Piper Arrow
PA-28 RG
Procedures Guide

ALL V-SPEEDS IN MPH

Vr:	**65**
Vx:	**91**
Vy:	**95**
Crx Clb:	**105**
Vs0:	**64**
Vs1:	**70**
Va:	**134**
Best Glide:	**105 (Clean)**
Normal Ldg:	**80**

See AFM for weight and balance data

See checklist for Abnormal and Emergency Procedures

GO AROUND/REJECTED LANDINGS

Objective:
Regardless of the height above the ground at which it is begun, a safe go around may be accomplished if an early decision is made, a sound plan is followed, and the procedure is performed properly.

Elements:

1. Full throttle
2. Verify prop high
3. Accelerate to 95mph
4. Retract flaps to 25 degrees
5. Reduce control force by trimming nose down
6. Positive rate of climb – retract landing gear
7. Maneuver to the side of runway
8. Retract remaining flaps
9. Pitch to approximately 3 degrees nose up
10. Continue with Normal Takeoff Profile

Note: Step 1, 2 and 3 are completed simultaneously

NORMAL TAKEOFF AND CLIMB

Objective:
The normal takeoff is one in which the airplane is headed directly into the wind or the wind is very light, and the takeoff surface is firm with no obstructions along the takeoff path, and is of sufficient length to permit the airplane to gradually accelerate to normal climbing speed (Vy).

Elements:

1. Checklist complete
2. Taxi into take off position
3. Full Throttle (2700 rpm)
4. Check engine instruments
5. Airspeed rising
6. Rotate at **65** mph
7. Hold approximately 5 degree nose up
8. Climb out at Vx until 500 Ft
9. Gear up (positive rate) (no runway over the nose)
10. At 500 ft pitch to approximately 3 degrees, accelerate to 95.
11. At or after 1000 Ft AGL, Accelerate to **105** mph
12. Complete the ATO Ck
13. Cruise Climb

CROSS WIND TAKEOFF AND CLIMB

Objective:
The cross wind takeoff technique is used to maintain proper ground track while departing a firm or a soft runway. This involves the correct use of aileron/rudder cross control.

Elements:

1. Note wind direction and speed
2. Checklist complete
3. Taxi into takeoff position
4. Deflect ailerons into wind – use rudder as required for directional control
5. Full throttle
6. Check engine instruments
7. Airspeed rising
8. As speed builds reduce aileron and vary rudder inputs to maintain proper directional control
9. Rotate at 65
10. Hold approximately 5 degree nose up
11. Climb out at Vy (95 mph)
12. Gear up (positive rate)
13. See Normal Takeoff

POWER OFF 180˚ ACCURACY APPROACH AND LANDING

Note: This maneuver is not recommended in this model aircraft unless the turn to final approach can be accomplished at or above **500 FT AGL**.

Objective:
This type of approach and landing involves the use of techniques to further develop judgment in estimating distances and glide ratios without power available in order to touch down on a preselected landing spot.

Elements:

1. Approach checklist completed before entering downwind
2. Slow to 105 mph
3. On downwind establish 105 mph, level, gear down, Landing checklist completed.
4. Trim for 105 mph
5. Abeam landing point, reduce power to idle, establish 79 mph, gear down, descent trim.
6. Turn base at pilot's discretion based on altitude and wind conditions. Flaps as necessary.
7. Adjust pitch, flaps and airspeed as necessary to reach the desired landing spot.
8. Flare airplane so that main gear contacts the runway first
9. Maintain directional control and lower nose wheel before braking

See "Normal Landing" procedure for Gear down verification.

SOFT-FIELD APPROACH AND LANDING

Objective:
The approach for a soft field is similar to a normal or short field approach depending on field selection. The major difference between the techniques is that during the soft field landing, the airplane is held 1 to 2 feet off the surface as long as possible to dissipate the forward speed to touch down at the minimum forward speed at the minimum rate of descent.

The final approach speed for short field landings is equally appropriate to soft field landings, but there is no reason for a steep angle of descent unless obstacles are present in the approach path.

Elements:

1. Fly normal approach configuration to final
2. Adjust pitch and power to maintain 3 degrees GP so as to be stabilized at Vref no lower than 100 feet AGL
3. Perform final check no lower than 100 feet AGL
4. Maintain aiming point with pitch/power corrections until approaching round out
5. During landing flare adjust pitch/power (approximately 11" MP) for minimum sink rate
6. Touchdown at slowest possible airspeed with nose-high pitch attitude
7. Lower nose gently to surface and taxi clear of runway

See Landing Gear down verification under "Normal Landings"

SOFT FIELD TAKEOFF AND CLIMB

Objective:
Takeoffs and climbs from soft fields require the use of the operational techniques for getting the airplane airborne as quickly as possible to eliminate drag caused by tall grass, soft sand, mud, snow, etc., and may or may not require climbing over an obstacle. These same techniques are also useful on a rough field where it is advisable to get the airplane off the ground as soon as possible to avoid damaging the landing gear.

Elements:

1. Checklist complete (flaps 25 degrees)
2. Taxi into position while maintaining full aft elevator
3. Apply full throttle without stopping aircraft
4. As nose wheel leaves the ground, adjust A/C to Vy pitch attitude until lift off
5. Maintain aircraft in ground effect until reaching Vy
6. Pitch to Vx attitude (approximately 3 degrees)
7. Gear up (Positive rate)
8. Flaps up at 50 Ft
9. Accelerate to Vy (95 mph gear up – approximately 5 degrees)
10. At 500 ft pitch to approximately 3 degrees and accelerate to 95 mph
11. See Normal Takeoff

***Note**: Soft field takeoff with an obstacle: Accelerate in ground effect to Vx attitude until obstacle is cleared

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SHORT FIELD TAKEOFF AND CLIMB

Objective:
Taking off and climbing from fields where the takeoff area is restricted by obstructions requires that the pilot operate the airplane at the limit of its takeoff capabilities. The pilot must use all available runway, correctly configure the airplane, develop maximum available horsepower before brake release, rotate at the correct speed, climb at Vx to clear the obstacle, accelerate to Vy then cycle gear up.

Elements:

1. Checklist complete (flaps 25 degrees)
2. Taxi into takeoff position
3. Hold brakes
4. Full throttle
5. Check engine instruments
6. Release brakes
7. Airspeed rising
8. Rotate and lift off at 65 mph
9. Maintain Vx attitude until obstacle cleared
10. Gear up (Positive Rate)
11. Flaps up at or after 50 Ft AGL
12. Accelerate to Vy at 500 FT AGL
13. See Normal Takeoff

SHORT-FIELD APPROACH AND LANDING

Objective:
This short field operation requires the use of a procedures and techniques for the approach and landing at fields which have a relatively short landing area or where an approach must be made over obstacles which limits the available landing area.

Elements:

Traffic Pattern is the same as a Normal Landing.

See Landing Gear Down verification policy under “Normal Landing”

The major difference is on Final approach. Power is used to adjust the touchdown point. Stabilize at an Airspeed of not less than 75 mph in calm winds at 500 Ft agl.

1. Maintain aiming point with pitch/power corrections until approaching round out
2. Reduce power to idle
3. Flare airplane so that main gear contacts the runway first
4. Maintain directional control and lower nose wheel before braking
5. Retract flaps to zero degrees and apply brakes (simulate maximum braking for training)

CROSSWIND LANDINGS

Objective:

Many runways or landing areas are such that landings must be made while the wind is blowing across rather than parallel to the landing direction; therefore, all pilots should be prepared to cope with these situations when they arise. The same basic principles and factors involved in normal, soft, or maximum performance approach and landing apply to crosswind approach and landings. Therefore, only the additional techniques required for correcting wind drift are discussed here.

Elements:

1. Establish appropriate approach configuration (normal, soft field, maximum performance)
2. Maintain alignment with centerline using crab into wind
3. Transition to wing-low method prior to touchdown
4. Round out and flare while maintaining wing-low into crosswind
5. As aircraft slows increase aileron deflection into the wind
6. Opposite rudder deflection rudder is required to maintain directional control

STEEP TURNS

Objective:

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

Elements:

1. Reduce throttle to 19”MP/2400 RPM to obtain 115 mph
2. Establish bank of 45 degrees or 50 degrees as appropriate
3. Adjust pitch, bank and power as necessary to maintain altitude and airspeed (approximately 23”MP)
4. After completing a 360 degree turn, roll wings level and immediately start a steep turn in the opposite direction. Adjust pitch, bank and power as necessary to maintain altitude and airspeed.
5. Time roll out so that wings reach level flight on entry heading.

STEEP SPIRAL

Objective:

Perform a continuous gliding turn, during which a constant radius around a point on the ground is maintained similar to turns around a point. The radius should be such that the steepest bank will not exceed 60 degrees. This maneuver will improve pilot techniques for power-off turns, wind drift control, planning, orientation and division of attention.

Elements:

1. Select ground reference point and altitude sufficient to continue through a series of at least 360° turns.
2. Establish 105 mph power off-glide and gear-up. After stabilizing airspeed and descent, adjust throttle slightly forward to achieve 2000 RPM. This is done to keep the RPM out of the placarded "Avoid Continuous Operations" band and prevent engine damage.
3. Abeam reference point, establish power-off gliding turn
4. Maintain 105 mph glide and constant turn radius about reference point not to exceed 60˚ angle of bank
5. Clear engine each 1000' – upwind to minimize drift
6. Recover at or above 1500" AGL on entry heading or specified heading.
7. Pilot will have completed three turns.

NORMAL APPROACH AND LANDING

Objective:
This type of approach and landing involves the use of techniques for what is considered a normal situation; that is, when engine power is available, the wind is light or the final approach is made directly into the wind, the final approach path has no obstacles, and the landing surface is firm and of ample length to gradually bring the airplane to a stop.

Elements:

1. Descent and Approach checklist completed before entering downwind
2. Slow to 105 mph
3. Abeam landing point **Gear Down**; perform landing check, establish 10 degree flaps, begin descent
4. At 45 degree point – turn base establish 100 mph, 25 degrees flaps,
5. On final begin point progressive deceleration to 80 mph, 40 degrees flaps,
6. Adjust pitch and power to maintain 3 degree so as to be stabilized at Vref no lower than 500 feet AGL
7. Perform final **Gear Down** check no lower than 500 feet AGL
8. Maintain aiming point with pitch/power corrections until approaching round out
9. Reduce power to idle
10. Flare airplane so that main gear contacts the runway first
11. Maintain directional control and lower nose wheel before braking

Note: Falcon Policy Requires that the PIC and IP point to the Gear Down Lights during the landing checklist and again at 500 Ft AGL.

Announce:
"GEAR HANDLE DOWN (touch handle),
THREE GREEN LIGHTS (point to lights),
HEELS ON THE FLOOR"

SECONDARY STALL

Objective:
This maneuver demonstrates the hazards of secondary stalls during normal stall recovery emphasizing the importance of using proper technique when recovering from a normal stall situation

Elements:

1. Power to idle
2. Gear down below Vle
3. Flaps down below Vfe
4. Prop to high
5. Stabilize at 80 mph
6. Establish and maintain a landing pitch attitude that will induce a stall; initiate recovery without power followed by an immediate increase in pitch to 10 degrees
7. Secondary stall should follow immediately after first stall indication
8. Upon reaching secondary stall simultaneously apply full power and reduce AOA
9. slowly pitch to Vy attitude (approximately 3 degrees) while retracting flaps to 25 degrees
10. Gear up (positive rate)
11. Accelerating through Vx retract remaining flaps and accelerate to Vy
12. Recover to cruise

CHANDELLE

Objective:
This maneuver is a climbing turn beginning from approximately straight-and-level flight, and ending at the completion of 180 degree turn in a wings-level, nose-high attitude at the minimum controllable airspeed. The maneuver demands that the maximum flight performance of the aircraft be obtained; that is the plane should gain the most altitude possible for the given degree of bank and power setting without stalling.

Elements:

1. Power to 20” MP/2700 RPM to establish 115 mph
2. Roll into approximately but not to exceed 30 degrees bank in either direction
3. Begin pitch towards approximately 11 degrees while increasing power to full throttle
4. Continue pitch towards approximately 11 degrees until reaching 90 degree of turn
5. After 90 degree of turn begin reducing bank while maintaining approximately 11 degrees of pitch
6. At 180 degrees, wings level at approximately 5 mph above stall
7. Recover to cruise while maintaining final altitude

LAZY EIGHTS

Objective:
To develop the pilot's feel for varying control forces, and the ability to plan and remain oriented while maneuvering the plane with positive accurate control.

Elements:

1. Establish 115 mph (19"MP/2400 RPM)
2. Begin slowly pitching up and banking to obtain maximum pitch up and approximately 15 degrees bank at the 45 degree point
3. Passing 45 degree point, bank slowly increasing to approximately 30 degrees, pitch decreasing, passing through level flight attitude at the 90 degree point.
4. Passing 90 degree point, both bank and pitch decreasing to maximum pitch down and approximately 15 degrees bank at the 135 degree point
5. Passing 135 degree point, bank still decreasing while adjusting pitch to arrive at 180 degree point with 0 degree pitch and 0 degree bank at the entry altitude and entry airspeed.
6. Perform maneuver in opposite direction.

ELEVATOR TRIM STALL

Objective:
This maneuver will show the importance of making smooth power applications, overcoming strong trim forces and maintaining positive control of the airplane so as to hold safe flight attitudes, and using proper and timely trim techniques.

Elements:

1. Power idle
2. Gear down below Vle
3. Flaps down below Vfe
4. Prop to high
5. Trim for glide
6. Upon reaching 80 mph/IAS, smoothly apply full power
7. Upon reaching stall, reduce AOA to break stall
8. Slowly pitch to Vy attitude (approximately 5 degrees) while retracting flaps to 25 degrees
9. Gear up (positive rate)
10. Accelerating trough Vx retract remaining flaps and accelerate to Vy
11. Recover to cruise

CROSSED CONTROL STALL

Objective:
This is a simulation of a base-to-final approach turn where rudder is added in an effort to align A/C with runway and opposite aileron used to maintain constant angle of bank.

Elements:

1. Power idle
2. Gear down below Vle
3. Prop to high
4. Upon reaching glide, establish A/C into a medium bank stabilized turn simulating a final approach turn
5. Allow A/C to assume uncoordinated flight by adding excessive rudder pressure in the direction of the turn and opposite aileron
6. Maintain pitch that will induce a stall
7. Upon reaching stall, reduce control pressure and apply full power
8. Roll wings level and slowly pitch to Vy attitude (approximately 5 degrees),
9. Positive rate – gear up
10. Accelerate to Vy
11. Recover to cruise

RECTANGULAR COURSE

Objective:
The Rectangular Course is a training maneuver in which the ground track of the airplane is equidistant from all sides of the selected rectangular area on the ground. Like other ground track maneuvers, one of the objectives is to develop division of attention between the flight path and ground references while controlling the airplane and watching for other aircraft in the vicinity. Another objective is to develop recognition of drift toward or away from a line parallel to the intended ground track. This will be helpful in recognizing drift toward or from an airport runway during various legs of the airport traffic pattern.

Elements:

1. Selects a square or rectangular field near an area where an emergency landing can be made.
2. Enters 45° to the downwind leg at 115 mph (20”MP/2400 RPM) at an altitude of 800 feet.
3. Maintains a flight path positioned outside the field boundaries just far enough that they may be easily observed from either pilot seat by looking out the side of the airplane (¼ to ½ mile).
4. Applies adequate wind drift correction during straight and turning flight to maintain a constant ground track around the rectangular reference area.
5. Exits at the completion of at least one full circuit.

S-TURNS ACROSS A ROAD

Objective:
S-Turns are used to develop pilot's ability to compensate for drift during turns along a selected reference on the ground. The maneuver consists of crossing a road at a 90 degree angle and beginning a series of 180 degree turns of equal radius in opposite directions, re-crossing the road at a 90 degree angle, just as each 180 degree turn is completed.

Elements:

1. Establish 115 mph (20" MP/2400 RPM)
2. Select a road where a safe landing can be made if required, and enter downwind at 800 ft
3. Apply wind drift correction and bank angle to track a constant radius 180 degree turn back towards the road using approximately but not to exceed 45 degrees of bank
4. At 180 degrees of turn and over road, begin maneuver in opposite direction
5. Depart maneuver on entry heading

POWER-ON STALL

Objective:
Power-on stall recoveries are practiced from straight climbs, and climbing turns with 20 degrees of bank, to simulate an accidental stall occurring during takeoffs and departure climbs.

Elements:

NOTE: Maneuver is performed gear down to simulate a departure stall

1. Find practice area where terrain is appropriate for maneuvering with an available emergency landing area
2. Perform the maneuver no lower than 1500 AGL (Use 3500 MSL)
3. Set power to 15" MP, 2400 RPM
4. Trim the aircraft for level hands-off flight
5. Clear the area, and Pre Maneuver Check
6. Maintain level flight and reduce airspeed to lift off speed (V_R)
7. At lift off speed, simultaneously pitch up and increase throttle to 23" MP, Prop Full
8. Enter 15 degree bank turn
9. Coordinate with rudder pressure (increasing right rudder as pitch attitude increases due to torque effect)
10. Set a nose high pitch attitude that will allow the airspeed to decrease (1 mph/IAS per second)
11. Recognize and announce symptoms of approaching stall
12. Airspeed and noise level decrease, sight etc.
13. Maintain wings level (or 15 degrees of bank for turning stall) and keep rudder ball centered
14. Stall Aircraft
15. Recover at first indication of airframe buffeting
16. Add full power and simultaneously lower the nose to the horizon
17. Level the wings using coordinated rudder and aileron
18. As airspeed increases pitch for V_X to establish a positive rate of climb
19. At positive climb rate, set climb power (25" MP, 2400 RPM)
20. As airplane accelerates to normal cruise speed, set cruise power

23. Practice stall from straight flight and turns (maximum 20° bank)

NOTE: This stall may cause one wing to be more stalled than the other (usually due to uncoordinated flight) causing the wing to drop. Use coordinated rudder and aileron inputs to level the wings.

POWER – OFF STALL

Objective:
The practice of power-off stalls is usually performed with normal landing approach conditions in simulation of an accidental stall occurring during landing approaches. The stalls can be performed to either imminent or full stall conditions.

Elements:

1. Find practice area where terrain is appropriate for maneuvering with an available emergency landing area
2. Perform the maneuver no lower than 1500 AGL (Use 3500 MSL)
3. Set power to 15" MP, 2400 RPM
4. Trim the aircraft for level hands-off flight
5. Clear the area
6. Pre Maneuver Check/ Gear Down
7. Apply back pressure on the elevator to reduce airspeed and maintain altitude
8. Lower flaps to 30 degrees in the white arc
9. Stabilize the aircraft in a descent at approach speed (80)
10. Level Off at planned altitude
11. Decrease speed at a rate of about 1 mph per second
12. Recognize and announce symptoms of approaching stall
13. Sight, sound, etc
14. Recover at first sign of airframe buffeting
15. RECOVERY
16. Reduce Pitch
17. Add full power (full throttle in)
18. Level the wings using coordinated rudder and aileron
19. Retract flaps to takeoff (20°) setting as airspeed increases
20. Establish a shallow climb (100 – 200 FPM)
21. When a positive rate of climb is established, retract gear
22. At 95 mph/IAS retract remaining flaps
23. Perform cruise checklist
24. Climb to beginning altitude
25. Set climb power
26. Level off
27. Practice stall from straight flight and turns

TURNS AROUND A POINT

Objective:
The turns around a point is a proficiency maneuver used to help the pilot develop the ability to control the aircraft while dividing attention between flight path and traffic, while maintaining a constant radius around a reference point and using an angle of bank no greater than 45 degrees. Drift control must be maintained throughout the entire maneuver.

Elements:

1. Establish 115 mph (20" MP/2400 RPM)
2. Select a ground reference point near an area where an emergency landing can be made.
3. Enter downwind of selected point at 800 ft
4. Maintain constant altitude and radius around point while adjusting bank and drift correction using approximately 45 degrees of bank at the steepest point of the turn.
5. Depart maneuver on entry heading

EIGHTS ON PYLONS

Objective:
This training maneuver also involves flying the airplane in circular paths, alternately left and right, in the form of a figure 8 around two selected pylons. In this case no attempt is made to maintain a constant turn radius. Instead, the plane is flown at such an altitude and airspeed that the line parallel to the aircraft's lateral axis and extending from the pilot's eye appears to pivot on each of the pylons.

Elements:

1. Establish 115 mph (20" MP/2400 RPM)
2. Select suitable pylons perpendicular to wind-line in unpopulated areas with an emergency landing site within glide distance
3. Enter at 45 degrees to downwind at 900 ft (AGL).
   NOTE: Higher entry altitude should be considered as groundspeed increases due to high winds.
4. Abeam first pylon bank toward the pylon
5. Maintain correct lateral axis position (reference line on pylon)
   Pylon forward – control forward – reduce bank angle
   Pylon rearward – controls rearward – increase bank angle
6. After completing turn on first pylon allow 3-5 seconds of straight and level, then roll toward second pylon
7. After completing turn around second pylon, depart on entry heading

MANEUVERING DURING SLOW FIGHT

Objective:
To develop pilots sense of feel and ability to use the controls correctly, and to improve proficiency in performing maneuvers in which very low airspeeds are required.

Elements:

1. Find practice area where terrain is appropriate for maneuvering with an available emergency landing area
2. Perform the maneuver no lower than 1500 AGL (Use 3500 MSL)
3. Reduce power to 15" MP. 2400 RPM
4. Clear the area
5. Trim the aircraft for level, hands-off flight
6. Pre Maneuver Check (Conduct clean and with Gear)
7. Apply back pressure on the elevator to reduce airspeed and maintain altitude
8. Coordinate with rudder pressure (increasing right rudder as pitch attitude increases due to torque effect)
9. Lower flaps to 30 degrees in the white arc
10. As airspeed approaches MCA add power to maintain
11. Use pitch attitude to control altitude
12. Trim to relieve control pressures
13. Maintain directional control using outside visual references
14. Practice gentle climbs, descents, and turns at constant airspeed
15. Practice lowering and raising flaps in small increments
16. Recover using full power
17. Raise flaps to takeoff (20°) setting
18. Reduce the angle of attack by lowering the nose and maintain altitude
19. Retract Gear
20. Return to Cruise

Note: Perform maneuver with no flaps and at various flap positions.

Pre maneuver check

- Gas – on Fullest Tank
- Gear – as required
- Mixture – rich
- Prop - forward