PIPER ARROW/PA28R-201 2014

The following maneuvers are set forth only as a guide to the student and the instructor on how to teach and in what order to perform steps while executing the maneuvers. They serve to standardize the maneuvers, which in turn aids students in transitioning between instructors as well as aiding check instructors during progress, and stage checks. Small differences will always occur between instructors and students, however these procedures should be adhered to as closely as possible. In all cases, the appropriate checklists shall be used when warranted. Refer to the Airplane Flying Handbook (AFH) or the Pilots Operating Handbook (POH) for more details.

Airspeeds and Limitations

	Arrow III	Arrow IV		Arrow III	Arrow IV
V_{SO}	55 KIAS	53 KIAS	$V_{LO\ UP}$	107 KIAS	109 KIAS
V_S	60 KIAS	58 KIAS	$V_{LO\ DOWN}$	129 KIAS	130 KIAS
$V_{X(Gear\ Down)}$	72 KIAS	70 KIAS	V_{LE}	129 KIAS	130 KIAS
$V_{X(Gear\ Up)}$	78 KIAS	77 KIAS	V_{NO}	146 KIAS	149 KIAS
$V_{Y(Gear\ Down)}$	78 KIAS	76 KIAS	V_{NE}	183 KIAS	190 KIAS
$V_{Y(Gear\ Up)}$	90 KIAS	87 KIAS	Max X-Wind	17 Knots	
V_A (min weight)	96 KIAS	96 KIAS	Best Glide	79 KIAS	79 KIAS
V_A (max weight)	118 KIAS	121 KIAS	Cruise Climb	104 KIAS	104 KIAS
V_{FE}	103 KIAS	108 KIAS	Final Approach	75 KIAS	75 KIAS

Altitude
Maneuver must be completed above this altitude.

Clearing Turns
Complete a 90° turn to the left followed by a 90° turn to the right. (At least 180° of turning.

Desired Heading
This is the Direction of the Entry of the Maneuver.

Flow Check (BGUMPS)
Boost Pump…….On
Gas……..Fullest Tank
Undercarriage…. Down and Locked (3 green)
Mixture……... Rich/As Desired
Prop……. As Required
Seat Belts…… Secure

Slow Flight & Stalls

Slow Flight (Landing Configuration)

1. Altitude .....Above 1500’ AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Pilot’s discretion
5. Power .....15” MP
6. Gear……...Extend below V_{LE}
7. Flaps.....Extend to full when in the white arc
8. Prop……Full Forward below 100 Knots
9. Altitude .....Maintain (+/- 100 Ft. for Private or +/- 50 Ft. for Commercial)
10. Airspeed.....V_{SO} (+10/-0 Knots For Private or +5/-0 Knots for Commercial)
11. Power .....Increase As Required
12. Heading.....Maintain (+/- 10°)

Recovery

13. Power……Increase Gradually
14. Altitude .....Maintain
15. Heading.....Maintain
16. Flaps.....Retract 1st Notch
17. Gear……...Retract
18. Flaps……...Retract 2nd and 3rd notches (One notch at a time)

Slow Flight (Departure Configuration)

1. Altitude .....Above 1500' AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Pilot's Discretion
5. Power .....15" MP
6. Prop……Full Forward below 100 Knots
7. Altitude .....Maintain (+/- 100 Ft. for Private or +/- 50 Ft. for Commercial)
8. Airspeed.....Vs (+10/-0 Knots For Private or +5/-0 Knots for Commercial)
9. Power .....Increase As Required
10. Heading.....Maintain (+/- 10°)

Recovery

11. Power……Increase Gradually
12. Altitude .....Maintain
13. Heading.....Maintain

Power-Off (Approach to Landing) Stall

1. Altitude .....Above 1500'AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Pilot's Discretion
5. Power .....15" MP
6. Gear……...Extend below V_{LE}
7. Flaps .....Extend to landing configuration in the white arc
8. Prop……Full Forward below 100 Knots
9. Heading.....Maintain (+/- 10°)
10. Airspeed.....75 Knots and 500 FPM Descent Rate
11. Power .....Reduce to Idle
12. Pitch .....As required to induce a stall

Recovery

13. Recognize and Announce Stall
14. Reduce Pitch , Increase Power to Full, and Level Wings
15. Flaps .....Retract 1st notch immediately
16. Pitch .....V_X
17. Gear……...Retract when VSI reverses its trend to a climb
18. Climb…… At V_X until reaching 100 feet over simulated ground level
19. Flaps……...Retract 2nd notch
20. Pitch…….. V_Y
21. Flaps .....Retract 3rd notch when VSI shows a positive rate of climb

Power-On (Takeoff or Departure) Stall

1. Altitude .....Above 1500'AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Pilot's Discretion
5. Power .....15" MP
6. Flaps .....Extend to Takeoff or Departure configuration in the white arc
7. Prop……Full Forward below 100 Knots
8. Heading.....Maintain (+/- 10°)
9. Airspeed.....75 Knots
10. Power .....Increase to full power
11. Pitch .....As required to induce a stall

Recovery

12. Recognize and Announce Stall
13. Reduce Pitch, Increase Power to Full, and Level Wings
14. Pitch …….V_x, Retract 1st notch of Flaps if necessary
15. Climb…… At V_X until reaching 100 feet over simulated ground level
16. Pitch…….. V_y, Retract 2nd notch of Flaps if necessary

Accelerated Stall

1. Altitude…….Above 3000’ AGL
2. BGUMPS…….Complete
3. Clearing Turns……..Complete
4. Desired Heading…...Pilot’s Discretion
5. Power……...18” MP
6. Prop…….Full Forward below 100 Knots
7. Airspeed……...80 Knots
8. Bank…….Roll into 45º to 50º bank
9. Pitch…….As required to maintain level flight

Recovery

10. Recognize and Announce Stall
11. Reduce Pitch, Increase Power, Level Wings

Ground Reference Maneuvers (Private)

S-Turns Across a Road

Select a road with a suitable emergency landing area

1. Altitude .....1000’ AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Downwind
5. Power .....Set
6. Prop……Set
7. Airspeed.....Stabilized @ or Below Va
8. Altitude .....Maintain (+/- 100ft.)
9. Airspeed.....Maintain (+/- 10 Knots)

The maneuver starts when airplane is perpendicular with the road

10. Bank……Roll into Steep Bank (~ 25°- 30°)

At the 45° point (of the 180° turn)

11. Bank……...Gradually decrease bank to a Medium Bank turn (~ 20°- 30°) Crab into the Wind

At the 135° point (of the 180°)

12. Bank……...Gradually decrease bank to a Shallow Bank turn (~ 0°- 20°)

The airplane must be perpendicular to the road when crossing back over it. (This should not be accomplished prior to the road)

1. Bank……...Gradually increase bank to a Shallow Bank turn (~ 0°- 20°)

At the 45° point (of the 180° turn)

14. Bank……...Gradually increase bank to a Medium Bank turn (~ 20°- 30°) Crab into the Wind

At the 135° point (of the 180°)

15. Bank……...Gradually increase bank to a Steep Bank (~ 25°- 30°)

The airplane must be perpendicular to the road when crossing back over it. (This should not be accomplished prior to the road)

At this point the maneuver may be repeated or you can return to straight and level flight

The bank angle is only a recommended bank angle. The actual angle of bank will depend on wind direction and speed.

Turns Around a Point

Select a point with a suitable emergency landing area

1. Altitude .....1000’ AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Downwind
5. Power .....Set
6. Prop……Set
7. Airspeed.....Stabilized @ or Below Va
8. Altitude .....Maintain (+/- 100ft.)
9. Airspeed.....Maintain (+/- 10 Knots)

The maneuver starts when airplane is perpendicular with the reference point

10. Bank……...Roll into Steep Bank (~ 25°- 30°)

CONTINUED ON NEXT PAGE

At the 45° point (of the 360° turn)

11. Bank……...Gradually decrease bank to a Medium Bank turn (~ 20°- 30°) Crab into the Wind
    At the 135° point (of the 360°)
12. Bank……...Gradually decrease bank to a Shallow Bank turn (~ 0°- 20°)
    At the 180° point (of the 360°)
13. Bank……...Gradually increase bank to a Shallow Bank turn (~ 0°- 20°)
    At the 225° point (of the 180° turn)
14. Bank……...Gradually increase bank to a Medium Bank turn (~ 20°- 30°) Crab into the Wind
    At the 315° point (of the 180°)
15. Bank……...Gradually increase bank to a Steep Bank (~ 25°- 30°)

The airplane should maintain a uniform distance around the reference point at all times. The airplane should also complete two full circles around the point to complete the maneuver. At this point the maneuver may be repeated or you can return to straight and level flight.

The bank angle is only a recommended bank angle. The actual angle of bank will depend on wind direction and speed.

Rectangular Course

Select a course with a suitable emergency landing area

1. Altitude .....1000' AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading…... .Downwind
5. Power…… Accordingly
6. Prop……Accordingly
7. Altitude .....Maintain (+/- 100ft.)
8. Airspeed.....Maintain (+/- 10 Knots)

   The maneuver should be entered on a 45° angle to the downwind leg.

   Downwind to Base- Crab as required to maintain desired flight path over the ground
9. Bank……...Roll into a Steeper Bank (~ 25°-30°) and as the turn progresses reduce the bank angle as needed

   Base to Final- Crab as required to maintain desired flight path over the ground
10. Bank……...Roll into a Medium Bank (~ 15°- 25°) and as the turn Progresses reduce the bank angle as needed

    Final to Crosswind- Crab as required to maintain desired flight path over the ground
11. Bank……...Roll into a Shallow Bank (~5°- 15°) and as the turn Progresses increase the bank angle as needed

    Crosswind to Downwind- Crab as required to maintain desired flight path over the ground
12. Bank……..Roll into a Medium Bank (~15°-25°) and as the turn Progresses increase the bank angle as needed

Rectangular course can be performed in many different configurations. The flight instructor prior to commencing the maneuver will decide these configurations.

The bank angle is only a recommended bank angle. The actual angle of bank will depend on wind direction and speed.

Takeoff

Normal Takeoff

1. Power ……2000 PRM while holding brakes
2. Engine Gauges……Check
3. Brakes……Release
4. Power .....Full
5. Lift Off.....~65 Knots
6. Climb .....V_Y (+10/-5 Knots for Private or +5/-5 Knots for Commercial)
7. Gear……Retract (when out of usable runway)

Short-Field Takeoff

1. Flaps.....Extend to 25°
2. Power ……2000 PRM while holding brakes
3. Engine Gauges……Check
4. Power .....Full
5. Brakes .....Release
6. Lift Off.....~60 Knots
7. Climb .....V_X (+10/-5 Knots for Private or +5/-5 Knots)
8. Gear……Retract (when out of usable runway)
9. Flaps.....Retract 1st notch at 100' and obstacle clearance
10. Accelerate .....V_Y (+10/-5 Knots for Private or +5/-5 Knots)
11. Flaps.....Retract 2nd notch at 200' AGL

Soft-Field Takeoff

1. Flaps.....Extend to 25°
2. Prop……Full Forward
3. Power .....Full
4. Control Yoke .....Full Back
5. Lift Off.....At slowest possible airspeed
6. Climb .....Stay in ground effect until Vx is attained
7. Gear……Retract (when out of usable runway)
8. Flaps.....Retract 1st notch at 100' AGL
9. Accelerate .....V_Y (+10/-5 Knots or +5/-5 Knots for Commercial)
10. Flaps.....Retract 2nd notch at 200' AGL

Crosswind Takeoff

1. Control Yoke .....Fully into wind
2. Prop……Full Forward
3. Power .....Full
4. Control Yoke .....Gradually decrease deflection as airspeed increases ending with a deflection at rotation
5. Lift Off.....~65 Knots
6. Climb .....V_Y (+10/-5 Knots for Private or +5/-5 Knots for Commercial)
7. Gear……Retract (when out of usable runway)
8. Flaps.....Retract 1st notch at 100' AGL
9. Flaps.....Retract 2nd notch at 200' AGL

Landing

Normal and Crosswind Landing

1. The pattern should be flown 1 mile from the airport. The student should enter the pattern at 95 knots.
2. Maintain a crab angle for the wind and trim for airspeed and perform BCGUMPS.
3. Abeam the numbers first reduce the power to establish descent, then extend 1st notch of flaps, and trim.
4. At 1 mile from the end of the runway, turn base and maintain 85 knots, and extend the 2nd notch of flaps
5. Turn final to align airplane with the runway, maintain 75 knots (apply gust factor for crosswind and gusts) and extend 3rd notch of flaps, establish a slip for the wind correction.
6. On short final begin to reduce the power; power should be at idle before they begin to flare.
7. Touchdown in a full stall with the ailerons into the wind.

Downwind

1. Airspeed……95 Knots
2. BGUMPS…… Complete
3. Power……. Reduce to ~17" MP (This will change with temperature)
4. Flaps…….. Extend 1st notch

Base (~ 1 mile from the end of the runway)

5. Airspeed……85 Knots
6. Power……. Adjust as necessary
7. Flaps…….. Extend 2nd notch
8. Gear…….. Check down and locked

Final

9. Airspeed……75 Knots
10. Power……. Adjust as necessary
11. Flaps……...Extend 3rd notch
12. Gear…….. Check down and locked

Short-Field Landing

1. Everything in a short field should be the same as a normal landing until short final.
2. Approach speed should be as published in the POH. (~ 70 Knots)
3. Maintain a constant angle of decent down to the touch down point (Do not pick a point ahead of the touchdown point and flare to it).
4. If an obstacle needs to be cleared the angle of descent should be made to clear the obstacle. (The obstacle should be no more then 50 feet high)
5. On short final begin to decelerate to a full stall landing, which should be at the runway.
6. Use maximum braking.

Airplane must touch down beyond 200 feet (Private) or 100 feet (Commercial) of the specified point.

Although it will be necessary to use maximum braking on an actual short-field landing or for an emergency landing, *simulated* maximum braking shall be used for practice short-field landings in an effort to prevent excessive wear on brakes.

Downwind

1. Airspeed……95 Knots
2. BGUMPS…… Complete
3. Power……. Reduce to ~17" MP (This will change with temperature)
4. Flaps…….. Extend 1st notch

Base (~ 1 mile from the end of the runway)

5. Airspeed……85 Knots
6. Power……. Adjust as necessary
7. Flaps…….. Extend 2nd notch
8. Gear…….. Check down and locked

Final

9. Airspeed……70 Knots
10. Power……. Adjust as necessary
11. Flaps……...Extend 3rd notch
12. Gear…….. Check down and locked
13. Airspeed……70 Knots on short final

Soft-Field Landing

1. Everything in a soft field should be the same as a normal landing until the flare.
2. Just prior to the main wheels touchdown a small amount of power (~100-200 RPM) may be added in to soften the landing and keep the nose from touching down to early.
3. The airplane should touchdown at its lowest possible airspeed.
4. As the speed of the airplane slows down on the ground the control yoke should be gradually increased to full back, so the airplanes nose wheel will not touch down until the slowest possible speed.
5. Once the nose wheel touches down keep the control yoke full back, and do not use brakes unless it is necessary. Apply aileron correction as necessary for x-wind.

Downwind

1. Airspeed……95 Knots
2. BGUMPS…… Complete
3. Power……. Reduce to ~17" MP (This will change with temperature)
4. Flaps…….. Extend 1st notch

Base (~ 1 mile from the end of the runway)

5. Airspeed……85 Knots
6. Power……. Adjust as necessary
7. Flaps…….. Extend 2nd notch
8. Gear…….. Check down and locked

Final

9. Airspeed……75 Knots
10. Power……. Adjust as necessary
11. Flaps……...Extend 3rd notch
12. Gear…….. Check down and locked

Go-Around

1. Power .....Full
2. Prop……Full Forward
3. Flaps.....Retract first notch immediately
   Airplane should be leveled off until Vx is obtained
4. Climb .....V_X
5. Gear……Retract (When out of usable runway)
6. Flaps……...Retract 2nd notch when VSI indicates a climb and 100' AGL
7. Pitch…… ...V_Y
8. Flaps.....Retract 3rd notch when VSI shows a positive rate of climb

If an obstacle needs to be cleared the 2nd notch of flaps should be retracted when cleared of the obstacle and the 3rd notch of flaps should be retracted at 200' AGL

Performance Maneuvers

Steep Turns

1. Altitude .....Above 1500' AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Pilot's Discretion
5. Power .....21" MP
6. Prop……2300 RPM
7. Airspeed.....Stabilized @ or Below Va (~105 IAS)
8. Bank.....As Required (45º for Private or 50º for Commercial) (+/- 5°)
9. Power .....Increase to 23" MP
10. Altitude .....Maintain (+/- 100 Ft.)
11. Airspeed.....Maintain (+/- 10 Knots)
12. Roll Out .....On Specified Heading (+/- 10°)
13. Power .....21" MP

Emergencies

Emergency Descent

1. BGUMPS.....Complete
2. Clearing Turns .....Complete
3. Power .....Idle
4. Prop……Full Forward
5. Gear……Extend
7. Flaps…….....Extend to Full when in the White Arc
8. Bank.....45-50º
9. Pitch.....V_{FE}

Commercial Maneuvers

Eights-on-Pylons

Select a course with a suitable emergency landing area

1. Altitude .....Pivotal Altitude (no lower than 500' AGL)
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Downwind
5. Power .....23" MP
6. Prop……2300 RPM
7. Pick 2 pylons ~ 1 mile apart from each other (The pylons should allow straight and level flight between the pylons)
8. Enter downwind on a 45° angle to the 1st pylon
9. Maintain the reference point by circling the pylon and adjusting for the pivotal altitude
10. Repeat around the 2nd pylon

Chandelles

1. Altitude .....1500' AGL
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading…... .Crosswind (Turn should be made towards the crosswind)
5. Power .....23" MP
6. Prop……Full Forward
7. Bank Angle .....30°
8. Power .....Full
9. Pitch .....Gradually Pitch up so the plane is max Pitch up at the 90° Point
10. Bank.....At the 90° Point gradually roll out the bank so the plane is 0° Bank at the 180° Point
11. Pitch .....Maintain constant after 90° Point
12. Airspeed.....+5 KIAS of Vs at the 180° Point
    Resume Straight and Level Flight
13. Altitude .....Maintain Final Altitude with Minimum Altitude Loss
12. Heading…….Maintain (+/- 10°)

Lazy Eights

1. Altitude……. .....1500' AGL
2. BGUMPS…. .....Complete
3. Clearing Turns .....Complete
4. Desired Heading .....Pilot's Discretion
5. Power……. .....23" MP
6. Prop……2300 RPM
   Find 180° Reference Point
7. Bank……...Gradually Roll in so the plane is 15° Bank at the 45° Point
8. Pitch…….. …….Gradually Pitch Up until 45° Point
9. Bank……..Gradually Roll Into 30° when at the 45° Point
10. 90° Point…….. .....30° Bank, Level Pitch
11. Bank……... Gradually Roll out so the plane is 15° at the 135° Point
12. Pitch……... Gradually Pitch Down until the 135° Point
13. Bank……...Gradually Roll out so the plane is 0° at the 180° Point
14. 180° Point……. .....Return To Straight And Level
15. Repeat In Opposite Direction

    Tolerance @ each 180° Point for Altitude is +/- 100ft., Airspeed is +/- 10 Knots, and Heading is +/- 10°

Steep Spiral

1. Altitude .....Adequate to allow for 3 -360º power-off turns (~4000 Ft. AGL)
2. BGUMPS.....Complete
3. Clearing Turns .....Complete
4. Desired Heading… ..Downwind
   Select a Suitable Ground Reference Point
5. Power .....Idle
6. Prop……....Full Forward
7. Airspeed.....80 Knots (+/- 10 Knots)
8. Bank Angle .....Wind drift correction to maintain constant radius (no more than 60º bank)
9. Power……. Increase to recover by 1500 feet AGL after 3 rotations

Engine should be cleared out approximately every 15 seconds by advancing the throttle and then returning it to idle

Steep Spirals may only be made over unpopulated areas and must terminate by 1500 feet AGL. Additionally, steep spirals may not be continued to a landing but must terminate in a go-around.

180º Power-Off Approach

1. Altitude…… No greater than 1000’ AGL
2. BCGUMPS……...Complete
   Enter maneuver on the downwind leg
4. Power.....Idle (abeam the numbers)
6. Prop……Full Forward
7. Gear……As Required (This would normally be extended, but can be different depending on performance)
5. Airspeed.....Best glide
7. Flaps……...Extend when landing assured
   Airplane must touch down within the first 200 feet beyond the specified point

180º Power-Off Approaches must be conducted at an airport and may only be conducted after a normal traffic pattern and all appropriate checklists have been completed.