

FIT AVIATION LLC **FLIGHT MANEUVERS MANUAL**



PIPER PA44-180 SEMINOLE

INTRODUCTION

This manual is a compilation of flight training maneuvers and procedures for the Piper Seminole. This manual provides standardized procedures for completing each VFR and IFR maneuver required by the FAA's Practical Test Standards for the, Private, Commercial, Instrument and Flight Instructor Multi-Engine Practical Tests.

This manual does not supersede any current FAA publications. References to those publications can be found at the top and bottom of each page for further study. These references should be used in order to enhance the students understanding of each maneuver.

It is important to keep in mind that this manual provides only a standardized guide to perform each maneuver, and that actual pitch or power settings may vary. All VFR maneuvers should be completed with references to pitch attitude made using the horizon. All IFR maneuvers should be completed with references to pitch attitude using the attitude indicator. The student should be aware that small adjustments to pitch and power should be made in flight in order to successfully complete each maneuver.

It is the instructor's responsibility to teach each maneuver based upon this guide and to ensure the student fully understands and can perform each maneuver required.

This manual should serve only as a guide to complete the required maneuvers and should not be used in place of competent instruction or thorough and complete study of FAA publications. Students should use this manual in combination with the Airplane Flying Handbook, the Instrument Flying Handbook, the Pilot's Handbook of Aeronautical Knowledge, the FAA Practical Test Standards, and any other relevant FAA documents.

PA44-180 MANEUVERS MANUAL

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BRIEFINGS

To ensure a positive flight training experience, briefings should be used for certain phases of flight so that all parties involved understand important characteristics of the flight.

PASSENGER BRIEFINGS

During the "Before Starting Engine" checklist, each aircraft occupant should be thoroughly briefed on:

- Operation of Harnesses and Hatches.
- Engine Fire during Start.
- Emergency Exit / Evacuation procedures and equipment location (i.e. fire extinguishers, first aid kits, etc.)
- No eating, smoking, or drinking, except for bottled water.
- Cell phones off or airplane mode.
- Location of Life Jackets / Rafts for overwater operations.

TAKEOFF BRIEFINGS

During the "Before Starting Engine" checklist, the pilot should give a takeoff briefing that includes:

- Pilot Conducting the Takeoff
- Type of takeoff / Takeoff distance / Available runway distance.
- Crosswind / Headwind components.
- Applicable aircraft V-speeds.
- Emergency procedures during takeoff and climb.

APPROACH BRIEFINGS

When approaching an airport for landing under VFR, the pilot should give an approach briefing that includes:

- Active runway.
- Type of landing / Landing distance / Landing distance available.
- Runway Conditions
- Emergency procedures during landing.

For IFR flights, the pilot should use the approach plate as a guide to give the approach briefing by proceeding from the header to the minimums section of the approach plate.

- Type and name of approach.
- Approach Transition (i.e. vectors, etc.)
- Inbound final approach course.
- Frequencies.
- Approach airspeeds and flap settings.
- MDA or DA.
- Timing.
- Missed approach procedure.

SPARK PLUG CLEARING PROCEDURE

An excessive drop in engine RPM during the magneto ground check is often due to a fouled spark plug. The following procedure should be used for clearing a fouled spark plug:

1. Verify the engine oil temperature gauges are within the normal operating range or, "In the green arc".
2. Verify that the magneto switches are on.
3. Smoothly apply power to full RPM on the engine with the bad magneto.
4. Lean the mixture until the first indication of an RPM drop or engine roughness.
5. Maintain this mixture and RPM combination for 10-20 seconds.
6. Move the mixture control to full rich while simultaneously reducing power to 2000 RPM.
7. Perform the magneto check again and if within limits continue with the before takeoff checklist. If not, return to step #3 and repeat the spark plug clearing procedure.
8. If after the second attempt the magneto drop is still out of limits, return to the ramp for maintenance and advise flight operations.

GLASS COCKPIT POLICIES AND PROCEDURES

1. The flight director may be used at any time.
2. The autopilot may be used at any time at or above 1,000 AGL, throughout the flight, and during the descent until reaching the DA/MDA.
3. No PFD or MFD failures in actual instrument conditions.
4. No autopilot coupled balked landings or missed approach procedures.
5. No engine failure procedures with the autopilot engaged. If an engine failure occurs, actual or simulated, the pilot shall immediately disengage the autopilot.
6. The instructor pilot may pull the PFD or MFD circuit breaker(s) to simulate a failure of the avionics. Reset the pulled circuit breaker after 30 seconds to display the red X's. Note: the aircraft must be brought to a complete stop in order to reset the PFD.

Note: Use Datalink weather only for strategic planning purposes. Do not use the MFD weather function to penetrate severe weather, thunderstorms, cells, or lines of cells.

Note: Datalink does not qualify as (and is not intended to replace) an FAA approved weather briefing. Do not rely upon Datalink to replace pre-flight or in-flight briefings and other sources.

RETRACTABLE LANDING GEAR OPERATIONS

FAA-H-8083-3A, page 11-12

When conducting operations in an airplane equipped with retractable landing gear, a minimum of three “gear down” checks and callouts are required:

- Abeam the touchdown point or when beginning initial descent for landing.
- Base.
- Final.
- Short final. (Optional)

The pilot flying the airplane will place the gear selector down and callout, “Gear down, three green, no red, one in the mirror, and confirm gear down.” The pilot not flying will verify the gear is down and locked and callout, “Gear down confirmed.”

EMERGENCY LANDING GEAR EXTENSION (SIMULATED)

When performing the manual gear extension procedure during training (**Dual flights only**), the instructor must first de-activate the gear pump by pulling the circuit breaker. The student will perform the procedure by use of the Abnormal Procedures Checklist, Tab 2, Page A-4. At the completion of the procedure, the instructor will be responsible for returning all systems to normal operation.

USE OF COWL FLAPS

The cowl flap control levers located below the control quadrant are used to regulate cooling air for the engines. The cowl flaps are normally left open during ground operations and closed after reaching cruising altitude. However, the pilot should periodically monitor engine temperatures during flight and open or close the cowl flaps, as required, to maintain engine temperatures within the proper limits. Particular attention should be paid to engine temperatures while performing maneuvers and during traffic pattern operations.

FLIGHT AT TRAINING CRUISE

Training Cruise has been established for use prior to any maneuvering flight. Its purpose is to keep the airplane at an appropriate airspeed prior to the commencement of a maneuver and to ensure that during maneuvering the airplane remains within a limited geographic area.

1. From a climb, smoothly level off at the desired altitude by slowly lowering the nose to a level pitch attitude.
2. Allow the airplane to accelerate to 120 KIAS.
3. Adjust MP and RPM to maintain 120 KIAS depending on the existing conditions. This power setting should be approximately 21-22” MP and 2300 RPM with the cowl flaps open and 19-20” MP/2300 RPM with the cowl flaps closed. Set trim. Either configuration may vary depending upon altitude, temperature, and aircraft weight.
4. Complete the Cruise Checklist.

Operations at 120 KIAS allow for a safe margin below V_A , even at lighter operating weights. Maneuvers performed at a constant speed (constant altitude turns, ground reference maneuvers, etc.) should be done at 120 KIAS. Decelerating maneuvers (stalls, maneuvering at slow flight, etc.) should be started at 120 KIAS.

ENROUTE CRUISE

Enroute Cruise is to be used when relatively long periods of straight and level flight are required (cross country navigation or flying between airports in the local area). Before starting any maneuvering, slow to Training Cruise.

1. Level off smoothly at the desired altitude by slowly lowering the nose to a level pitch attitude.
2. Allow the airplane to accelerate to the appropriate airspeed.
3. Set the power according to the performance chart being used and trim for level flight.
4. Complete the Cruise Checklist.

The airspeed for en route cruise will be determined by using either the Best Economy Cruise or the Best Power Cruise performance chart, as required.

SEMINOLE V-SPEEDS IN KIAS

Symbol	Speed	KIAS	Symbol	Speed	KIAS
V _{NE}	Never Exceed	202	V _{SO}	Stall Speed Flaps 40°	55
V _{NO}	Max. Structural Cruise	169	V _{MC}	Minimum Controllable Speed	56
V _A	Design Maneuvering Speed: 3800 lbs. 2700 lbs.	135 112	V _{S1}	Stall Speed Flaps Up	57
			V _X	Best Angle of Climb	82
			V _{XSE}	Best Angle of Climb Single Engine	82
			V _Y	Best Rate of Climb	88
V _{FE}	Max. Flap Extended Speed	111	V _{YSE}	Best Rate of Climb Single Engine	88
V _{LO} Retract	Max. Gear Retraction Speed	109		Enroute Cruise Climb	105
V _{LO} Extend	Max. Gear Extension Speed	140	—	Normal Approach Flaps 40°	80
V _{LE}	Max. Gear Extended Speed	140	—	Short Field Approach Flaps 40°	70-75
V _{SSE}	Intentional One Engine Inoperative Speed	82	—	Instrument Approach Flaps 10°	100

TAXI OPERATIONS

FAA-H-8083-3A, page 12-12

Maneuver: Taxiing is the controlled movement of the airplane under its own power while on the ground. Since an airplane is moved under its own power between the parking area and the runway, the pilot must thoroughly understand and be proficient in taxi procedures.

Objective: To develop the student's ability to safely operate the airplane during ground and taxi operations.

Procedure:

1. A taxi clearance must be obtained from ground control prior to moving an aircraft onto the airport movement area when an air traffic control tower is in operation.
2. At an airport without a control tower or when the tower is closed, the pilot should announce his intentions to taxi on the appropriate frequency.
3. When first beginning to taxi, the brakes should be tested for operation as soon as the airplane is put in motion. If braking action is unsatisfactory, the engine should be shut down immediately.
4. Steering the airplane is accomplished with rudder pedals, differential power control, and minimal usage of brakes. Turns should be made at a slow, safe speed.
5. The taxi speed should be slow enough so that when the throttles are at idle the airplane can be stopped immediately.
6. When yellow taxiway centerline stripes are provided, the airplane's nosewheel should remain on the line unless necessary to clear other airplanes, vehicles, or obstructions. If in doubt, stop the aircraft immediately and seek assistance from ground personnel.
7. In no-wind conditions, the ailerons and stabilator controls should be held in a neutral condition.
8. In windy conditions;
9. Headwind: Deflect ailerons into the wind, neutral stabilator.
10. Tailwind: Deflect ailerons away from the wind, stabilator full forward.
11. While taxiing, clear all taxiway and runway intersections visually and verbally i.e. "Clear left, clear center, clear right." Also, when taxiing onto an active runway clear the final approach paths in both directions.
12. Although ATC issues a taxi clearance, it is the pilot's responsibility to avoid collision with other aircraft, vehicles, and objects on the ground.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 2, Task D
Flight Instructor Multi-Engine PTS, Area of Operation 5, Task D

TRAFFIC PATTERN OPERATIONS

FAA-H-8083-3A, page 7-1
AIM 4-

Maneuver: To assure that air traffic flows into and out of an airport in an orderly manner, an airport traffic pattern is established appropriate to the local conditions, including the direction and placement of the pattern, the altitude to be flown, and the procedures for entering and leaving the pattern.

Objective: To develop the student's ability to conduct safe and efficient traffic pattern operations when approaching to land at an airport with an operating control tower.

Procedure:

1. Determine the active runway and complete the before landing checklist.
2. Establish pattern altitude, report your position to the tower, and slow to 100 KIAS.
3. Establish a 45 degree entry at the midpoint of the landing runway or as directed by the tower controller.*
4. Turn onto the downwind leg and maintain ½ to 1 mile from the active runway. Set flaps to 10 degrees.
5. Abeam the point of intended landing, extend the landing gear and callout when you have "three green, no red, one in the mirror and verify gear down."
6. Reduce power to approximately 15" MP/2400 RPM, and begin a gradual descent at 100 KIAS.
7. At a point approximately 45 degrees from the approach end of the runway, or abeam preceding traffic, begin a medium bank turn onto the base leg. Set flaps to 25 degrees and slow to 90 KIAS.
8. While on the base leg, verify the before landing checklist is complete and visually and verbally clear the final approach area.
9. Refer to the appropriate landing procedure.

*Note: The tower controller may instruct pilots to enter the traffic pattern at any point or to make a straight-in approach without flying the usual rectangular pattern. Therefore, the descent to landing should be adjusted depending on entry.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 3, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 6, Task B

TRAFFIC PATTERN OPERATIONS AT NON-TOWERED AIRPORTS

FAA-H-8083-3A, page 7-3, AIM 4-1-9 and 4-3-3

Maneuver: When entering the traffic pattern at a non-towered airport, pilots inbound for landing are expected to observe other traffic in the pattern and to conform to the traffic pattern in use.

Objective: To develop the student's ability to conduct safe and efficient traffic pattern operations at an airport without an operating control tower.

Procedure:

ARRIVAL

1. When approaching to land at a non-towered airport, monitor the appropriate radio frequencies no later than 10 NM from the airport, to determine the active runway, airport conditions, and other traffic in the pattern.
2. Complete the descent checklist.
3. Reports should be made when approaching the airport, entering the downwind leg, base leg, final, and when departing the pattern.
4. If the runway in use is known, maneuvering clear of other traffic and directly to the 45° entry point is permitted.
5. If unable to determine the active runway or if landing at an unfamiliar airport, plan to fly overhead the airport at 500 feet above the published traffic pattern altitude and circle to the left.
6. Determine the most suitable runway by the use of visual wind indicators.
7. Maneuver overhead and fly away from the airport on a heading perpendicular to the landing runway.
8. When clear of the downwind leg, descend to pattern altitude, set flaps to 10 degrees and slow to 100 KIAS.
9. Plan to enter the traffic pattern on a 45° angle at the midpoint of the landing runway.
10. Turn onto the downwind leg and maintain ½ to 1 mile from the active runway. Under normal conditions, the airplane should be flown within power-off gliding distance from the runway.
11. Abeam the point of intended landing, extend the landing gear and reduce power to approximately 12-15" MP/2400 RPM. Then begin a gradual descent at 100 KIAS.
12. At a point approximately 45 degrees from the approach end of the runway, or abeam preceding traffic, begin a medium bank turn onto the base leg. Set flaps to 25 degrees and slow to 90 KIAS.
13. While on the base leg, visually and verbally clear the final approach area.
14. Refer to the appropriate landing procedure.

CLOSED TRAFFIC

15. If remaining in the traffic pattern for touch-and-go landings, climb to within 300 feet of the traffic pattern altitude and beyond the departure end of the runway before beginning the crosswind turn. Go to step #7.

DEPARTURE

16. If departing the traffic pattern, continue straight out, or exit with a 45° turn in the direction of the traffic pattern beyond the departure end of the runway. Departures must climb to the traffic pattern altitude before turning.

STANDARDS: Same as those for Towered Airports.

NORMAL TAKEOFF AND CLIMB

FAA-H-8083-3A, page 12-12

Maneuver: There is virtually little difference between a takeoff in a multiengine airplane and one in a single engine airplane. The multiple throttles of the multiengine airplane normally are treated as one power control and can be operated simultaneously with one hand.

Objective: To develop the student's ability to safely takeoff and depart the takeoff area under normal conditions.

Procedure:

1. Taxi into takeoff position when cleared for takeoff by ATC and verify magnetic heading matches assigned takeoff runway heading.
2. Hold the brakes and smoothly set power to 2000 RPM. Confirm engine indications "In the Green".
3. Set full takeoff power and confirm 2700 RPM. Then release the brakes and verify airspeed rising.
4. Use rudder as necessary to maintain directional control.
5. When the flight controls become effective, gradually apply back-stabilator pressure to attain a lift-off pitch attitude.
6. Note the position of the airplane's nose in relation to the horizon and adjust as necessary to attain a V_Y climb pitch attitude.
7. After a positive rate of climb is established and with no available runway remaining, retract the landing gear.
8. At 1,000ft AGL, slightly lower the nose to attain a cruise climb pitch attitude, set climb power 25"/2500RPM, and complete the climb check.*

*Note: As you climb in a non turbocharged airplane, continually monitor manifold pressure in order to maintain climb power.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task A
Flight Instructor Multi-Engine PTS, Area of Operation 7, Task A

NORMAL APPROACH AND LANDING

FAA-H-8083-3A, page 12-14

Maneuver: Multiengine airplanes characteristically have steeper gliding angles because of their relatively high wing loading, and greater drag of wing flaps and landing gear when extended. For this reason, power is normally used throughout the approach to shallow the approach angle and prevent a high rate of sink.

Objective: To develop the student's ability to safely and accurately land the airplane.

Procedure:

1. Final approach:
 - Select an aiming point in order to land within the first 1/3 of the runway.
 - Set flaps to 40 degrees.
 - Verify the landing gear is extended and set the propeller controls full forward.
 - Normal approach speed 80 KIAS.
 - On short final gradually slow to 75 KIAS.
2. Maintain aiming point with pitch and power corrections until approaching round out.
3. At the round out, smoothly reduce power to idle and continue the flare to touchdown on the main wheels first at approximately stalling speed.
4. Upon touchdown, hold the nose wheel off the runway as long as the stabilator remains effective to provide aerodynamic braking, as appropriate.
5. Maintain directional control using rudder.
6. Do not initiate the after-landing checklist until clear of the runway.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 7, Task E

CROSSWIND TAKEOFF AND CLIMB

FAA-H-8083-3A, page 12-12

Maneuver: A crosswind will affect the airplane during takeoff much as it does during taxiing. Therefore, the pilot must be familiar with the procedures and techniques involved with crosswind takeoffs.

Objective: To develop the student's ability to safely takeoff and depart the takeoff area during crosswind conditions.

Procedure:

1. Taxi into takeoff position when cleared for takeoff by ATC and verify magnetic heading matches assigned takeoff runway heading.
2. Note wind direction and deflect full ailerons into the wind.
3. Hold the brakes and smoothly set power to 2000 RPM. Confirm engine indications "In the Green".
4. Set full takeoff power and confirm 2700 RPM. Then release the brakes and verify airspeed rising.
5. Use rudder as necessary to maintain directional control.
6. As airspeed builds, gradually reduce aileron input to maintain a wings level attitude.
7. When the flight controls become effective, gradually apply back-stabilator pressure to attain a lift-off pitch attitude.
8. Note the position of the airplane's nose in relation to the horizon and adjust as necessary to attain a V_Y climb pitch attitude.
9. After a positive rate of climb is established and with no available runway remaining, retract the landing gear.
10. At 1,000ft AGL, slightly lower the nose to attain a cruise climb pitch attitude, set climb power 25"/2500RPM, and complete the climb check.*

*Note: As you climb in a non-turbocharged airplane, continually monitor manifold pressure in order to maintain climb power.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task A
Flight Instructor Multi-Engine PTS, Area of Operation 7, Task A

CROSSWIND APPROACH AND LANDING

FAA-H-8083-3A, page 12-16

Maneuver: Crosswind landing procedures in multiengine airplanes are similar to those in single engine airplanes. The only significant difference lies in the fact that because of the greater weight, more positive drift correction must be maintained before the touchdown. The same factors involved in a normal approach and landing apply to a crosswind approach and landing; therefore, only the additional procedures required for correcting wind drift are presented here.

Objective: To develop the student's ability to safely and accurately land the airplane while correcting for a crosswind during the landing approach, touchdown, and roll out.

Procedure:

1. Establish approach configuration (normal, short-field), verify the landing gear is extended, and set the propeller controls full forward.
2. Maintain alignment with centerline using crab into the wind.
3. Transition to the wing-low method on short final.
4. At the round out, smoothly reduce power to idle and continue the flare to touchdown on the upwind main wheel first.
5. As the airplane slows, increase aileron deflection into the wind, slowly increase back-stabilator pressure, and gently apply brakes.
6. Do not initiate the after-landing checklist until clear of the runway.

*Note: It's preferable to maintain the wing low method; however, the crab method can be used to correct for a crosswind on final. In some airplanes, there may not be sufficient rudder travel to compensate for the crosswind, in this case the airplanes crosswind capacity has been exceeded and a go-around must be initiated

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 7, Task E

TURBULENT AIR APPROACH AND LANDING

FAA-H-8083-3A, page 8-17

Maneuver: Power-on approaches at airspeeds slightly above the normal approach speed should be used for landing in turbulent air. This provides for more positive control of the airplane when strong horizontal or vertical wind gusts are experienced.

Objective: To develop the student's ability to land the airplane when turbulent and gusty wind conditions are encountered.

Procedure:

1. Final approach:
 - Select an aiming point in order to land within the first 1/3 of the runway.
 - Set flaps to no greater than 25 degrees.
 - Verify the landing gear is extended and set the propeller controls full forward.
 - Final approach speed 80 KIAS + ½ gust.*
2. Maintain aiming point with pitch adjustments and power for airspeed until approaching roundout.
3. At the roundout, and just as the main wheels contact the landing surface in approximately a level pitch attitude, smoothly reduce the power to idle.*
4. Maintain directional control with rudder and apply brakes gently.
5. Do not initiate the after-landing checklist until clear of the runway.

*Gust factor: Take half the difference between the maximum sustained surface winds and the reported gusts, and add this number to the final approach speed.

Example: 360/10G20. Maximum wind = 10 knots
Maximum gust = 20 knots
Difference = 10 knots/2 = 5 knot gust factor.

*Note: The pitch attitude at touchdown should be only high enough to prevent the nosewheel from contacting the surface before the main wheels. Refer to the no-flap landing procedures for turbulent air approaches and landings without flaps.

STANDARDS: There are no specific standards for this maneuver.

SHORT-FIELD TAKEOFF AND CLIMB

FAA-H-8083-3A, page 12-16

Maneuver: Takeoffs and climbs from fields where the takeoff area is short or the available takeoff area is restricted by obstructions require that the pilot operate the airplane at the limit of its performance capabilities. To depart from such an area safely, the pilot must exercise positive and precise control of airplane attitude and airspeed so that takeoff and climb performance results in the shortest ground roll and the steepest angle of climb.

Objective: To develop the student's ability to obtain maximum airplane performance during the takeoff and climb-out phases.

Procedure:

1. Set flaps according to manufacturers recommend takeoff setting, either 0 or 25 degrees.
2. Taxi into takeoff position and hold the brakes when cleared for takeoff by ATC.*
3. Verify magnetic heading matches assigned takeoff runway heading.
4. Smoothly set power to 2000 RPM and confirm engine indications "In the Green".
5. Set full takeoff power and confirm 2700 RPM. Then release the brakes and verify airspeed rising.
6. Use rudder as necessary to maintain directional control.
7. Smoothly and firmly apply back-stabilator pressure as the calculated lift-off speed approaches.
8. Maintain a V_X climb pitch attitude until the obstacles have been cleared or 50 feet, if there are no obstacles.
9. After a positive rate of climb is established and with no available runway remaining, retract the landing gear and set flaps to 10 degrees.
10. Slightly lower the nose to attain a V_Y pitch attitude and set flaps to 0 degrees.
11. At 1,000ft AGL, slightly lower the nose to attain a cruise climb pitch attitude, set climb power 25"/2500RPM, and complete the climb check.

*Note #1: An alternate method to perform the short-field takeoff is to start at the beginning of the takeoff area and as the airplane is aligned with the intended takeoff path power is applied without braking.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task D
Flight Instructor Multi-Engine PTS, Area of Operation 7, Task G

SHORT-FIELD APPROACH AND LANDING

FAA-H-8083-3A, page 12-17

Maneuver: Short-field approaches and landings require the use of procedures and techniques for landing at fields with a relatively short landing area or where an approach is made over obstacles that limit the available landing area.

Objective: To develop the student's ability to obtain maximum aircraft performance in order to land safely within confined landing areas.

Procedure:

1. Final approach:
 - Select an aiming point to clear obstacles.
 - Set flaps to 40 degrees.
 - Verify the landing gear is extended and set the propeller controls full forward.
 - Short-field approach speed 75 KIAS.
 - On short final gradually slow to 70 KIAS.
2. Adjust pitch to maintain a steeper than normal angle of descent and power to maintain airspeed.
3. At the round out, continue the flare to touchdown on the main wheels first in approximately the pitch attitude that will result in a power-off stall just as the power is reduced to idle.
4. Upon touchdown, hold this pitch attitude as long as the stabilator remains effective to provide aerodynamic braking, as appropriate.
5. Brakes should be applied evenly and firmly to minimize the after-landing roll without skidding.
6. Do not initiate the after-landing checklist until clear of the runway.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task D
Flight Instructor Multi-Engine PTS, Area of Operation 7, Task G

GO-AROUNDS (BALKED LANDINGS)

FAA-H-8083-3A, page 12-17

Maneuver: Occasionally, it may be advisable to discontinue the landing approach and make another approach under more favorable conditions. Air traffic control requirements, low base to final turns, wake turbulence, or unexpected hazards on the runway are some examples of hazardous situations that would demand initiating a go-around.

Objective: To develop the student's ability to safely initiate a go-around during a balked landing.

Procedure:

1. Smoothly apply full power, level the wings, and transition to a V_x climb pitch attitude to slow or stop the descent.*
2. After the descent has stopped, set flaps to 25 degrees.
3. After a positive rate of climb is established and with no available runway remaining, retract the landing gear.
4. As the airplane accelerates to V_x , retract the remaining flaps in increments.
5. Pitch for a V_y climb attitude and continue the climb to traffic pattern altitude at V_y .

Note: Unless absolutely necessary, the decision to go-around should not be delayed to the point where the airplane is ready to touch down.

*Note: Since the airplane has been trimmed for the approach (a low power and low airspeed condition), application of full power will require considerable forward control pressure to keep the airplane's nose from rising suddenly. Trim should be used to relieve adverse control pressures and assist the pilot in maintaining a proper climb pitch attitude.

Note: When initiating a go-around at a towered airport, follow ATC directions as to which side of the runway to maneuver towards. At a non-towered airport, the pilot should maneuver to a position that allows them to see the runway in order to avoid conflicting traffic.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 4, Task I
Flight Instructor PTS, Area of Operation 7, Task F

STEEP TURNS

FAA-H-8083-3A, page 9-1

Maneuver: This maneuver consists of a turn in either direction using a bank angle steep enough to cause an over banking tendency during which maximum turning performance is attained and relatively high load factors are imposed.

Objective: To develop smoothness, coordination, orientation, division of attention, and control techniques while executing high performance turns.

Procedure:

1. Begin maneuver at 120 KIAS.
2. Smoothly roll into a bank angle of 45 or 50 degrees, as appropriate.
3. Maintain altitude and airspeed by adjusting the pitch, bank, and power as necessary.
4. After completing a 360 degree turn, roll wings level and immediately begin a steep turn in the opposite direction.*
5. The rollout from the turns should be timed so that the wings reach level exactly on the entry heading.

* Note: Step 4 can be omitted for a Private Pilot applicant.

STANDARDS: Private Pilot PTS, Area of Operation 5
Commercial Pilot Multi-Engine PTS, Area of Operation 5, Task A
Flight Instructor Multi-Engine PTS, Area of Operation 9, Task A

RECTANGULAR COURSE

FAA-H-8083-3A, page 6-4

Maneuver: This is a training maneuver in which the ground track of the airplane is equidistant from all sides of a rectangular area on the ground. While performing the maneuver, altitude and airspeed should be held constant. Practice of this maneuver will be helpful in recognizing the effects of wind drift toward or away from an airport runway during the various legs of the airport traffic pattern.

Objective: To develop division of attention between the flight path and ground references, while controlling the airplane and watching for other air traffic.

Procedure:

1. Select a suitable rectangular reference area well away from other air traffic and near where an emergency landing can be made.
2. Plan the maneuver so as to enter a left or right pattern at 45 degrees to the downwind leg, at 1,000 feet AGL,* at 120 KIAS.
3. Maintain a uniform distance from the field boundary of ¼ to ½ mile away from the field boundaries, not directly above the field boundaries.
4. All turns should be started when the airplane is abeam the corner of the field boundaries, and the bank should normally not exceed 45 degrees.
5. Vary the bank angle used during the turns as necessary to maintain a constant radius from the field.
6. Apply adequate wind-drift correction during the straight and level legs to maintain a constant ground track around the rectangular reference area.
7. Maintain entry altitude and airspeed during the maneuver.
8. Exit the maneuver at the end of the downwind leg 45 degrees away from the field.

STANDARDS: Private Pilot PTS, Area of Operation 6, Task A
Flight Instructor PTS, Area of Operation 10, Task A

S-TURNS ACROSS A ROAD

FAA-H-8083-3A, page 6-6

Maneuver: This is a training maneuver in which the airplane's ground track describes semicircles of equal radii on each side of a selected straight line on the ground. The maneuver consists of crossing a line at a 90 degree angle and immediately beginning a series of 180 degree turns of equal radius in opposite directions, intersecting the line at a 90 degree angle just as each 180 degree turn is completed.

Objective: To develop the ability to compensate for wind drift during turns, orient the flight path with ground references, and divide the pilot's attention between inside and outside the aircraft.

Procedure:

1. Select a suitable ground reference line, perpendicular to the wind and well away from other air traffic and near where an emergency landing can be made.
2. Plan to enter the maneuver downwind at 1,000 feet AGL,* at 120 KIAS.
3. Apply adequate wind-drift correction and bank angle to track a constant radius 180 degree turn back towards the reference line using up to a maximum bank angle of 45 degrees.
4. After 180 degrees of turn, and over the reference line with wings level, continue the maneuver in the opposite direction.
5. Depart the maneuver on the entry heading.

STANDARDS: Private Pilot PTS, Area of Operation 6, Task B
Flight Instructor PTS, Area of Operation 10, Task B

TURNS AROUND A POINT

FAA-H-8083-3A, page 6-7

Maneuver: This is a training maneuver in which the airplane is flown in two or more complete circles of uniform radius from a prominent ground reference point. Wind drift control, altitude, and airspeed must be maintained throughout the entire maneuver.

Objective: To help the pilot develop the ability to control the airplane while dividing attention between the flightpath and ground references, while watching for other air traffic, obstacles, and birds.

Procedure:

1. Select a suitable ground reference point well away from other air traffic and near where an emergency landing can be made.
2. If desired, select four equidistant points around the ground reference point to aid in making a symmetrical circle.
3. Plan the maneuver so as to enter a left or right pattern downwind at 1,000 feet AGL,* and at a distance equal to the desired radius of turn at 120 KIAS.
4. Maintain constant airspeed, altitude, and radius around the point while adjusting bank and drift correction using up to but not exceeding 45 degrees of bank angle.
5. Depart the maneuver after a minimum of two circles on the entry heading.

STANDARDS: Private Pilot PTS, Area of Operation 6, Task C
Flight Instructor PTS, Area of Operation 10, Task C

DIVERSION

FAA-H-8083-25A, page 15-34

Maneuver: Cross Country diversion

Objective: To develop the pilot's ability to safely and efficiently divert to an alternate airport.

Procedure:

1. Once the decision to divert to an alternate airport is made, consideration should be given to returning to your last checkpoint or a prominent landmark and circling until your navigation planning is complete.
2. Estimate an approximate heading, distance, and time enroute (ETE) to the alternate airport and note the time that the diversion began.*
3. Turn to the estimated magnetic heading, attempt to identify any prominent landmarks nearby, maintain appropriate VFR cruising altitude, reset the heading indicator to the magnetic compass..
4. If time permits, and once established on course towards the alternate airport, an accurate course, groundspeed, ETE, and fuel consumption can be determined using the E6B Flight Computer.
5. Complete the diversion log.
6. Call the appropriate Flight Service Station (FSS) and approach control if applicable, to amend your flight plan and provide a pilot report (UA/UUA).
7. Use the Airport Facilities Directory (AF/D) to determine any airport restrictions at the alternate airport.
8. Identify airspace along the diversion route.

*Note: Because of limited cockpit space, and because attention must be divided between flying the airplane, making calculations, and scanning for other air traffic, take advantage of all possible shortcuts and rule of thumb calculations. For example: Use a straight edge and a VOR compass rose for magnetic heading. For groundspeed, 100 knots equals 1.7 nautical miles per minute. Thus, it would take approximately 6 minutes to travel 10 nautical miles, plus or minus winds aloft. For fuel consumption, the Arrow would use approximately .2 gallons/min. at 75% power. During a diversion, priority must be given to flying the airplane while dividing attention between navigation and planning.

STANDARDS: Private Pilot PTS, Area of Operation 7, Task C
Commercial Pilot PTS, Area of Operation 7, Task C

LOST PROCEDURES

FAA-H-8083-25A, page 14-27

Maneuver: Lost Procedures

Objective: To identify different methods of determining aircraft location in the event of becoming lost during flight. This can occur during a cross country into unfamiliar terrain, by poor preflight planning, or restricted visibility due to weather.

Procedure:

1. Remain **Calm** at all times.
2. **Climb**, being mindful of traffic and weather conditions, to identify prominent landmarks.
3. Scan the area around the aircraft for prominent landmarks to determine the aircraft's location.
4. **Circle**, so as not to aggravate the situation or wander into restricted or controlled airspace.
5. **Crosscheck** using the aircraft's navigational instruments; plot an azimuth from either two VOR or NDB facilities, to determine approximate location.
6. **Communicate** if still unable to determine location, and request assistance from ATC or FSS.
7. **Comply** with all ATC or FSS instructions.
8. **Conserve** fuel by reducing power to 55% and lean the mixture for best economy.
9. If position is determined, reestablish cruise power and continue to destination airport.
10. If the situation becomes an emergency, squawk "7700" on the transponder and seek assistance on 121.50.

STANDARDS: Private Pilot PTS, Area of Operation 7, Task D
Commercial Pilot PTS, Area of Operation 7, Task D

MANEUVERING DURING SLOW FLIGHT AT MINIMUM CONTROLLABLE AIRSPEED (MCAS)

FAA-H-8083-3A, page 12-25

Maneuver: As with single engine airplanes, the pilot should be familiar with the minimum controllability characteristics of the multiengine airplane being flown. The pilot's ability to estimate the margin of safety above the stalling speed by the diminishing control effectiveness is of great importance.

Objective: To develop the student's ability to recognize changes in airplane flight characteristics and control effectiveness at critically slow airspeeds.

Procedure:

1. Perform the maneuver above 3,000 feet AGL.
2. Select prominent outside visual reference points to aid in accurate heading and attitude control.
3. Reduce power to 15" MP.
4. Extend the landing gear below V_{LE} .
5. Set flaps to 40 degrees when in the white arc and set the propeller controls full forward.
6. Set required power to maintain altitude while using pitch attitude to control airspeed at MCAS.*
7. Turns, climbs, and descents should be practiced in this configuration.
8. Recover to normal cruise using takeoff power while maintaining altitude.
9. Retract the landing gear and flaps in increments as the airplane accelerates.

*Note: Minimum controllable airspeed is defined as the airspeed at which any further increase in angle of attack or load factor, or reduction in power will cause an immediate stall. The aural stall warning horn should remain activated throughout the maneuver.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 7, Task A
Flight Instructor Multi-Engine PTS, Area of Operation 11, Task A

POWER-OFF STALL

FAA-H-8083-3A, page 12-26

Maneuver: The practice of power-off stalls is usually performed in a normal approach to landing configuration in order to simulate an accidental stall occurring during landing. The stalls can be performed to either imminent or full stall conditions. Also, they should be practiced in a no-flap configuration, with partial flaps, full flaps, and in turns.

Objective: To familiarize the pilot with conditions that produce stalls, to recognize an approaching stall, and to develop the habit of taking prompt corrective action.

Procedure:

1. Perform the maneuver above 3,000 feet AGL.
2. Select prominent outside visual reference points to aid in accurate heading and attitude control.
3. Reduce power to idle and maintain altitude while slowing to normal approach speed.
4. Extend the landing gear below V_{LE} and set flaps to the desired configuration.
5. Set the propeller controls full forward.
6. Establish and trim for a stabilized glide at normal approach speed.
7. When approach speed and attitude have stabilized, smoothly raise the nose to a landing pitch attitude that will induce a stall.*
8. Announce the onset of the stall as recognized by clues such as full back stabilator, airframe buffeting, high descent rate, or nose down pitching.
9. Immediately recover from the stall by smoothly releasing back-stabilator pressure to decrease the angle of attack and advance both throttles to takeoff power.
10. Set a V_X climb pitch attitude and simultaneously set flaps to 25 degrees to achieve a minimum loss of altitude.
11. With a positive rate of climb retract the landing gear.
12. Accelerate to V_X or V_Y before final flap retraction.
13. Climb at V_Y to the specified heading and altitude.

*Note: Recovery from power-off stalls should also be practiced from shallow banked turns not to exceed 20 degrees, to simulate an inadvertent stall during a base to final turn. The stall normally should be made to occur within a heading change of approximately 90 degrees.

STANDARDS: Commercial Pilot Multi- Engine PTS, Area of Operation 7, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 11, Task C

POWER-ON STALL

FAA-H-8083-3A, page 12-26

Maneuver: Power-on stall recoveries are practiced from straight climbs and climbing turns with 15 to 20 degrees of bank to simulate an accidental stall during takeoffs and climbs. Flaps should be set to the short-field takeoff or climb configuration.

Objective: To teach the student to recognize the indications of an approaching or full stall during power on situations and to take prompt corrective action to prevent a prolonged stalled condition.

Procedure:

1. Perform the maneuver above 3,000 feet AGL.
2. Select prominent outside visual reference points to aid in accurate heading and attitude control.
3. Reduce power to idle and establish the short-field takeoff or climb configuration while maintaining altitude.
 - Short-field takeoff – Gear down and set flaps 0° (Flaps 25° — N880FT).
 - Climb – Verify gear up and flaps 0°.
4. Set the propeller controls full forward while slowing to normal lift off speed, approximately 65-75 KIAS.
5. Apply 65 percent of available power while simultaneously establishing a climb attitude.
6. Smoothly and continuously apply back-stabilator pressure while climbing straight ahead or banking 15 to 20 degrees until the full stall occurs.
7. Maintain coordinated flight with rudder.
8. Announce the onset of the stall as recognized by clues such as full-back stabilator, airframe buffeting, high descent rate, or nose down pitching.
9. Immediately recover from the stall by smoothly releasing back-stabilator pressure to decrease the angle of attack and advance both throttles to takeoff power.
10. Set a V_x climb pitch attitude to achieve a minimum loss of altitude.
11. Retract the landing gear and flaps in increments, if applicable, after a positive rate of climb is established and accelerate to V_x or V_Y before final flap retraction.
12. Return to the specified heading and altitude.

*Note: Use the POH/AFM in order to determine 65% of available power prior to the proposed flight.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 7, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 11, Task B

ACCELERATED STALL (DEMONSTRATION)

FAA-H-8083-3A, page 4-9

Maneuver: This stall demonstrates a stall at higher indicated airspeeds when excessive maneuvering loads are imposed by steep turns, pull-ups, or other abrupt changes in the airplane's flight path are made. It further demonstrates that a stall is a function of angle of attack rather than airspeed.

Objective: To learn how an accelerated stall may occur, to develop the ability to recognize such stalls immediately, and to take prompt, corrective action.

Procedure:

1. Enter the maneuver in straight-and-level flight at an airspeed below design maneuvering speed (120 KIAS for training purposes), and verify flaps retracted.
2. Reduce power to idle and move the propeller control full forward.
3. Simultaneously roll into a 45 degree bank.
4. Smoothly and firmly increase back-stabilator pressure until the stall occurs.
5. Recover promptly by releasing back-stabilator pressure and increasing power while using coordinated control pressures to return to straight-and-level flight.

Note: This maneuver is for dual only demonstration purposes.

STANDARDS: There are no specific standards for this maneuver.

EMERGENCY DESCENT

FAA-8083-3A, page 16-6

Maneuver: This is a maneuver for descending as rapidly as possible to a lower altitude or to the ground for an emergency landing. The need for an emergency descent may result from an in flight fire, a sudden loss of cabin pressure, or any situation requiring an immediate and rapid descent.

Objective: To descend as soon and as rapidly as possible, within the structural limitations of the airplane.

Procedure:

1. Reduce power to idle and move the propeller controls full forward.
2. Extend the landing gear below V_{LE} , verify cowl flaps closed and wing flaps retracted.
3. Simultaneously pitch down and bank 30 to 45 degrees in the descent to clear the area and maintain a positive load factor.
4. Stabilize the descent at V_{LE} .*
5. During the recovery, slow below V_{LO} before retracting the landing gear.

*Note: For training purposes, as soon as the descent is established and stabilized, terminate the maneuver to prevent shock cooling the engine.

Note: Do not exceed V_A except when operating in smooth air.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 8, Task A
Flight Instructor Multi-Engine PTS, Area of Operation 13, Task E

ENGINE FAILURE BEFORE LIFT-OFF

FAA-8083-3A, page 12-18

Maneuver: When an engine fails during the takeoff roll before becoming airborne, it is advisable to close both throttles and employ maximum braking, while maintaining directional control. In training, the simulated engine failure will occur before the airplane accelerates past 50 percent of V_{MC} .

Objective: To develop the student's ability to recognize an engine failure during the takeoff roll and take prompt corrective action.

Procedure:

1. Upon recognition of an engine failure immediately bring both throttles to idle.
2. Maintain directional control with rudder and apply maximum braking.
3. Bring the airplane safely to a full stop.
4. Before executing a takeoff, ensure that the airplane is ready to resume normal operations and sufficient runway remains to accomplish a takeoff.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 8, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 13, Task B

ENGINE FAILURE AFTER LIFT-OFF

FAA-8083-3A, page 12-18

Maneuver: A takeoff or go-around is the most critical time to suffer an engine failure. The airplane will be close to the ground, and may even have flaps and landing gear extended. Airplane climb performance will be minimal or even non-existent, and obstructions may lie ahead. Complete failure of one engine shortly after takeoff can be broadly categorized into one of three scenarios. The procedures for each are briefly presented here.

Objective: To develop the student's ability to recognize an engine failure after lift-off and maneuver the airplane for landing or while climbing on one engine.

Procedure:

LANDING GEAR DOWN

1. Upon recognition of the engine failure, pitch for level attitude / V_{YSE} , maintain directional control with rudder and initially bank 5 to 8 degrees into the good engine.
2. If the engine failure occurs prior to selecting the landing gear to the UP position, use power as necessary and land straight ahead on the remaining runway or overrun. Exit to a taxiway if practical.

GEAR UP-CLIMB PERFORMANCE INADEQUATE

1. Upon recognition of the engine failure, pitch for level attitude / V_{YSE} , maintain directional control with rudder and initially bank 5 to 8 degrees towards the good engine / opposite the yaw.
2. When operating near or above the single-engine service ceiling, a landing must be accomplished on whatever essentially lies straight ahead. The landing gear should be extended at the pilot's discretion.

GEAR UP-CLIMB PERFORMANCE ADEQUATE

1. Upon recognition of the engine failure, maintain directional control with rudder and initially bank 5 degrees into the good engine.
2. Simultaneously move the mixture, propeller, and throttle controls full forward. Retract the landing gear and flaps.
3. Stabilize the airspeed at V_{YSE} while identifying, verifying, and feathering/decide to restart the inoperative engine, as appropriate.
4. With the airplane under control at V_{YSE} , establish zero sideslip for best climb performance.*
5. Remain in the traffic pattern for landing and complete the one engine inoperative landing checklist.
6. If altitude permits and positive climb performance is attained, attempt to restart the inoperative engine using the restart checklist.

*Note: Without a yaw indicator, 2 to 3 degrees of bank and one-half ball deflection is recommended for maximum performance.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 8, Task C
Flight Instructor Multi-Engine PTS, Area of Operation 13, Task C

APPROACH AND LANDING WITH AN INOPERATIVE ENGINE (SIMULATED)

FAA-H-8083-3A, page 12-22

Maneuver: Essentially, a single engine approach and landing is the same as a normal approach and landing. Long, flat approaches with high-power output on the operative engine and/or excessive approach speeds should be avoided.

Objective: To develop the student's ability to safely land a multiengine airplane with one engine inoperative.

Procedure:

1. Execute the normal traffic pattern procedure.
2. Maintain airspeed of 90 KIAS, until the landing is assured.
3. When initiating the descent from traffic pattern altitude, extend the landing gear.
4. Final approach:
 - Select an aiming point in order to land within the first 1/3 of the runway.
 - Set flaps to 25 degrees max. after landing is assured.*
 - Verify the landing gear is extended and propeller controls full forward.
 - On short final gradually slow to 70 KIAS, approximately 1.3 V_{so}
5. Maintain aiming point with pitch and power corrections until approaching round out.
6. At the round out, smoothly reduce power to idle and continue the flare to touchdown on the main wheels first at approximately stalling speed.
7. Upon touchdown, hold the nose wheel off the runway as long as the stabilator remains effective to provide aerodynamic braking, as appropriate.
8. Maintain directional control using rudder.
9. Do not initiate the after-landing checklist until clear of the runway.

*Note: The pilot should be particularly judicious in the lowering the flaps. Once they have been extended, it may not be possible to retract them in time to initiate a go-around.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 8, Task D
Flight Instructor Multi-Engine PTS, Area of Operation 13, Task D

NO-FLAP LANDING

FAA-8083-3A, page 16-8

Maneuver: The no-flap landing demonstrates the airplane's handling and performance characteristics when approaching to land without wing flaps extended.

Objective: To develop the student's ability to safely land in a no-flap configuration.

Procedure:

1. Follow the normal traffic pattern operations procedure for arriving at a tower or non-towered airport.
2. Abeam the point of intended landing, extend the landing gear, reduce power to approximately 15" MP/2400 RPM.
3. Begin a gradual descent at 100 KIAS. Do not extend the flaps during the pattern.
4. At a point approximately 45 degrees from the approach end of the runway, begin a medium bank turn onto the base leg and slow to 95 KIAS.
5. While on the base leg, visually clear the final approach area.
6. Final approach:
 - Set an aiming point in order to land within the first 1/3 of the runway.
 - Flaps should remain retracted.
 - Verify the landing gear is extended and set propeller controls full forward.
 - No-flap approach speed 90 KIAS.
 - On short final, gradually slow to 80 KIAS.
7. Maintain aiming point with pitch and power corrections until approaching round out.
8. At the round out, smoothly reduce power to idle and continue the flare to touchdown on the main wheels first at approximately stalling speed.
9. Upon touchdown, hold the nose wheel off the runway as long as the stabilator remains effective to provide aerodynamic braking, as appropriate.
10. Maintain directional control using rudder.
11. Do not initiate the after-landing checklist until clear of the runway.

Note: The descent angle in a no-flap condition is much shallower than when using flaps. Also, landing distances will be increased due to the higher approach speed used.

STANDARDS: There are no specific standards for this maneuver.

MANEUVERING WITH ONE ENGINE INOPERATIVE

FAA-H-8083-3A, page 12-21

Maneuver: This maneuver is designed to demonstrate how to use the appropriate Abnormal/Emergency Checklist procedures while maintaining positive control of the airplane in flight with one engine inoperative. The feathering of one propeller should be demonstrated in flight.

Objective: To develop the student's ability to feather and un-feather an engine in flight, and maneuver the airplane with one engine inoperative.

Procedure:

1. Perform the maneuver above 3,000 feet AGL.
2. Upon recognition of the engine failure, maintain directional control with rudder and initially bank 3 to 5 degrees into the good engine.
3. Simultaneously move the mixture, propeller, and throttle controls full forward and retract the landing gear and flaps in increments.
4. Stabilize the airspeed at or above V_{YSE} while maintaining altitude or minimum sink as appropriate.
5. With the airplane under control at V_{YSE} , establish zero sideslip for best performance.*
6. Identify, verify, and feather the inoperative engine, as appropriate.
7. Perform turns, climbs, and descents, as directed.
8. Complete the Engine Start in Flight Checklist, or as directed.
9. Set power to 15" MP on the "restarted" engine.

Verify engine temperature is within normal operating temperature ("in the green") before setting power greater than 15" MP.

10. Recover to training cruise.

*Note: Without a yaw indicator, 2 to 3 degrees of bank and one-half ball deflection is recommended for maximum performance.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 10, Task A
Flight Instructor Multi-Engine PTS, Area of Operation 14, Task D

VMC DEMONSTRATION

FAA-H-8083-3A, page 12-27

Maneuver: This maneuver will demonstrate the single-engine minimum control speed and will emphasize the necessity of banking into the good engine.

Objective: To develop the student's ability to recognize and recover from a loss of directional control when operating with one engine inoperative.

Procedure:

1. Perform the maneuver above 4,000 feet AGL.
2. Select a prominent visual reference point consistent with the entry heading.
3. Reduce power to idle and maintain altitude with pitch.
4. While slowing to V_{YSE} :
 - Verify landing gear up, cowl flaps open, and flaps retracted.
 - Move propeller controls full forward.
5. Upon reaching V_{YSE} :
 - Smoothly apply takeoff power on the right engine and establish zero sideslip.*
 - Slowly increase pitch attitude to decrease airspeed at approximately 1 knot per second until directional control can no longer be maintained.
6. Initiate recovery at the first indication of:
 - Stall buffeting.
 - Stall warning horn.
 - Loss of directional control as evidenced by inability to maintain heading.
7. Recovery:
 - Reduce power as necessary on the operative engine.
 - Immediately lower the nose to regain V_{YSE} .
 - Once control is regained, reapply takeoff power on the right engine to minimize altitude loss.
 - Resume flight at V_{YSE} .
8. When V_{YSE} is stabilized, smoothly increase power on the left engine and decrease power on the right engine.
Verify engine temperature is within normal operating temperature ("in the green") before setting power greater than 15" MP.
9. Recover to training cruise.

*Note: The VMC demonstration should also be performed in the sideslip condition.

STANDARDS: Commercial Pilot Multi-Engine PTS, Area of Operation 10, Task B
Flight Instructor Multi-Engine PTS, Area of Operation 14, Task E

DEMONSTRATING THE EFFECTS OF VARIOUS AIRSPEEDS AND CONFIGURATIONS DURING ENGINE INOPERATIVE PERFORMANCE

FAA-H-8083-3A, page 12-27

Maneuver: This demonstration will show how aircraft performance is degraded when V_{YSE} is not maintained during engine-out operations. It will also show the effects of various flap and gear configurations on aircraft performance.

Objective: To further develop the students understanding of one engine performance characteristic.

Procedure:

1. Perform the maneuver above 3,000 feet AGL.
2. Reduce throttles to idle and maintain altitude while slowing to V_{YSE} .
3. Move the propeller controls full forward and verify cowl flaps open.
4. At V_{YSE} :
 - Apply takeoff power on the right engine.
 - Establish zero sideslip.
 - Set left engine to zero thrust. (11.5"MP/2000 RPM)
 - Slow to 78 KIAS and note the VSI reading.
 - Accelerate to 98 KIAS and note the VSI reading.
5. Reestablish flight at V_{YSE} :
 - Extend landing gear and note the VSI reading.
 - Extend full flaps and note the VSI reading.
 - Retract the landing gear and note the VSI reading.
 - Retract the flaps
 - Move the left throttle to idle and the left propeller control full forward
 - Note the VSI reading with the propeller windmilling.

Verify engine temperature is within normal operating temperature ("in the green") before setting power greater than 15" MP.

6. Recover to training cruise.

STANDARDS: Flight Instructor Multi-Engine PTS, Area of Operation 14, Task F

INSTRUMENT APPROACH-ONE ENGINE INOPERATIVE

FAA-H-8083-3A, page 12-22

Maneuver: An instrument approach in a multi-engine airplane with one engine inoperative is similar to an approach with both engines operating. Therefore, only the additional procedures for a one engine approach are presented here.

Objective: To develop the students ability to perform instrument approaches with one engine inoperative.

Procedure:

1. Follow the non-precision or precision approach procedure, as appropriate.
2. Upon recognition of the engine failure:
 - Maintain directional control with rudder and initially bank 3 to 5 degrees into the good engine.
 - Simultaneously move the mixture, propeller, and throttle controls full forward.
 - Retract the landing gear.*
 - Retract the flaps in increments.*
3. Stabilize the airspeed at V_{YSE} while identifying, verifying, and feathering the inoperative engine, as appropriate.
4. With the airplane under control at V_{YSE} , establish zero sideslip for best performance and accelerate to and maintain 100 KIAS.
5. Prior to intercepting the final approach course inbound maintain approach speed, complete the before landing checklist, and set flaps and gear as appropriate for existing conditions.*
6. The instructor will set zero thrust on the inoperative engine to simulate feather.
7. When the landing is assured, follow the approach and landing with one engine inoperative procedures.

***Note #1: ILS Approach/GPS WAAS Approach—Gear down ½ dot prior to glideslope intercept and flaps at the discretion of the PIC.**

All other Non-Precision Approaches—If unable to maintain altitude, gear/flap usage is at the discretion of the PIC. Gear must be extended and verified when commencing descent from MDA.

Note #2: If favorable conditions exist, it is preferable to follow the normal non-precision/precision approach procedures with respect to the use of landing gear and flaps.

STANDARDS: Commercial Pilot PTS, Area of Operation 10, Task D

FLYING A GPS DME ARC APPROACH (AVIDYNE EQUIPPED)

FAA-H-8083-15A, page 7-14

Maneuver: Intercepting and tracking DME Arcs can be used in order to fly the aircraft along a desired course to intercept the final approach course to a precision, a non-precision, or GPS instrument approach.

Objective: To develop the student's ability to track a GPS DME arc at a specified distance to an instrument approach.

Procedure:

1. In the GNS430, select your destination airport via the Direct-To key or as the last destination in your flight plan in GPS1.
2. Press the Procedure (PROC) key and select the appropriate approach as assigned by ATC.
3. From the transitions window, select the appropriate Initial Approach Fix (IAF) and select "Load" or "Activate", if already cleared direct to the IAF for the approach.
4. As you approach the IAF, a waypoint alert message will appear in the lower right corner of the GPS screen directing you to turn to the arc intercept heading within a specified time.
5. Follow altitude directions on the approach plate or as directed by ATC.
6. Follow the arc, keeping the CDI centered. When using the autopilot, the course select on the CDI must be updated with the desired track to ensure proper tracking.
7. As you approach the next / intermediate fix, a waypoint (WP) alert message will appear again in the lower right corner of the GPS screen. Set appropriate course on CDI and initiate a standard rate turn to this heading.
8. If this is not a GPS approach, the pilot must be using the VLOC receiver, tuned and identified to the correct station for navigation.
9. Verify at 2.0 NM from the FAF, GNS430 switches from terminal to approach mode.
10. Approaching the Final Approach Fix (FAF), make any necessary adjustment for final course segment.
11. As you cross the FAF, the destination sequences to the Missed Approach Point (MAP) / runway threshold.
12. Fly toward the MAP, CDI centered, and observe altitudes dictated by the approach plate.
13. Crossing the MAP, "SUSP" appears above the OBS key indicating suspension of automatic WP sequencing
14. If a published missed approach is required, use the OBS key to initiate missed approach sequence.

STANDARDS: Instrument Rating PTS, Area of Operation 5, Task A

NON-PRECISION APPROACH

FAA-H-8083-15A, page 10-13

Maneuver: A non-precision approach provides horizontal guidance to the aircraft in order to land at an airport in instrument meteorological conditions. (IMC)

Objective: The objective of this maneuver is to transition the aircraft from the enroute airspace structure to landing. Non-precision approaches are used to guide the aircraft horizontally through the air and use a series of step down fixes to guide the aircraft vertically to the Minimum Descent Altitude (MDA).

Procedure:

1. Study the selected approach plate and conduct the approach briefing.
2. Tune and identify the appropriate navigational facilities.
3. Check and set the heading indicator against the magnetic compass. (For conventional gauge instrument equipped airplanes only)
4. Complete the "Descent Check" checklist.
5. While being radar vectored or while executing a full approach, slow to 110 KIAS.
6. Prior to intercepting the final approach course or procedure turn inbound on a full approach, set flaps to 10°, and slow to 100 KIAS.
7. One mile prior to beginning descent on the final approach course inbound, extend the landing gear.
8. Once the aircraft is established on the final approach course, cleared for the approach, and has crossed the Final Approach Fix (FAF); if applicable; maintain course guidance and descend at 500 FPM, or as appropriate to the Minimum Descent Altitude (MDA).
9. Complete the "Final Check" checklist at 500 AGL or 1 mile final. Verify gear down and set the propeller control full forward.
10. Once the runway environment is in sight, execute the normal approach or circling approach procedure.
11. Upon reaching the Missed Approach Point (MAP) with the runway environment not in sight, execute the missed approach procedure.

Note: Altitude callouts must be made at "1,000 ft. above MDA", "500 ft. above MDA", and "100 ft. above MDA" until reaching the MDA.

STANDARDS: Instrument Rating PTS, Area of Operation 6, Task A

PRECISION ILS APPROACH

FAA-H-8083-15A, page 7-27

FAR 91.175

Maneuver: A precision approach provides horizontal and vertical guidance to the aircraft in order to land at an airport in instrument meteorological conditions (IMC).

Objective: The objective of this maneuver is to transition the aircraft from the enroute airspace structure to landing. Precision approaches are used to guide the aircraft horizontally and vertically along the runway's extended centerline.

Procedure:

1. Study the selected approach plate and conduct the approach briefing.
2. Tune and identify the appropriate navigational facilities.
3. Check and set the heading indicator against the magnetic compass. (For conventional gauge instrument equipped airplanes only)
4. Complete the "Descent Check" checklist.
5. While being radar vectored or while executing a full approach, slow to 110 KIAS.
6. Prior to intercepting the final approach course or procedure turn inbound on a full approach, set flaps to 10° and slow to 100 KIAS.
7. When cleared for the approach, track the localizer inbound until intercepting the glideslope.
8. Prior to beginning descent on the glideslope inbound, (about ½ ball), extend the landing gear and move the propeller controls full forward.*
9. Track the localizer and glideslope to the Decision Altitude (DA).
10. Complete the "Final Check" checklist at 500 AGL or 1 mile final. Verify gear down and set the propeller control full forward.
11. Upon reaching the decision altitude with the runway environment in sight, execute the normal approach and landing procedure while continuing to monitor the localizer and glideslope until touchdown.
12. Upon reaching the decision height with the runway environment not in sight, execute the missed approach procedure.

Note #1: One dot below the glideslope, the landing gear should be extended.

Note #2: Altitude callouts must be made at "1,000 ft. above DA", "500 ft. above DA", and "100 ft. above DA" until reaching the DA.

STANDARDS: Instrument Rating PTS, Area of Operation 6, Task B

MISSED APPROACH PROCEDURE

FAA-H-8083-15A, page 10-22

Maneuver: A missed approach procedure is formulated for each published instrument approach and allows the pilot to return to the airway structure while remaining clear of obstacles. A missed approach will be initiated at the point where the aircraft has descended to authorized landing minimums at a specified distance or time from the facility and visual contact has not been established, or when directed by ATC.

Objective: To develop the student's ability to safely and efficiently transition from the final approach segment of an instrument approach to the missed approach segment when landing minimums have not been met.

Procedure:

1. Study the approach plate to become familiar with the published missed approach flight path or the directions given by ATC, as appropriate.
2. Upon reaching the Decision Altitude (DA) or Missed Approach Point (MAP),* if no visual contact is made with the runway environment, apply full power and establish a climb pitch attitude.
3. With a positive rate of climb, retract the flaps.
4. Proceed as directed along the appropriate missed approach path.
5. Notify ATC of the missed approach.

*Note: If the missed approach is initiated prior to reaching the MAP, unless otherwise cleared by ATC, continue to fly the Instrument Approach Procedure (IAP) as specified on the approach plate to the MAP at or above the MDA or DH/DA before beginning a turn.

STANDARDS: Instrument Rating PTS, Area of Operation 6, Task C

CIRCLING APPROACH PROCEDURE

FAA-H-8083-15A, page 10-20

Maneuver: A circling approach is used to transition the aircraft from one runway to another runway. It can be used to land on runways with more favorable winds or to conform to traffic pattern operations already in use at an airport.

Objective: To develop the student's ability to safely maneuver from one runway to another for landing when the runway is not aligned with the final approach course.

Procedure:

1. Descend to the circling minimums.*
2. Circle to the runway of intended landing using the appropriate circling approach traffic pattern and maneuver the shortest path to the base or downwind leg. Verify before landing checklist complete.
3. Once a landing on the appropriate runway is assured, descend from the circling minimums and complete the normal approach and landing procedure.
4. If visual contact with the runway is lost, make a climbing turn towards the original approach runway and execute the missed approach procedure.

*Note: If the ceiling allows it, fly at an altitude that more nearly approximates the VFR traffic pattern altitude.

STANDARDS: Instrument Rating PTS, Area of Operation 6, Task D