altitude ± 100 ft, specified heading $\pm 10^\circ$, airspeed $+10/-0$ KIAS, and specified angle of bank $\pm 10^\circ$

**Common
Errors**

- Failure to establish specified flap configuration
- Improper entry technique
- Failure to establish and maintain the specified airspeed
- Excessive variations of altitude and heading when a constant altitude and heading are specified
- Rough or uncoordinated control technique
- Improper correction for torque effect
- Improper trim technique
- Unintentional stalls
- Inappropriate removal of hand from throttles

Power-Off Stall

Basic Steps	<ol style="list-style-type: none"> 1. Climb to ≥ 2000 AGL 2. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 3. Pick visual heading reference point and note entry altitude, airspeed, and heading 4. (172N/P) Carb heat—On 5. Power—Reduce to 1500 rpm 6. Pitch—Begin slowing to 65 KIAS (full flaps) or 70 (flaps up) 7. Flaps—As specified 8. Pitch—Stabilize in a descent at 65 KIAS (full flaps) or 70 (flaps up) 9. Power—Smoothly reduce to idle 10. Pitch—Smoothly pitch up to stall attitude <p>Recover after break:</p> <ol style="list-style-type: none"> 11. Power—Smoothly advance to full 12. (172N/P) Carb heat—Cold 13. Pitch—55 KIAS 14. Flaps—Retract to 20° 15. At 55 KIAS: Flaps—Retract to 10° 16. Climb for 50 ft 17. Pitch—Smoothly accelerate to 75 KIAS 18. At 60 KIAS: Flaps—Up 19. Climb for another 250 ft at 75 KIAS 20. Accelerate to cruise <p>At cruise airspeed:</p> <ol style="list-style-type: none"> 21. Power—Cruise (approx. (172R) 2200/(172N/P) 2400 rpm)
Variant Scenarios	<ul style="list-style-type: none"> — Perform in straight and turning flight ($\leq 20^\circ$ bank) — Full stalls vs. imminent stalls — Configurations (flaps and/or gear up or down)
Instructional Augmentation	<ul style="list-style-type: none"> — Call out all stall indications, such as buffeting, control effectiveness loss, or stall warning horn — Call out all recovery procedure steps as executed
Standards	<ul style="list-style-type: none"> — Complete ≥ 1500 AGL — Heading $\pm 10^\circ$ in straight flight, angle of bank $\leq 20^\circ \pm 10^\circ$ in turning flight, while inducing the stall — Recognize and recover promptly as (or after) the stall occurs with a minimum loss of altitude appropriate for the airplane — Retract flaps to the recommended setting — Accelerate to V_X or V_Y speed before the final flap retraction; return to the altitude, heading, and airspeed specified

**Common
Errors**

- Failure to establish the specified flap configuration prior to entry
- Improper pitch, heading, and bank control during straight-ahead stalls
- Improper pitch and bank control during turning stalls
- rough or uncoordinated control technique
- Failure to recognize the first indications of a stall
- Failure to achieve a stall
- Improper torque correction
- Poor stall recognition and delayed recovery
- Excessive altitude loss or excessive airspeed during recovery
- Secondary stall during recovery

Power-On Stall

Basic Steps	<ol style="list-style-type: none"> 1. Climb to ≥ 1700 AGL 2. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 3. Pick visual heading reference point and note entry altitude, airspeed, and heading 4. (172N/P) Carb heat—On 5. Power—Reduce to 1500 rpm 6. Pitch—Begin slowing to 65 KIAS (full flaps) or 70 (flaps up) 7. Flaps—Up or 10° 8. Pitch—Stabilize at 65 KIAS (full flaps) or 70 (flaps up) 9. Power—Smoothly increase to full throttle 10. (172N/P) Carb heat—Cold 11. Pitch—Smoothly pitch up to stall attitude <p>Recover after break:</p> <ol style="list-style-type: none"> 12. Pitch—55 KIAS 13. Climb for 50 ft 14. Pitch—Smoothly accelerate to 75 KIAS 15. At 60 KIAS: Flaps—Up 16. Climb for another 250 ft at 75 KIAS 17. Accelerate to cruise <p>At cruise airspeed:</p> <ol style="list-style-type: none"> 18. Power—Cruise (approx. (172R) 2200/(172N/P) 2400 rpm)
Variant Scenarios	<ul style="list-style-type: none"> — Perform in straight and turning flight (20° bank) — Full stalls vs. imminent stalls — Configurations (flaps and/or gear up or down)
Instructional Augmentation	<ul style="list-style-type: none"> — Call out all stall indications, such as buffeting, control effectiveness loss, or stall warning horn — Call out all recovery procedure steps as executed
Standards	<ul style="list-style-type: none"> — Complete ≥ 1500 AGL — Set power to no less than 65 percent available power. — Heading $\pm 10^\circ$ in straight flight, angle of bank $\leq 20^\circ \pm 10^\circ$ in turning flight, while inducing the stall — Recognize and recover promptly as (or after) the stall occurs with a minimum loss of altitude appropriate for the airplane — Retract flaps to the recommended setting — Accelerate to V_X or V_Y speed before the final flap retraction; return to the altitude, heading, and airspeed specified

**Common
Errors**

- Failure to establish the specified flap configuration prior to entry
- Improper pitch, heading, and bank control during straight ahead and turning stalls
- Improper pitch and bank control during turning stalls
- Rough or uncoordinated control procedure
- Failure to recognize the first indications of a stall
- Failure to achieve a stall
- Improper torque correction
- Poor stall recognition and delayed recovery
- Excessive altitude loss or excessive airspeed during recovery
- Secondary stall during recovery

Rectangular Course

Basic Steps	<ol style="list-style-type: none"> 1. Descend to 1000 AGL 2. Select section lines (or other rectangular ground reference) $\approx 1/2-1$ NM per side 3. Locate a emergency landing field within glide range 4. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 5. Establish 90 KIAS 6. Determine which sides correspond to the legs of the “pattern” 7. Perform a standard 45° entry into the downwind leg 8. Turn parallel to the reference line, and place aircraft $\approx 1/2$ NM outside reference 9. Execute pattern, while scanning for traffic 10. At each corner, over- or under-turn 90°, establishing crab for the next leg
Variant Scenarios	<ul style="list-style-type: none"> — Enter on crosswind or upwind — Simulate left traffic and right traffic
Instructional Augmentation	<ul style="list-style-type: none"> — Call out crabbing left/right — Call out traffic checks — Call out altitude or airspeed deviations or OK when checked
Standards	<ul style="list-style-type: none"> — Select a suitable reference area. — Plan the maneuver so as to enter a left or right pattern, 600 to 1,000 ft AGL at an appropriate distance from the selected reference area, 45° to the downwind leg — Apply adequate wind-drift correction during straight-and-turning flight to maintain a constant ground track around the rectangular reference area — Divide attention between airplane control and the ground track while maintaining coordinated flight — Maintain altitude ± 100 ft; maintain airspeed ± 10 KIAS
Common Errors	<ul style="list-style-type: none"> — Poor planning, orientation, or division of attention — Uncoordinated flight control application — Improper correction for wind drift — Failure to maintain selected altitude or airspeed — Selection of a ground reference where there is no suitable emergency landing area within gliding distance

Turns Around a Point

Basic Steps	<ol style="list-style-type: none"> 1. Descend to 600–1000 AGL 2. Select a ground reference point 3. Locate a emergency landing field within glide range 4. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 5. Establish 90 KIAS 6. Fly downwind to the point, placing it about 1200 ft left of aircraft 7. Enter from upwind of reference, flying downwind perpendicular to the reference 8. Abeam reference point, roll to maximum bank (try 35°, must be ≤45°) 9. Roll in and out out bank as turn progresses, keeping radius constant 10. Maximum bank downwind, minimum bank upwind, smoothly roll between the two throughout the maneuver 11. Continue to scan for traffic throughout maneuver
Variants Scenarios	<ul style="list-style-type: none"> — Enter on crosswind or upwind
Instructional Augmentation	<ul style="list-style-type: none"> — Call out getting closer/farther and crabbing more out/in — Call out downwind/upwind and steeper/shallower bank — Call out traffic checks — Call out altitude or airspeed deviations or OK when checked
Standards	<ul style="list-style-type: none"> — Select a suitable ground reference point — Plan the maneuver so as to enter left or right at 600 to 1,000 ft AGL, at an appropriate distance from the reference point. — Apply adequate wind-drift correction to track a constant radius turn around the selected reference point. — Divide attention between airplane control and the ground track while maintaining coordinated flight. — Maintain altitude ±100 ft; maintain airspeed ±10 KIAS
Common Errors	<ul style="list-style-type: none"> — Faulty entry procedure — Poor planning, orientation, or division of attention — Uncoordinated flight control application — Improper correction for wind drift — Failure to maintain selected altitude or airspeed — Selection of a ground reference point where there is no suitable emergency landing area within gliding distance

S-Turns Across a Road

Basic Steps	<ol style="list-style-type: none"> 1. Descend to 600–1000 AGL 2. Select a road (or other straight ground reference) perpendicular to wind 3. Locate a emergency landing field within glide range 4. Execute clearing turn (90° left/90° right or 180° left) and scan for traffic 5. Establish 90 KIAS 6. Enter from upwind of reference, flying downwind perpendicular to the reference 7. After crossing reference, roll to maximum bank (try 35°, must be ≤45°) 8. Determine point on road that is the center of the turn (about ¼ NM radius) 9. Roll out bank as turn progresses, keeping radius constant (watch center point) 10. As cross road, minimum bank, wings level over road 11. Begin shallow roll opposite direction, establishing similar radius circle on other side of aircraft 12. Continue to scan for traffic throughout maneuver
Variants Scenarios	<ul style="list-style-type: none"> — Enter on upwind — Start to left or right
Instructional Augmentation	<ul style="list-style-type: none"> — Call out getting closer/farther and crabbing more out/in — Call out downwind/upwind and steeper/shallower bank — Call out traffic checks — Call out altitude or airspeed deviations or OK when checked
Standards	<ul style="list-style-type: none"> — Select a suitable ground reference line — Plan the maneuver so as to enter at 600 to 1,000 ft AGL, perpendicular to the selected reference line — Apply adequate wind-drift correction to track a constant radius turn on each side of the selected reference line — Reverse the direction of turn directly over the selected reference line — Divide attention between airplane control and the ground track while maintaining coordinated flight — Maintain altitude ±100 ft; maintain airspeed, ±10 KIAS
Common Errors	<ul style="list-style-type: none"> — Faulty entry procedure — Poor planning, orientation, or division of attention — Uncoordinated flight control application — Improper correction for wind drift — An unsymmetrical ground track — Failure to maintain selected altitude or airspeed — Selection of a ground reference line where there is no suitable emergency landing area within gliding distance

Traffic Pattern

Basic Steps	<ol style="list-style-type: none"> 1. If maneuvering over top to join, do so at ≥ 2000 AGL 2. Traffic pattern altitude (TPA) in <i>Chart Supplement</i> or 1000 AGL 3. Entry 45° to downwind, ideally join before midfield 4. Fly TPA at 85 KIAS 5. Complete before landing checklist 6. Abeam threshold: Carb. heat, throttle, flaps 10°, 75 KIAS 7. At 45° from runway centerline @ threshold: Turn base, flaps 20°, 70 KIAS 8. As approaching runway centerline: Turn final, flaps 30°, 65 KIAS 9. Upwind, crosswind, downwind, base, final 10. At TPA-300 ft: depart straight-out, 45° towards the downwind, or turn crosswind
Variant Scenarios	<ul style="list-style-type: none"> — Extended downwind — Turn 360° at request of ATC
Instructional Augmentation	<ul style="list-style-type: none"> — Consider how to deconflict from: straight-ins, midfield crosswinds, 1500 AGL jets, 500 AGL rotorcraft
Standards	<ul style="list-style-type: none"> — Comply with proper traffic pattern procedures — Maintain proper spacing from other aircraft — Correct for wind drift to maintain the proper ground track — Maintain orientation with the runway in use — Maintain traffic pattern altitude ± 100 ft, and the appropriate airspeed ± 10 KIAS
Common Errors	<ul style="list-style-type: none"> — Failure to comply with traffic pattern instructions, procedures, and rules — Improper correction for wind drift — Inadequate spacing from other traffic — Poor altitude or airspeed control

Normal and Crosswind Takeoff and Climb

Basic Steps	<ol style="list-style-type: none"> 1. Clear final approach area and runway, “final clear, runway clear”, check spacing good 2. Taxi onto runway (follow taxi lines), align with centerline 3. Full aileron deflection, roll out as ailerons become effective 4. Smoothly advance power to full 5. Monitor engine instruments 6. Pitch: slightly tail low until rotation speed (55 KIAS), then pitch for initial climb attitude, “rotate” 7. First downwind wheel unsticks, then upwind; Apply immediate right rudder 8. Crab to track runway centerline; Apply brakes 9. Climb at 75 KIAS until TPA–300 ft 10. Set climb power (full throttle); Continue climb at 85 KIAS
Variant Scenarios	— Short or soft field (in course phase 2)
Instructional Augmentation	— Call outs indicated quote marks in basic steps
Standards	<ul style="list-style-type: none"> — Position the flight controls for the existing wind conditions — Clear the area — Align the airplane on the runway centerline — Advance the throttle smoothly to takeoff power — Establish and maintain the most efficient liftoff attitude — Lift off at 60 KIAS and accelerates to 75 KIAS — Establish a pitch attitude that will maintain 75 +10/-5 KIAS — Maintain takeoff power and 75 +10/-5 KIAS to a safe maneuvering altitude — Maintain directional control and proper wind-drift correction throughout the takeoff and climb — Comply with noise abatement procedures — Complete the appropriate checklists
Common Errors	<ul style="list-style-type: none"> — Improper runway incursion avoidance procedures — Improper use of controls during a normal or crosswind takeoff — Inappropriate liftoff procedures — Improper climb attitude, power setting and airspeed (V_Y) — Improper use of checklist

Normal and Crosswind Approach and Landing

Basic Steps	<ol style="list-style-type: none"> 1. Before landing checklist complete At abeam point: 2. (172N/P) Carb heat—On 3. Power—1500 rpm 4. Flaps—10° 5. Slow to 75 KIAS 6. Trim Base: 7. Flaps—20° 8. Slow to 70 KIAS 9. Trim Final: 10. Flaps—30° 11. Slow to 65 KIAS 12. Trim 13. GUMPS 14. Transition from crab to sideslip before flare Flare: 15. Reduce power to idle smoothly 16. Pitch to near stall; Touchdown smoothly 17. Land on upwind wheel first Rollout: 18. Roll full aileron into wind as ailerons lose effectiveness 19. Lower nose wheel to runway after slowing
Variant Scenarios	<ul style="list-style-type: none"> — Short or soft field (in course phase 2) — No flaps
Instructional Augmentation	<ul style="list-style-type: none"> — Call out procedure steps as executed

Standards	<ul style="list-style-type: none">— Select suitable touchdown point for wind, landing surface, and obstructions— Complete appropriate checklist— Fly final at 65 +10/-5 KIAS, with wind gust increment applied— Flaps: Pilot discretion— Maintain a stabilized approach, adjust pitch attitude and power as required— Maintain crosswind correction and directional control throughout the approach and landing sequence— Smooth, timely, and correct control during the round out and touchdown— Smooth touch down— Touch down at approximate stalling speed— Touch down spot: -0/+400 ft— No side drift, aligned with and over the runway centerline
Common Errors	<ul style="list-style-type: none">— Improper use of landing performance data and limitations— Failure to establish approach and landing configuration at appropriate time or in proper sequence— Failure to establish and maintain a stabilized approach— Inappropriate removal of hand from throttle— Improper procedure during round out and touchdown— Poor directional control after touchdown— Improper use of brakes

Go-Around/Rejected Landing

Basic Steps	<ol style="list-style-type: none"> 1. Power—<i>Smoothly</i> advance to full 2. (172N/P) Carb heat—Cold 3. Pitch—55 KIAS 4. Flaps—Retract to 20° 5. At 55 KIAS: Flaps—Retract to 10° 6. Climb until clear of obstacles 7. Pitch—Smoothly accelerate to 75 KIAS 8. At 60 KIAS: Flaps—Up 9. Climb at 75 KIAS <p>At 1000 AGL:</p> <ol style="list-style-type: none"> 10. If remaining in pattern, level off at TPA, set power 11. (In any case) Pitch down & trim for 85 KIAS
Variants Scenarios	<ul style="list-style-type: none"> — Go-around before full flaps — “Go-around” from base leg
Instructional Augmentation	<ul style="list-style-type: none"> — Call out procedure steps as executed
Standards	<ul style="list-style-type: none"> — Make a timely decision to discontinue the approach to landing — Apply takeoff power immediately and transitions to climb pitch attitude for 55, and maintain 55 +10/-5 KIAS — Retract flaps as appropriate — Maneuver to the side of runway to clear and avoid conflicting traffic — Maintain takeoff power and 75 +10/-5 KIAS to a safe maneuvering altitude — Maintain directional control and proper wind-drift correction throughout the climb — Complete the appropriate checklist
Common Errors	<ul style="list-style-type: none"> — Failure to recognize a situation where a go-around/rejected landing is necessary — Delaying a decision to go-around/rejected landing — Improper power application — Failure to control pitch attitude — Failure to compensate for torque effect — Improper trim procedure — Failure to maintain recommended airspeeds — Improper wing flaps retraction procedure — Failure to maintain proper track during climb-out — Failure to remain well clear of obstructions and other traffic

Forward Slip to a Landing

Basic Steps	<ol style="list-style-type: none"> 1. Before landing checklist complete At abeam point: <ol style="list-style-type: none"> 2. 172N/P Carb heat—On 3. Power—1500 rpm 4. Flaps—10° 5. Slow to 75 KIAS 6. Trim Base: <ol style="list-style-type: none"> 7. Position for a steep final leg 8. Flaps—20° 9. Slow to 70 KIAS 10. Trim Final: <ol style="list-style-type: none"> 11. Flaps—30° 12. Slow to 65 KIAS 13. Trim 14. Power—Idle 15. Establish slip—Low wing into the crosswind, opposite rudder 16. Maintain a track aligned with the runway centerline 17. Hold slip, steepen and shallow slip to adjust glide path 18. Maintain airspeed by attitude (sight and feel), <i>disregard airspeed indicator</i> 19. GUMPS 20. Transition from forward slip to sideslip before flare Flare: <ol style="list-style-type: none"> 21. Pitch to minimize float; Touchdown smoothly 22. Land on upwind wheel first Rollout: <ol style="list-style-type: none"> 23. Roll full aileron into wind as ailerons lose effectiveness 24. Lower nose wheel to runway after slowing
Variant Scenarios	— Without flaps
Instructional Augmentation	— Call out procedure steps as executed

Standards	<ul style="list-style-type: none"> — Select suitable touchdown point for wind, landing surface, and obstructions — Complete appropriate checklist — Fly final at 65 +10/-5 KIAS, with wind gust increment applied — Flaps up — Establish the slipping attitude at the point from which a landing can be made using the recommended approach and landing configuration and airspeed; adjust pitch attitude and power as required — Maintain a ground track aligned with the runway centerline — Smooth, timely, and correct control during recovery from the slip, round out, and touchdown — Smooth touch down — Touch down at approximate stalling speed — Touch down spot: -0/+400 ft — No side drift, aligned with and over the runway centerline
Common Errors	<ul style="list-style-type: none"> — Improper use of landing performance data and limitations — Failure to establish approach and landing configuration at appropriate time or in proper sequence — Failure to maintain a stabilized slip — Inappropriate removal of hand from throttle — Improper procedure during transition from the slip to the touchdown — Poor directional control after touchdown — Improper use of brakes