Private Pilot Maneuvers | Cessna 172-M/N

Numbers/instructions in **bold** are for Cessna 172-N model. Always reference POH, Airplane Flying Handbook and ACS for accuracy.

	NORMAL TAKEOFF AND CLIMB		**CROSSWIND 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).	OBJECTIVE	The crosswind 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
INSTRUCTIONS	1. Before takeoff checklist complete 2. Takeoff briefing (see "Sample Briefings" doc) 3. Taxi into takeoff position 4. Smoothly apply full throttle 5. Check engine instruments 6. "Airspeed alive" 7. Rotate at 60 mph **(55 kts)** 8. Bring nose up to meet the horizon 9. Accelerate to and climb out at Vy to 300' below pattern altitude, then lower nose to horizon 10. Make first turn no lower than 300' below pattern altitude (1,500' MSL at RCR). 11. At 1000' landing light off	INSTRUCTIONS	1. Note wind direction and speed 2. Before takeoff checklist complete 3. Takeoff briefing (see "Sample Briefings" doc) 4. Taxi into takeoff position 5. Deflect ailerons into wind – use rudder as required for directional control 6. Smoothly apply full throttle 7. Check engine instruments 8. "Airspeed alive" 9. As speed builds, reduce aileron and vary rudder inputs to maintain proper directional control 10. Rotate at 60 mph **(55 kts)** 11. Bring nose up to meet horizon 12. Accelerate to and climb out at Vy to 300' below pattern altitude, then lower nose to horizon 13. See Normal Takeoff
	SHORT-FIELD TAKEOFF AND MAX PERFORMANCE		**SOFT-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 and accelerate to Vy.	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.
INSTRUCTIONS	1. Before takeoff checklist complete (flaps 10^{o} if no obstacle – see POH) 2. Takeoff briefing (see "Sample Briefings" doc) 3. Taxi into takeoff position (use all available runway) 4. Hold brakes 5. Smoothly apply full throttle 6. Check engine instruments 7. Release brakes 8. "Airspeed alive" 9. Rotate to lift off at 60 mph **(55 kts)** 10. Maintain Vx attitude and airspeed until obstacle cleared 11. Flaps up at 300' AGL/obstacles cleared and positive rate of climb 12. Accelerate to Vy 13. See Normal Takeoff	INSTRUCTIONS *Note: Soft field with an obstacle – accelerate in ground effect to Vx attitude and speed until obstacle is cleared.*	1. Before takeoff checklist complete (flaps 10^{o} if no obstacle – see POH) 2. Takeoff briefing (see "Sample Briefings" doc) 3. Taxi into position with a smooth turn while maintaining full aft elevator (do not stop) 4. Apply full throttle without stopping aircraft 5. Reduce backpressure as aircraft accelerates to keep nose wheel just clear of the ground 6. Lift off at lowest possible airspeed 7. Reduce back pressure and keep aircraft in ground effect until reaching Vy 8. Pitch to Vy attitude (nose on horizon will get you close) 9. Flaps up at 300' AGL/cleared obstacles and positive rate of climb 10. See Normal Takeoff

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	NORMAL APPROACH AND LANDING		**CROSSWIND 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.	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. The same basic principles and factors involved in normal, soft, or maximum performance approach and landing apply to crosswind approach and landings. Only the additional techniques required for correcting wind drift are discussed here.
INSTRUCTIONS *How to calculate gust factor:* *If winds are reporting "20 knots, gusting 30", take the difference between the two and divide in half.* *30-20= 10÷2=5* *Add gust factor to final approach speed.*	1. Approach checklist completed before entering pattern 2. Reduce power on downwind to 2300 RPM 3. Midfield, perform landing checklist 4. Abeam threshold, carb heat on, 1500 RPM, below Vfe (100 mph/**110** knots) 10^{o} flaps 5. At 45^{o} point, turn base, flaps 20^{o}, 80 mph **(75 kts)** 6. On final 70 mph **(65 kts)** plus gust factor 7. Maintain aiming point with pitch/power corrections until approaching round out/over the runway 8. Reduce power to idle once runway is made 9. Flare airplane so that main gear contacts the runway first 10. Maintain directional control and lower nose wheel before braking.	INSTRUCTIONS	1. See Normal Landing 2. Establish appropriate approach configuration (normal, soft field, short field) 3. Maintain alignment with centerline using crab into the wind 4. Lower upwind wing into the wind 5. Simultaneously apply opposite rudder to maintain runway centerline 6. Maintain directional control with rudder 7. (Ailerons control drift side to side, rudder controls nose centered down runway) 8. Flare as normal 9. Optimally, land with upwind main gear touching first 10. Follow through with ailerons all the way into the wind as you slow down. Do not relax aileron control
	SOFT-FIELD APPROACH AND LANDING		**SHORT-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 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.	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.
INSTRUCTIONS *Technique: you can try leaving 100-200 rpm above idle power as you touch down to soften the landing*	1. Approach checklist completed before entering pattern 2. Specify touchdown point on downwind 3. Normal pattern (longer downwind if combined with short-field technique), flaps 40^{o} on final 4. Maintain aiming point with pitch/power corrections until approaching round out/over the runway 5. During landing flare, slowly reduce power 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 with full aft elevator	INSTRUCTIONS	1. Approach checklist completed before entering pattern 2. Specify touchdown point on downwind 3. Fly normal pattern, flaps 40^{o} on final 4. Stabilize approach speed at 69 mph **(60 kts**) no lower than 400' AGL 5. Maintain aiming point with pitch/power corrections until approaching round out/over the runway 6. Reduce throttle to idle a few hundred feet (laterally) to touchdown point 7. Maintain directional control and lower nose wheel before braking 8. Retract flaps to 0^{o}, elevator full aft, and apply brakes *Note: Flaps down for max aerodynamic braking on contaminated surfaces.*

	GO-AROUND/REJECTED LANDING		**ENGINE-OUT EMERGENCY LANDING**
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.	OBJECTIVE	The purpose of this practice is to simulate that your engine has quit and how to attempt a restart and safely land if the engine will not restart.
INSTRUCTIONS	1. Full throttle, carburetor heat off 2. Smoothly add in right rudder at the same time you add power 3. Gently pitch up for and accelerate to Vy 4. Positive rate, flaps to 20^{o} 5. Retract remaining flaps above 300' AGL or clear of obstacles 6. Use trim if needed to reduce control force 7. Continue with Normal Takeoff Profile	INSTRUCTIONS *Pro tip: When looking for a place to land, always look down and to your left first. You can always circle around a field you KNOW you can make rather than try to make a field straight in front of you that you may misjudge*	1. Clear the area, look below you 2. Carb heat on, power to idle 3. Pitch and trim for best glide (80 mph/**65 kts**). Use two big "nose up" swipes on the trim wheel to roughly hold this airspeed for you. 4. Look for a suitable place to land. Airport, road, or smoothest field. Keep in mind obstacles in the area. Usually a field is a better option than a road due to power lines. 5. While turning towards your landing spot, and if time permits, run your emergency landing checklist and attempt a restart 6. Simulate calling for help, either on 121.5 or preferably on the frequency you are already talking on 7. If the engine does not "restart", set up for an appropriate landing (i.e. soft field landing if in a field). Do not add flaps until you are absolutely certain you will make the field. 8. Set up your final approach speed on short final (70 mph/**65 kts**) plus gust factor *9.* When you and the instructor have determined the field is made, execute a go-around. *10.* If practicing solo, and not landing on a runway, go around no lower than 1,500' AGL
	SPIRAL EMERGENCY DESCENT		**STRAIGHT AHEAD EMERGENCY DESCENT**
OBJECTIVE	A spiraling emergency descent is a maneuver for descending as rapidly as possible within the structural limitations of the airplane to a lower altitude or to the ground for an emergency landing. The need for this maneuver may result from an uncontrollable fire, a sudden loss of cabin pressurization, or any other situation demanding an immediate and rapid descent.		A straight-ahead rapid descent would be primarily to speed up fast enough to put out an engine fire.
INSTRUCTIONS	1. Clearing turns. Look below you as well 2. Choose location at which if necessary, emergency landing can be made 3. Carb heat on, power to idle 4. Set flaps to desired setting (0-30 degrees) 5. Use 30-45 degrees bank throughout the turns to maintain positive load 6. Pitch for airspeed not to exceed maximum flap speed (100 mph/**85 kts**) or maneuvering speed (112 mph/**97kts**) 7. Level out no lower than 1500' AGL	INSTRUCTIONS	1. Clearing turns. Look below you as well 2. Choose location at which if necessary, emergency landing can be made 3. Carb heat on, power to idle 4. Pitch forward airspeed not to exceed top of the green arc 5. Level out no lower than 1500' AGL

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	SLOW FLIGHT		**POWER-OFF STALL**
OBJECTIVE	To develop pilot's sense of feel and ability to use the controls correctly, and to improve proficiency in performing maneuvers in which very low airspeeds are required, such as landing.	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.
INSTRUCTIONS *Tip to remember how to set up: the order you get into and recover from slow flight is "left to right". Carb heat is on the left, throttle/power is next, flaps are last.*	1. Clearing turns 2. Perform the maneuver no lower than 1500' AGL (3000'MSL or higher is preferred in the RCR area) 3. Carb heat on, set power to 1500 RPM 4. Slowly lower flaps to 30^{o} or 40^{o} (also practice flaps 0^{o}) 5. At a specified airspeed, approximately 5 mph/kts above stall speed a. with flaps: approx. 55 mph/**45 kts** b. no flaps: approx. 62 mph/**52 kts** 6. Add power to the bottom of green arc (2000 RPM) to maintain altitude 7. Trim as needed 8. Use rudder to help stay on heading 9. Practice gentle climbs, descents, and turns at a constant airspeed **Recover** 1. Carb heat off, full power 2. Maintain altitude and heading with rudder and pitch 3. Slowly retract flaps as airspeed increases and return to cruise while maintaining specified heading and altitude	INSTRUCTIONS *Tip to remember how to set up: the order you get into and recover from a stall is "left to right". Carb heat is on the left, throttle/power is next, flaps are last.*	1. Clearing turns 2. Perform the maneuver no lower than 1500' AGL (3000'MSL or higher is preferred in the RCR area) 3. Carb heat on, set power to 1500 RPM 4. Maintain altitude while airspeed decreases 5. Slowly lower flaps to 30^{o} as if landing 6. Decrease power to idle and smoothly pull up 7. Coordinate with rudder pressure to stay on specified heading 8. As airspeed decreases, recognize and announce the symptoms of approaching stall 9. Stall the airplane **Recover** 10. Reduce pitch slightly 11. Full power, carb heat off 12. Gently climb 13. Positive rate, flaps up 14. Establish climb attitude at Vx or Vy 15. Level off and recover to cruise
	POWER-ON STALL (STRAIGHT AHEAD)		**POWER-ON STALL (TURNING)**
OBJECTIVE	Power-on stall recoveries are practiced from straight climbs, and climbing turns with 20° of bank, to simulate an accidental stall occurring during takeoffs and departure climbs.	OBJECTIVE	Power-on stall recoveries are practiced from straight climbs, and climbing turns with 20° of bank, to simulate an accidental stall occurring during takeoffs and departure climbs.
INSTRUCTIONS *Tip: point the nose of the airplane at a cloud to help you keep wings level. You will be able to see the nose sliding right or left against the background of the cloud.*	1. Clearing turns 2. Perform the maneuver no lower than 1500' AGL (Preferably 3000' MSL or higher in the RCR area) 3. Set power to 1500 RPM to slow to 60-70 on the airspeed to simulate rotation speed 4. Flaps 10^{o} (if specified) 5. Full power and pitch up to 20^{o} smoothly and simultaneously 6. Coordinate with rudder pressure to stay on specified heading 7. Recognize and announce symptoms of approaching stall 8. Maintain wings level, ball centered 9. Stall the airplane **Recover** 1. Release backpressure and slowly lower nose to build airspeed and apply rudder pressure opposite to wind drop (if required) 2. As airspeed increases in the green arc, smoothly pitch up for Vx or Vy and establish positive rate of climb 3. Level off and recover to cruise	INSTRUCTIONS	1. Clearing turns 2. Perform the maneuver no lower than 1500' AGL (Preferably 3000' MSL or higher in the RCR area) 3. Set power to 1500 RPM to slow to 60-70 on the airspeed to simulate rotation speed 4. Flaps 10^{o} (if specified) 5. Full power and pitch up to 20^{o} smoothly and simultaneously while turning (no more than 20^{o} bank) 6. Coordinate with rudder pressure 7. Recognize and announce symptoms of approaching stall 8. Stall the airplane **Recover** 1. Release backpressure and slowly lower nose to build airspeed, apply rudder pressure opposite to wing drop (if required), and level wings 2. As airspeed increases in the green arc, smoothly pitch up for Vx or Vy and establish positive rate of climb 3. Level off and recover to cruise

	RECTANGULAR PATTERN		**S TURNS ACROSS A ROAD**
OBJECTIVE	Rectangular patterns is a 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 track and drift control to get the pilot ready for the traffic pattern	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° angle and beginning a series of 180° turns of equal radius in opposite directions, re-crossing the road at a 90° angle, just as each 180° turn is completed.
	1. Clearing turns 2. Note wind direction 3. Power 2300 rpm 4. Select a country road block to track 5. Enter downwind of selected road at 1000' AGL 6. Maintain constant altitude and track around block, correcting for wind. Maximum bank 45° 7. Depart maneuver on entry heading	INSTRUCTIONS	1. Clearing turns 2. Note wind direction 3. Power 2300 rpm 4. Select a road where a safe landing can be made which is also perpendicular to the wind (if the wind is blowing from the East, you will need a North/South road) 5. Enter downwind 1000' AGL 6. Maintain constant altitude and apply wind drift correction and bank angle to track a constant radius 180 degree turn back towards the road, not to exceed 45° of bank 7. At 180 degree point over the road, wings should be level 8. Begin maneuver in opposite direction *Note: The tops of the "S" curves should be no more than ½ mile from the road. Usually a tree line or where two fields meet make a good guideline to shoot for*
	TURNS ABOUT A POINT		**FORWARD SLIP**
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°. Drift control must be maintained throughout the entire maneuver.	OBJECTIVE	Forward slips allow the pilot to lose altitude quickly without building airspeed, whether at altitude or on final approach to landing.
INSTRUCTIONS	1. Clearing turns 2. Note wind direction 3. Power 2300 rpm 4. Select a ground reference point in an area where a safe landing can be made 5. Enter downwind of selected point at 1000' AGL 6. Maintain constant altitude and radius around point while adjusting bank and drift correction using no more than 45° of bank at the steepest point of the turn 7. Depart maneuver on entry heading *Note: turns should be no more than ½ mile from reference point. A crossroads works well with a barn, a tree, a house, a river creating "half mile" reference points to shoot for. You are drawing a perfect circle around the point. You are not pinning the wing on the point.*	INSTRUCTIONS	1. Clearing turns 2. Initially perform at 3,000 MSL or higher. After this maneuver is mastered at altitude, practice by staying at pattern altitude until final approach 3. Note wind direction 4. Carb heat on/power to idle 5. Simultaneously and gently pitch nose down while turning ailerons into wind, opposite rudder. The deeper the aileron/rudder usage, the more efficient the slip 6. Recover by bringing ailerons and rudder into normal positions no lower than 1500' AGL when practicing at altitude/400' AGL on final approach *Note: while most Cessna POH say that slips are not recommended with full flaps, they are not prohibited. At the instructor's discretion, it may be a good idea to show student that a slip can be performed with flaps as long as Vfe is respected.*

	STEEP TURNS	Notes:
OBJECTIVE	Steep turns is a performance maneuver that teaches the pilot smoothness, coordination, orientation, division of attention, and control techniques necessary for maximum performance turns. Bank angles of 45° are considered "steep" for the private pilot standards.	
INSTRUCTIONS *Tip: do not stare at your instruments. This maneuver requires your eyes to stay outside and dart back inside for quick peeks at the instruments. After rolling into the bank, find a bug or spot on the windshield that meets the horizon and cause that bug to "scrape" the horizon all the way around. If they bug stays on the horizon, you don't lose altitude!*	1. Clearing turns 2. Choose an altitude (preferably 3,000' MSL or higher) 3. Choose a heading and a prominent point outside of the plane (i.e. a North/South road) 4. Enter at airspeed 100 mph **(90 kts)**. Approximately 2200 rpm. 5. Smoothly turn into a 45^{o} bank while increasing back pressure to compensate for loss of vertical lift. 6. Fly a 360^{o} turn 7. Approximately 5-10^{o} before your specified heading or shortly before your specified outside reference, smoothly lead the turn 8. Roll out and decrease back pressure simultaneously so that you roll out precisely on your heading, altitude, and airspeed as when you started. 9. Perform a steep turn in the opposite direction *Note: you can add approximately 100 rpm of power as you bank into the turn to help compensate for loss of lift. Another technique is to use trim to your advantage.*	

Study Resources:

C172-M POH: https://mentoneflyingclub.org/aircraft/N12874POH.pdf

C172-N POH: https://mentoneflyingclub.org/wp-content/uploads/2019/06/N6091D_POH.pdf

Private Pilot ACS: https://www.faa.gov/training_testing/testing/acs/

Airplane Flying Handbook: https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/