GEAR

Gear Position	Airspeed	Rate of descent
down	15 - 20 kts	500 - 600 fpm
down	constant	500 - 600 fpm

To determine the landing gear vs airspeed value. Configure your aircraft at a constant airspeed and altitude then lower the landing gear and note the decrease in airspeed.

To determine the landing gear vs rate of descent for a constant airspeed value configure your aircraft at a constant airspeed and altitude and lower the landing gear. Maintain this constant airspeed and note the rate of descent.

PITCH

Airspeed	Degree of pitch
VY	10^{o} to 12^{o}
VYSE	8^{o} to 10^{o}
VX	15^{o} to 18^{o}
VXSE	12^{o} to 15^{o}

Configure the aircraft with full power, gear and flaps up. Determine the pitch attitude required for each of the above speeds.

If a flight director is installed it can be programmed for go-around prior to each take off. This will be helpful for light twins because go-around mode will position the command bars at approximately 8 . This will position the command bars to VYSE.

The rules of thumb will be an aid in assisting the pilot in programming the aircraft to perform in a specific configuration. The rules of thumb are not meant to replace or alter any operation information in the Pilot Operating Handbook or to substitute good basic piloting techniques and common sense. The numbers established are to be used as a supplemental guideline only. For any specific configuration it is emphasized that whatever power- pitch and trim is necessary will be applied regardless of guideline numbers.

Detailed explanation of Power Setting Chart Phases:

TRANSITIONAL PHASE

This is defined as the airspeed with which the aircraft should be configured within 10-15 miles of the final approach fix(if IFR) or 10-15 miles of the airport(if VFR).

Level off at an altitude that best meets the average altitude for the initial approach segment for the geographical area most often flown. Configure the aircraft gear-up and flaps up. CONSTANT ALTITUDE Adjust power until the desired airspeed is achieved. Make a note of this power in the Manifold Pressure block of your power setting chart.

NOTE: the initial approach altitude will vary between airports. ie. the power required on the initial approach segment at Denver will be different than at Miami.

EXAMPLE — Typical Light Twin

	Airspeed	M.P.	RPM	Gear	Flaps	Pitch
Transitional Area	120/140	NOTE	2300	U	U	0°

NOTE: Apply the Rule of Thumb for airspeed vs power

APPROACH PHASE

This is defined as the airspeed that the aircraft should be configured within 3 to 5 miles of the final approach fix or if VFR within 3 to 5 miles from the airport. Program the power to match the airspeed desired and trim the aircraft.

At the same power setting as in the transitional phase lower partial flaps until the desired airspeed is achieved. If the aircraft manufacturer limits do not allow flaps to be lowered reduce power until the desired airspeed is reached. An increase in flaps, reduction of power or combination of the two may be used to configure the aircraft in the approach phase.

EXAMPLE — TYPICAL LIGHT TWIN

	Airspeed	MP	RPM	Gear	Flaps	Pitch
Approach Phase	120 kts	NOTE	normal	U	U	NOTE & record

MP=should be approximately the same as the transitional phase unless power has to be reduced due to a flap airspeed limitation.

NOTE: Apply the Rule of Thumb Airspeed vs Power

ILS INBOUND PHASE

As is defined as the point on the approach that the aircraft starts descending on the glide slope. The speed to maintain will be the same as in the approach phase. It is important that the aircraft is programmed (power set for airspeed and configuration, trimmed and the pilot is relaxed) prior to final approach fix inbound. Lower the landing gear glideslope G/S intercept. Applying the Rule of Thumb gear down equal 500 fpm for the same airspeed.

Prior to reaching the FAF establish the wind correction angle. Once established FAF inbound make the following correction:

Localizer: make all corrections with 1/2 dot of localizer. The corrections to be made should not exceed the left or right boundaries of the heading bug unless there is an unusual wind.

Glideslope: make all corrections within 1/2 dot of G/S. The pitch change required will be generally no more than 2^{o} to 3^{o}. If corrections are made within the 1/2 dot parameter pitch and power changes will be minimal.

NOTE: Apply the Rule of Thumb airspeed vs power and airspeed vs gear down

NON PRECISION INBOUND

Lower the landing gear(retractable) and decrease power to establish 700 to 800 fpm. Maintain airspeed established in the approach phase.

NOTE: Apply the Rule of Thumb airspeed vs power and airspeed vs gear down

MINIMUM DESCENT ALTITUDE PHASE

Prior to reaching the MDA (approximately 50 ft.) add enough power to maintain airspeed but still maintain altitude. This is important, particularly if a timed approach is being made. It is important to hold accurate speed for the missed approach time, and altitude for reference to land. Applying the rule of thumb 1 inch = 100 ft. per minute for the same airspeed, the aircraft can be programmed to level off at the MDA at a constant altitude and airspeed.

NOTE: Apply the Rule of Thumb power vs rate of descent

MISSED APPROACH PHASE

a missed approach is required prop forward, full power and pitch up to maintain VY or VX or VYSE or VXse if one engine is inoperative, the pitch required may vary depending upon aircraft.

A typical high performance single-

VY	VYSE	VX	VXSE
10	N/A	15	N/A

A typical light twin

VY		VYSE		VX	VXSE	
10	-12	8	-10	15	12	-15

THESE ARE REFERENCES ONLY

TWIN ENGINE POWER SETTINGS

	A/S	MP	RPM	GEAR	FLAPS	PITCH	REMARKS
APPROACH AREA HIGH SPEED							
APPROACH AREA LOW SPEED							
ILS INBOUND							Gear down at Glide-slope Interception (500 fpm)
NON-PRECISION INBOUND							Power reduction & Gear down - Final Approach Fix INBD (800-1000 fpm)
CIRCLE TO LAND							

VA = _____K at _____MP _____RPM

KIAS	
_____	V_{MC}
_____	V_R
_____	V_{LOF}
_____	V_{SSE}
_____	V_{XSE}
_____	V_X
_____	V_Y
_____	V_A
_____	V_{NO}
_____	V_{FE}
_____	V_{FE} (FULL)

KIAS	
_____	V_{LE}
_____	V_{LO}
_____	V_{NE}
_____	T.O AND CLIMB TO 50 FEET
_____	LANDING APPROACH FROM 50 FEET
_____	BEST GLIDE

PITCH

_____	V_X CLIMB
_____	V_Y CLIMB
_____	V_{XSE}
_____	V_{YSE}

FOR TRAINING PURPOSES ONLY
Consult Owners Manual

TAXIING A DUKE

1. DESCRIPTION

When ready to taxi, release parking brake and as aircraft begins to move forward, test brakes at both pilot stations by depressing each brake pedal. Taxi at a moderate speed and avoid making fast turns that put abnormal side loads on the landing gear. Unless passing close to another aircraft or object, the nose of the aircraft should always follow the painted taxi lines.

a. Slow taxi speed and proper displacement, relative to the wind direction, are prime factors when taxiing during high wind conditions.

b. The brakes must be tested at all pilot stations prior to extensive taxi operations.

2. Acceptable Performance Guidelines

a. Always test brakes before taxiing.

b. Maintain safe distance from other aircraft and objects.

c. Taxi at a safe speed.

d. Follow yellow lines on taxiway.

e. Runway hold line procedures must be followed.

3. PERFORMANCE RATING

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4. DATE:_____ SIGNATURE_____ CFIAI#_____ EX_____

NORMAL DUKE TAKEOFF

1. DESCRIPTION

Brief the Instructor Pilot on takeoff procedures prior to clearance for takeoff. This briefing should consist of at least the following: all V speeds AND what procedures will be followed if an engine failure occurs prior to Vmc. During takeoff roll, monitor engine instruments particularly manifold pressure, RPM, and especially TIT, so as not to exceed limits. Use whatever control displacement is needed to compensate for crosswind conditions. Lift off should be made at no less than Vmc +10. After lift off, allow the aircraft to accelerate to Vy. and climb to 500 feet AGL using this speed and takeoff power. Upon reaching 500 feet AGL, accelerate to 160 KNOTS IAS and set climb power.

2. ACCEPTABLE PERFORMANCE GUIDELINES

A. Use of maximum allowable power that is applied smoothly and promptly.

B. Maintain runway centerline during the takeoff roll.

C. Initiate lift off at + or -5 knots of appropriate airspeed (no less that Vmc +10).

D. Maintain best rate (Vy) airspeed + or - 5 knots until at least 500 feet AGL.

NOTE

NOISE ABATEMENT PROCEDURES OR OTHER OPERATIONAL REQUIREMENTS MAY CHANGE THE 500 FEET AGL RULE

E. Unless otherwise directed, maintain a departure heading that will keep the aircraft aligned with the extended centerline of the runway.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

DUKE TAKE OFF BRIEFING

Vmc	Vr	Vxse	Vyse	V_Y	V_R
85 KIAS	95 KIAS	100 KIAS	110 KIAS	120 KIAS	90 KIAS

ENGINE FAILURE AND/OR SYSTEMS MALFUNCTION

BEFORE Vr

PILOT OR COPILOT

Monitor instruments, advise captain if discrepancy is observed

PILOT

STOP aircraft, if discrepancy warrants

AFTER Vr

Runway available - Pilot land on remaining runway

AFTER GEAR RETRACTION

PILOT

Establish Vyse 100 KIAS

COPILOT

Standby with ENGINE FAILURE AFTER TAKEOFF CHECKLIST

VFR EMERGENCY procedure is:

FLY THE AIRCRAFT-NOTIFY ATC-COMPLETE ENGINE SHUTDOWN CHECKLIST-LAND AS SOON AS POSSIBLE.

IFR EMERGENCY procedure is:

FLY THE AIRCRAFT-NOTIFY ATC-COMPLETE ENGINE SHUTDOWN CHECKLIST-REQUEST APPROACH CLEARANCE-LAND AS SOON AS PRACTICAL.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

DUKE REJECTED TAKEOFF

1. Description

Practice rejected takeoff will be initiated either by a simulated loss of engine power or by the instructor pilot's oral identification of a simulated malfunction. The trainee will reduce throttle to idle and employ normal stopping procedure.

NOTE: Simulating the loss of engine power on one of the engines shall be practiced at speeds that are no more than 50% of Vmc. If not contrary to the manufacturers recommendation this may be accomplished by reducing power to idle with the throttle.

2. Acceptable Performance Guidelines

A. Reduce power to idle in timely way.

B. Maintain runway centerline.

C. Brake application appropriate to runway length.

3. PERFORMANCE RATING

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4. DATE:_____ SIGNATURE_____ CFIAI#_____ EX_____

B60 SHORT & SOFT FIELD TAKEOFFS

1. Description

It is impossible to specify an exact procedure to be used that would be correct in any given situation involving the need for short and soft field takeoff. For the purpose of standardization, however, the short and soft field takeoff will be treated as two separate maneuvers as follows:

A. Soft Field Takeoff

Prime consideration given to becoming airborne as quickly as possible to overcome drag caused by tall grass, soft sand, etc., and may or may not require climbing over an obstacle.

B. Short Field Takeoff

Prime consideration is given to operating the aircraft in such a manner that will result in the greatest altitude gain in a given distance, i.e., over a 50 foot obstacle.

Execution of the soft field takeoff in a training environment should be as follows:

The aircraft should be taxied onto runway at as fast a speed as possible consistent with safety. As the aircraft becomes aligned with the runway, power should be applied smoothly and as rapidly as the power plant will accept it without faltering. As the aircraft begins to accelerate, enough back pressure should be applied to assume a positive angle of attack and reduce the pressure on the nose wheel. The aircraft should be allowed to fly as soon as possible, but in no case at a speed below Vmc +10. After becoming airborne the nose will be lowered gently until reaching best rate of climb speed (120 KIAS), at which time the flaps will be retracted and a normal climb established. Extreme care should be exercised during the time the aircraft is lifted off and as it accelerates to best rate of climb. It should be noted that a premature attempt to climb to steeply may cause the aircraft to settle back to the surface due to loss of ground effect.

Execution of the short field takeoff in a training environment should be as follows:

The short field takeoff will be made the same as a normal takeoff with the following exception. As the airspeed reaches the best angle of climb speed, or Vmc +5, whichever is higher, the nose is rotated to an angle of attack that will cause the aircraft to break ground and climb at that specified speed. At an altitude of approximately 50 feet and after passing over a simulated 50 foot obstacle, the nose is lowered to allow the airspeed to increase to best all engine rate of climb speed. Upon reaching 500 feet AGL, accelerate to cruise climb speed

and reduce to climb power. The manufacturer's recommended flap setting, power settings, and speeds will be used with the exception of best angle of climb speed. If published angle of climb speed is less than Vmc +5 Vmc +5 will be used. The use of any climb speed less than Vmc +5 should be avoided in the raining environment.

2. Acceptable Performance Guidelines

A. Use of maximum allowable power that is applied smoothly and promptly

B. Lift off initiated + 5 knots of appropriate airspeed.

C. Maintain runway centerline during the takeoff roll.

D. Maintain air speed +5 knots of best angle (Vx) or best rate (Vy) whichever is appropriate for the operating need.

E. Unless otherwise directed, maintain a departure heading that will keep the aircraft aligned with the extended centerline of the runway.

F. Improper flap or propeller setting or premature retraction of landing gear shall be disqualifying.

3. PERFORMANCE RATING

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4. DATE:_____ SIGNATURE_____ CFIAI#_____ EX_____

B60 CROSSWIND TAKEOFFS & LANDINGS

1. Description

   A. Takeoffs Careful consideration should be given to the effects of a strong crosswind before even taxiing to the takeoff position. Narrow wheel treads, high center of gravity and light weight when combined, result in an aircraft easily turned over in gusty cross and tail winds. At the start of the takeoff, the controls are displaced as through the airplane were being slipped into the wind. As the nose wheel comes off the ground, the rudder is used as necessary to prevent crabbing into the wind. When the Duke is becoming airborne, the tire into the wind leaves the ground last. If these corrections were not made, gusty winds could cause the plane to skip and if the plane were in a crab, landing gear failure or a ground loop could result. The aircraft should remain in slipping flight until well clear of the ground and then allowed to crab into the wind to continue the flight path straight out the extension of the runway centerline.

   B. Landings. On final approach, the crab into the wind is changed to a slip into the wind. The force held on the controls is proportionate to the crosswind. The slip must keep the flight path and the fuselage of the aircraft aligned with the runway centerline. As ground contact is made on the wheel into the wind, the controls are gradually moved further in the same direction to compensate for loss of control effectiveness as speed decreases. Certification rules require that there be no uncontrollable ground looping tendencies in 90 degree crosswinds which do not exceed 0.2 Vso (For the Duke, this speed is 15.2 KIAS) (76 X .20). Though skillful pilots may successfully takeoff and land in much stronger winds, they should do so with a realization of the hazard involved.

2. Acceptable Performance Guidelines

   A. Track maintained down centerline of runway for takeoff and landing.

   B. No drifting or crabbing at touchdown.

   C. No skipping or sideloads imposed on gear.

   D. Control maintained so that no danger of ground loop exists.

   E. Unless otherwise directed, maintain a heading that will keep the aircraft aligned with the extended centerline of the runway.

   F. Smooth transition from crab to slip.

B60 CROSSWIND TAKEOFFS AND LANDINGS

3. PERFORMANCE RATING

4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

B60 ENGINE FAILURE-TAKEOFF

1. Description

A. Normally simulated engine failures for this maneuver will be produced by retarding a throttle. Engine cuts will only be done at speeds not more than 50% of Vmc. There are two speeds which are of vital importance in any actual or simulated engine failure during takeoff; Vmc and Vyse. The trainee will state these two speeds aloud as he pulls onto the runway to begin takeoff. There are three situations through which each takeoff must pass before reaching a safe altitude for maneuvering:

1. On takeoff roll before becoming airborne when engine fails.

2. Airborne at a speed below Vyse when engine fails.

3. Airborne at a speed at or above Vyse when engine fails.

B. In situation a(1), immediately close both throttles and abort the takeoff using prompt braking action.

Note: There is no single engine certification requirement for a light twin to demonstrate any climb performance at Vmc.

C. Situation a(2) usually will require an immediate landing because of altitude loss required to increase speed to Vyse. The variables such as remaining runway, aircraft weight, altitude, density altitude and single engine performance must be considered in deciding whether it is safer to land immediately or to accelerate to Vyse and continue flight.

Note: The minimum speed for all normal takeoffs is Vmc +5. This assures having air control before losing ground control.

D. Situation a(3) leaves but one major decision to the pilot, which is where to land with maximum safety consistent with the performance limitations of his aircraft. After reaching Vyse, and before reaching a safe maneuvering altitude, the pilot must decide whether to land on the remaining runway, land in the best possible off airport area, or performance permitting, continue climbing on one engine to a safe maneuvering altitude and return to the airport for landing. If the last option is selected:

maintain Vxse, retract landing gear when a positive rate of climb is attained. Use a maximum bank angle of 5 degrees to maintain directional control. Identify and simulate propeller feather on failed engine. Adjust pitch to maintain Vxse and climb until clear of all obstacles (minimum of 400 feet above field elevations). When flight path permits, accomplish engine failure after takeoff checklist.

When a simulated engine failure following a maximum performance (obstacle) takeoff is practiced, consideration will be given to the flap setting being used and the procedure for retracting the flaps. The procedure to use will vary in different aircraft under various conditions; therefore, a set procedure to cover all situations cannot be given. The approved procedure in the Flight Manual will be used for a specific airplane. In the event a procedure is not listed, consideration will be given to altitude and the settling effect when flaps are retracted and the drag of the flaps compared to the drag of the gear for determining the correct procedure.

Caution: The instructor must closely follow the trainee's actions to insure correct responses. Inadvertent movement of any control in the wrong manner can jeopardize safety.

3. Acceptable Performance Guidelines

Situation a(1) Immediate reduction of power on operating engine and bring the aircraft safely to a full stop on the runway.

Situation a(2) Maintain flight straight ahead and make an engine out landing. Continue flight ONLY when less hazardous to do so.

Situation a(3) Maintain straight flight path, correctly identify and simulate feathering of failed engine, maintain Vyse + or - 5 mphs, make best choice of where to land.

4. PERFORMANCE RATING

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5. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

B60 CLIMBS & CLIMBING TURNS

1. Description

Climbs and climbing turns will be made in clean and takeoff configurations with climb power. Climbs will demonstrate the performance and may reveal heating problems at Vx, Vy, Vxse, Vyse, and in obstacle clearance configuration.

Climbing turns to predetermined headings up to 360 degrees will be practiced. In climbing turns, angles of bank to 45 degrees can be used to demonstrate loss of performance with rise in "G" forces.

2. Acceptable Performance Guidelines

A. Airspeed +10 knots.

B. Roll out on assigned heading within + or - 5 degrees.

C. Use of maximum allowable power.

D. Engine temperatures maintained within limits.

3. PERFORMANCE RATING

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4. DATE:_____ SIGNATURE_____ CFIAI#_____ EX_____

B60 SHALLOW & MEDIUM TURNS

1. Description

Shallow turns involve bank angles up to approximately 25 degrees. At these angles, the inherent stability of the aircraft tends to return to level flight.

Medium turns involve banks of approximately 25 degrees to 45 degrees. The aircraft tends to maintain this angle without further application of aileron control.

The trainees' instruction will include the following items:

a. Checking for traffic before starting turns.

b. Use of rudder to overcome aileron yaw.

c. Effect of speed on control forces and responses.

d. Effect of "G"forces in a turn.

f. Turns in the clean configuration at cruise speed, and the takeoff and landing configurations at Vx.

2. Acceptable Performance Guidelines

A. Airspeed + or - 10 knots.

B. Bank within + or - 5 degrees of assigned heading.

C. Altitude within + or - 100 feet of assigned altitude.

D. Recovery to assigned heading + or - 10 degrees.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

B60 STEEP POWER TURNS

1. Description

Turns in level flight with banks of at least 45 degrees, continuing for at least 360 degrees. Entry speed should be maneuvering speed (161 KIAS) or that recommended by the manufacturer. Entry and recovery should be made in a smooth and coordinated manner.

2. Acceptable Performance Guidelines

A. Altitude within + or - 100 feet of assigned.

B. Bank within + or - 5 degrees of assigned.

C. Airspeed + or - 10 knots of appropriate/assigned.

D. Heading + or - 10 degrees assigned.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

B60 APPROACHES TO STALLS

1. Description

Approaches to stall should be practiced at a minimum altitude of 3000 feet AGL.

NOTE: No stalls will be practiced with any engine throttled or cut off and the other engine(s) developing effective power.

2. Acceptable Performance Guidelines

A. All stall recoveries will be accomplished with a minimum loss of altitude.

B. No secondary stalls.

C. Heading + or - 10 degrees where applicable.

D. For power recoveries, maximum allowable power applied smoothly and promptly.

3. PERFORMANCE RATING

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4. DATE:_____ SIGNATURE_____ CFIAI#_____ EX_____

B60 MANEUVERING AT LOW AIRSPEEDS

1. Description

Maneuvering at minimum speed is practiced in both cruise and landing configuration, and will consist of straight flight, turns, climbs, and descents.

By definition the term "Flight at minimum controllable airspeed" means - A speed at which any further increase in angle of attack or increase in back pressure will cause an immediate physical indication of a stall.

Stall warning devices on U.S. certificated aircraft are required by regulation to be activated "at least 5, but not more than the greater of 10 knots, or 15% of the stalling speed, and must continue until the stall occurs." In view of the above requirement, flight at minimum controllable airspeed will result in activation of the stall warning device.

2. Acceptable Performance Guidelines

A. Maintain positive aircraft control with no unrecognized stalls.

B. Airspeed +5 - 0 knots of desired.

C. Altitude + or - 50 feet of assigned.

D. Heading + or - 10 degrees of assigned.

E. Degree of bank + or - 5 degrees of assigned, as appropriate.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

B60 PROP FEATHERING AND UNFEATHERING

1. Description

   A. Feathering. At a safe altitude (minimum 2000 feet above terrain) and within landing distance of an adequate airport, an engine will be cut with throttle.

   B. The following sequence shall be used:

      Memory Items

      (1) Props (High RPM)

      (2) Throttles (power as appropriate) FLY AIRPLANE

      (3) Flaps and gear (up)

      (4) Identify

      (5) Verify

      (6) Feather FLY AIRPLANE

      (7) Call for and use checklist

      (8) Maintain altitude with airspeed at least Vyse or above if possible.

   C. Unfeathering. Unfeathering will be accomplished in accordance with the engine restart in the flight checklist.

2. Acceptable Performance Guidelines

   a. Promptly and correctly identify the inoperative engine.

   b. Heading + or - 20 degrees of original assigned.

   c. Plus or minus 100 feet of original altitude, if it is within the capability of the airplane.

   d. Adherence to proper sequence.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____

MANEUVERING WITH ENGINE INOP. (B60)

1. Description

   With one engine feathered or set at zero thrust power, the trainee will make turns into and away from inoperative engine using banks up to 30 degrees. Power will be used as required to maintain altitude and/or airspeed.

2. Acceptable Performance Guidelines

   a. Banks within + or - 5 degrees assigned.

   b. Altitude + or - 100 feet of assigned if within the performance capability of the airplane.

3. PERFORMANCE RATING

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4. DATE: _____ SIGNATURE _____ CFIAI# _____ EX _____