



**Flight Training and  
Aircraft Rentals**

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**Multi-Engine Procedures and Maneuvers**  
**PA-44 Seminole**

**Normal Traffic Pattern**

- Smoothly accelerate to 75 knots (rotation speed)
- Once airborne, hit the brakes and with no more runway available, and positive rate of climb established, retract the landing gear while accelerating to blue line (88 knots) or greater.
- Reaching 500 ft. AGL. Reduce powers to 25 inches of MP and propellers to 2500 RPM. Turn to the crosswind leg.
- At 45 degrees from departure end of the runway, turn to downwind and level off at 1000 AGL (traffic pattern altitude) powers to 20 inches of MP
- Propellers to 2400 RPM
- Trim as necessary
- Reaching a beam point from landing runway: Pre-landing check, fuel sectors: on, mixtures: rich, fuel pumps: on, seat belts: fastened.
- Reduce powers to 15 inches of MP, trim as required
- Below 140 knots, extend landing gear and check 3 green lights while descending target speed should be 110 knots.
- Below 111 knots, extend 1<sup>st</sup> notch of flaps. Target speed should be 105 knots.
- At 45 degrees from landing runway, turn to base and extend 2<sup>nd</sup> notch of flaps. Target speed is 100 knots. Trim as necessary.
- Turn to final and extend 3<sup>rd</sup> notch of flaps. Target speed is 88 knots.
- Maintain wind correction as require. Below 500 ft propellers full forward.
- When the landing is assured, slowly allow the speed to decrease (speed should never be below blue line, except when the airplane is in the landing flare).

**Engine Failure on Runway**

- On the takeoff roll listen for unusual noises and expect a loss of directional control (either indicates a partial or complete engine failure).
- Recovery-retard both engines, maintain directional control with rudder pedals, and bring airplane to a controlled stop (this does not mean to stomp on the brake pedals if you have plenty of runway left to slow down on).

**Engine Failure After Rotation Above 75 Knots (Runway Available)**

- Close the throttles and land on remaining runway straight ahead.

### **Engine Failure After Rotation Above 75 Knots (NO Runway Available)**

- Maintain direction control
- Pitch nose down for blue line
  1. Mixtures: forward
  2. Props: forward
  3. Throttles: forward
  4. Flaps: up
  5. Gear: up
  6. Identify: dead foot, dead engine
  7. Verify: throttle back on the suspected engine
  8. Fuel valves: on
  9. Fuel pumps: on
  10. Point to the propeller that you will feather
  11. Point to the mixture and cut off
- Call for checklist and go through secure engine procedures
- Keep flying straight ahead until stabilized
- Begin a turn towards the good engine and return for landing to the runway that you took off from.
- Call the tower and declare an EMERGENCY

### **Engine Failure Enroute**

- |              |                        |                                     |
|--------------|------------------------|-------------------------------------|
| 1. Mixtures  | 6. Identify            | 11. Magnetos                        |
| 2. Props     | 7. Verify              | 12. Fuel pumps on                   |
| 3. Throttles | 8 Fuel Selectors       | 13. Prop-point-call-then feather    |
| 4. Flaps up  | 9. Primers             | 14. Mixture point-call-then cut off |
| 5. Gear up   | 10. Carburetor heat on |                                     |

- Secure checklist
- Un-feather checklist

- **Minimum altitude to perform maneuvers is 3000 feet AGL.**

### **Slow Flight**

- Make two 90 degree clearing turns
- Complete pre-maneuver checklist: fuel selectors: on, mixtures: rich, fuel pumps: on, seat belts: fastened
- MP: 15"

- Gears: down
- 1<sup>st</sup> Stage flaps: on
- 2<sup>nd</sup> Stage flaps: on
- 3<sup>rd</sup> Stage flaps: on
- Blue line: props forward
- MP: 20"
- Power for altitude and pitch for airspeed

### **Power Off Stall (Approach to Landing Stall)**

- Make two 90 degree clearing turns
- Complete pre-maneuver checklist: fuel selectors: on, mixtures: rich, fuel pumps: on, seat belts: fastened
- Go into *Slow Flight*
- Power back & pitch to maintain altitude, this will bleed off (reduce) speed.
- Once the aircraft stalls, decrease pitch add full power, nose above the horizon and build up speed.
- Retract flaps (two notches)
- At positive rate of climb, retract gear
- At blue line, retract last notch of flaps and resume to normal cruise (22" MP and 2400 RPM)

### **Power On Stall (Take-off and Departure Stall)**

- Make two 90 degree clearing turns
- Complete pre-maneuver checklist: fuel selectors: on, mixtures: rich, fuel pumps: on, seat belts: fastened
- Go into *Slow Flight – Clean configuration (no flaps, no gear)*
- Blue line 88 knots, props forward and continue pitching up
- Upon reaching 80 knots, pitch up and increase power to MP 18-20" (simultaneously).
- Upon reaching a stall, lower pitch to the horizon, add full power, pitch for blue line until reaching desired altitude (a gain in altitude is normal in this maneuver).

### **Steep Turn**

- Make two 90 degree clearing turns
- Complete pre-maneuver checklist: fuel selectors: on, mixtures: rich, fuel pumps: on, seat belts: fastened
- Smoothly roll into a 50 degree bank while maintaining altitude and coordination (some amount of trim may be needed or use back elevator pressure).
- Approximately 15 degrees to 20 degrees before target heading. Start roll out smoothly by maintaining coordination.

Note: first roll into a 30 degree bank. Then use back elevator pressure and continue to 50 degree. Increase the back elevator pressure. Never push the yoke; therefore, if you see an increase in altitude, release back pressure until the turn is completed.

## VMC Demonstration

- Make two 90 degree clearing turns
- Complete pre-maneuver checklist: fuel selectors: on, mixtures: rich, fuel pumps: on, seat belts: fastened
- Go into *Slow Flight* – clean **configuration (no flaps, no gear)**
- Airspeed 88 knots (blue line), props forward.
- Power at idle on the left engine (simultaneously correcting with aileron & rudder)
- Pitch up and add full power on the good engine (maintain directional control while pitching up to bleed off speed)
- As soon as directional control is lost, choose a cloud and use peripheral vision on the wing to determine when directional control is lost.
- Cut power on good engine and put the nose down (pick a point on the ground) to maintain directional control and add on right engine full power (Right engine, right rudder, right aileron) build speed to blue line.
- Loss of altitude is acceptable
- Resume to normal cruise

## Drag Demonstration

- Go into *Slow Flight* – **clean configuration (no flaps, no gear)**
- Airspeed 88 knots (blue line), props forward.
- Zero thrust on left engine 11-12” MP (correcting with aileron and rudder)
- MP depends upon density altitude on that particular day, whatever it takes to maintain altitude approximately 20” on the good engine (maintain blue line, and look at the horizon in relation to the dashboard).
- Pitch up approximately 5 degrees to get 10 knots (below the blue line) and look at the horizon in relation to the dashboard.
- Observe initial climb, followed by slow decent.
- Pitch down to 10 knots (above blue line), then back to blue line
- Lower gear
- Retract gear
- Lower flaps 25 degree (show decent)
- Windmilling propeller, power to idle on the left engine (show decent)
- Resume normal cruise

## ILS Approach (both engines)

- Vectored approach
  - **ATIS**: 40 miles out – 4 most important things
    1. Altimeter setting
    2. Approach in use
    3. Wind
    4. Runways
  - **Set** and identify the navigational aids to be used – 30 miles out (ATC will usually tell you which approach to expect)

- **Slow** down to initial approach speed – 10 miles out
- Set power to 20" MP and 2400 RPM for an airspeed of 110 knots
- Before the aircraft is given a 30 degree intercept to the final approach course, complete the 3 fuel checks: fuel valves, fuel mixtures and fuel pumps.
- As the localizer starts to come in, anticipate turning on to your final approach course, begin at 1 or 2 dot deflection, depending on the wind.
- When stabilized, power stays at 20" MP, then first 10 degrees of flaps, retrim, airspeed 105 knots and 1700 feet
- At glideslope interception, wait for 2 dots above the center and gear down (keep your hand on the gear knob until you have 3 green lights) airspeed 100 knots.
- Outer marker time, throttle to 18 inches, talk, 1<sup>st</sup> GUMPS check:
  - Gas – (fuel valves, fuel pumps and lights required, since they're on the same panel as your pump switches)
  - Undercarriage – confirm three green, and one in the mirror.
- Mixtures: rich
- Props: wait for final GUMPS
- Follow localizer (5 degree changes when inside the OM), glideslope (VSI of 537 at 100 knots groundspeed will keep you on the 3 degree G/S), and hold 100 knots (adjust MP 1-2" at a time).
- At 500' final GUMPS, Gear down, props forward.
- Follow the needles to the DH

### ILS Approach (Single Engine)

- **Vectored approach:** Everything stays the same as the 2 engine approach up until turning on the localizer. When turning on the localizer the inside engine will be failed so as to keep the plane turning on to the localizer. Go through your engine out procedures and just say engine secure. When you brought up to zero thrust, which will simulate the engine being feathered. Fly the rest of the approach the same (i.e. gear down 2 dots above on the glideslope, time, talk throttle and maintain 100 knots after OM inbound).