

# Pattern Operations at Lakehurst NAES Airport

## Cessna 172 – CAP 180 HP

### Lakehurst NAES Airport Complex

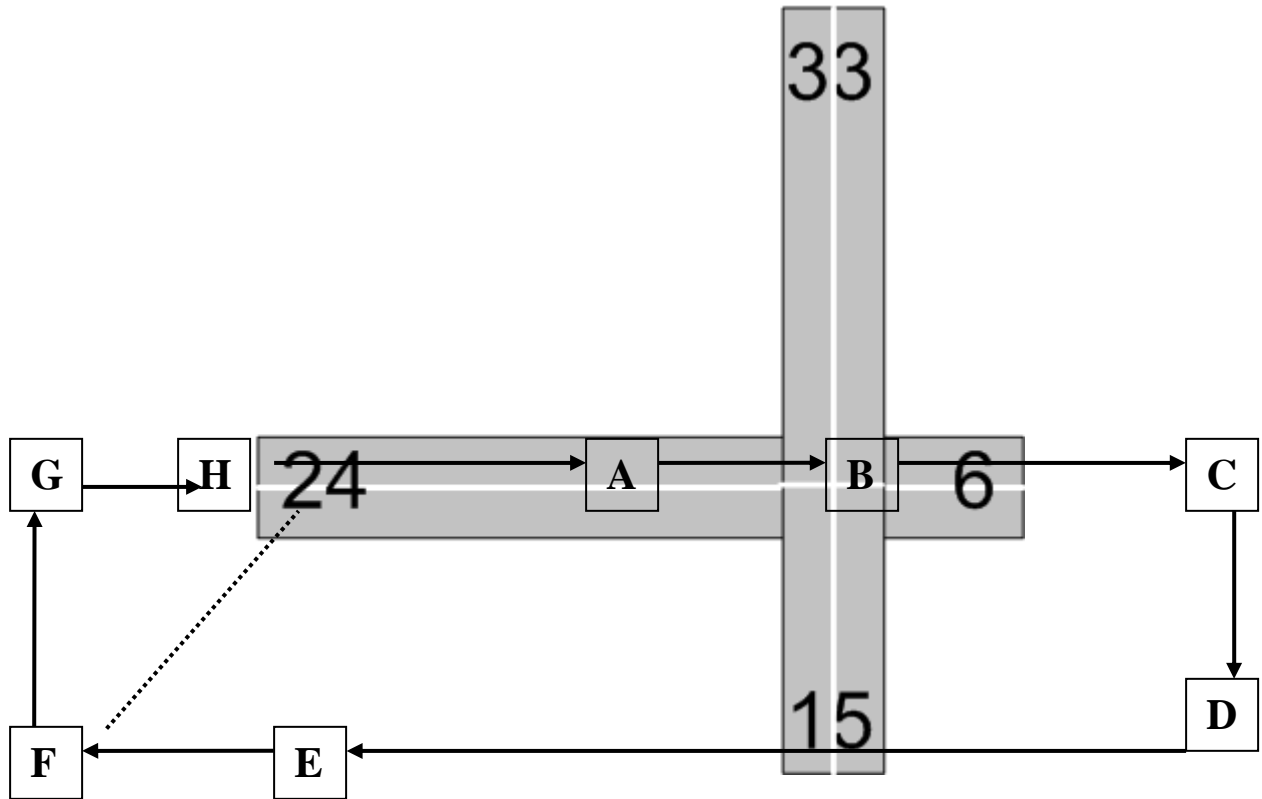
- Airport Designator: KNEL
- Runway dimensions:
  - Runway 6-24: 5002 feet x 150 feet
  - Runway 15-33: 5001 feet x 150 feet
  - Runway 062-242: 3500 feet x 90 feet



- Field Elevation: 103 feet MSL
- Pattern Altitude: 1,100 feet MSL
- Frequencies:
  - Tower: 127.775
  - Ground: 118.375
  - McGuire: 124.15
  - NDB: 396 [NEL]
- Restrictions:
  - Runway 24: Right Traffic
  - Runway 15: Right Traffic
- Noise Abatement Procedures
  - None
- Approaches:
  - DME, VOR, RNAV, GPS, NDB

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**Pattern Work – Runway 24 Lakehurst NAES**  
**Cessna 172 – CAP 180 HP**

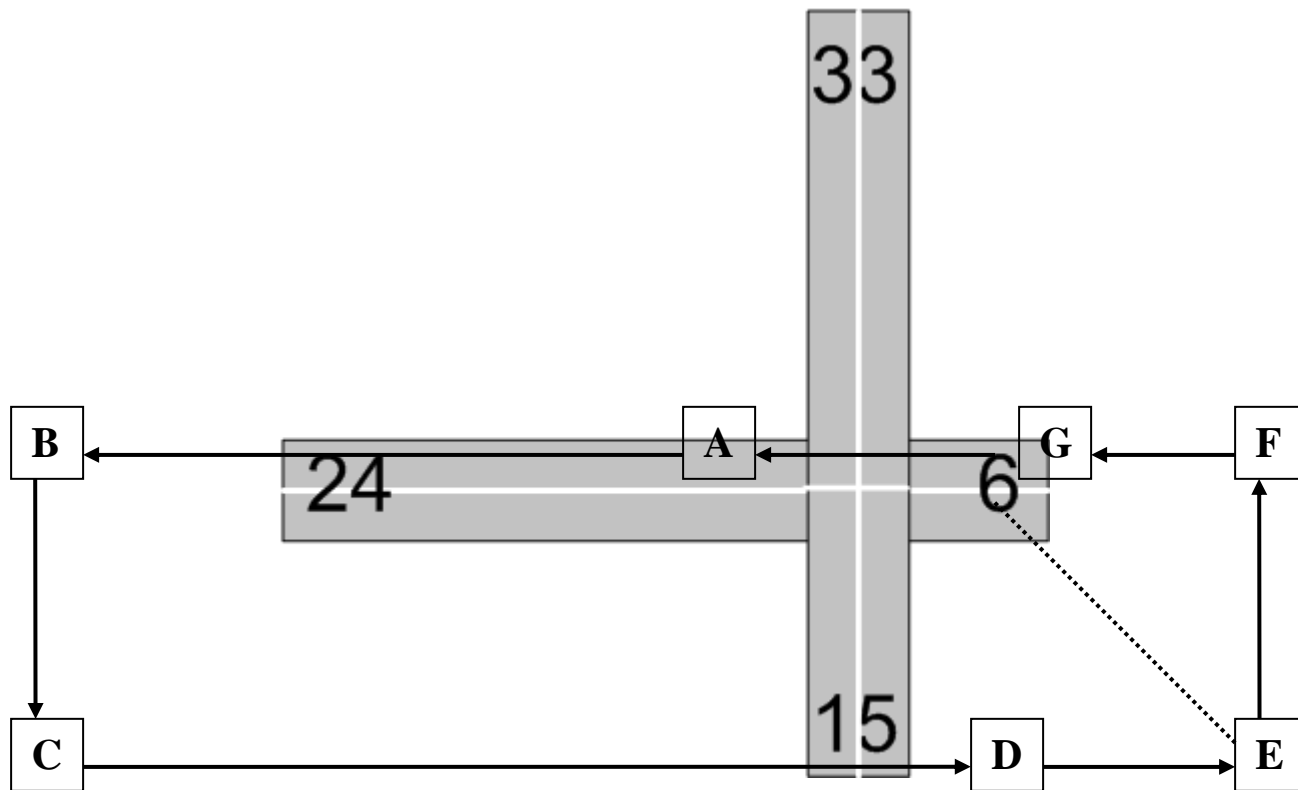


<b>Procedures</b>		
<b>A</b>	<ol style="list-style-type: none"> <li>1. Begin rotation at 55 KIAS</li> <li>2. Pitch for 60 KIAS</li> </ol>	<ol style="list-style-type: none"> <li>3. Establish climb</li> <li>4. TC = ball centered</li> </ol>
<b>B</b>	<ol style="list-style-type: none"> <li>1. Pitch for 76 KIAS</li> <li>2. Maintain runway heading of 240°</li> </ol>	<ol style="list-style-type: none"> <li>3. Climb to 700 ft MSL</li> </ol>
<b>C</b>	<ol style="list-style-type: none"> <li>1. Make crosswind turn to 330°. May need to wait for Tower clearance.</li> <li>2. Level off at 1100 ft MSL</li> <li>3. Throttle to 2300 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Adjust trim for level flight               <ol style="list-style-type: none"> <li>a. ASI = stable in green arc</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 330°</li> <li>e. ALT = 1100</li> <li>f. VSI = 0</li> </ol> </li> </ol>
<b>D</b>	About ½ Mile from Extended Center Line. May need to wait for Tower clearance. <ol style="list-style-type: none"> <li>1. Turn downwind to heading of 060°</li> <li>2. Carb Heat – On</li> <li>3. Throttle 2000 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Maintain straight-and-level flight               <ol style="list-style-type: none"> <li>a. ASI = 90 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 060°</li> <li>e. ALT = 1100</li> <li>f. VSI = 0</li> </ol> </li> </ol>

## Procedures

<b>E</b>	<p>Abeam Base Numbers (24)</p> <ol style="list-style-type: none"> <li>1. Throttle 1500 RPM</li> <li>2. Flaps -- 10°</li> <li>3. Push yoke forward to minimize ballooning from flap extension</li> <li>4. Pitch down for 500 FPM</li> <li>5. Carb Heat – On</li> </ol>	<ol style="list-style-type: none"> <li>6. Verify Instruments             <ol style="list-style-type: none"> <li>a. ASI = 80 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 060°</li> <li>e. ALT = 1100</li> <li>f. VSI = 500 ↓ start descent</li> </ol> </li> </ol>
<b>F</b>	<p>At 45° from the runway threshold</p> <ol style="list-style-type: none"> <li>1. Turn to heading of 150°</li> <li>2. Transmit “CAP Flight 29xx, Base with the gear.”</li> <li>3. Flaps -- 20°</li> </ol>	<ol style="list-style-type: none"> <li>4. Verify instruments             <ol style="list-style-type: none"> <li>a. ASI = 75 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 150°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol> </li> </ol>
<b>G</b>	<p>When nose is about to touch extended centerline</p> <ol style="list-style-type: none"> <li>1. Turn to heading of 240°</li> <li>2. Make sure Tower has said, “CAP Flight 29xx, cleared to land.”</li> <li>3. Flaps -- 30°</li> <li>4. <b>No slips with more than 10° of flaps</b></li> </ol>	<ol style="list-style-type: none"> <li>5. Verify instruments             <ol style="list-style-type: none"> <li>a. ASI = 65 - 70 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 240°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol> </li> </ol>
<b>H</b>	<p>Just before crossing the threshold</p> <ol style="list-style-type: none"> <li>1. Throttle to Idle (full back)</li> <li>2. Pitch for 65 KIAS</li> <li>3. At 2 – 3 feet above runway surface             <ol style="list-style-type: none"> <li>a. Begin flare</li> <li>b. Gently apply back pressure to the yoke</li> </ol> </li> <li>4. If flare too high, add 100 RPM</li> </ol>	<ol style="list-style-type: none"> <li>5. If go-around is necessary             <ol style="list-style-type: none"> <li>a. Full power</li> <li>b. Carb heat – Off</li> <li>c. Flaps up 10°</li> <li>d. Pitch for 60 KIAS</li> <li>e. Establish positive rate of climb</li> <li>f. Flaps up 10°</li> <li>g. Establish 500 FPM ↑</li> <li>h. At 700 ft MSL retract flaps</li> <li>i. Pitch for 76 KIAS</li> </ol> </li> </ol>

**Pattern Work – Runway 6 Lakehurst NAES**  
**Cessna 172 – CAP 180 HP**

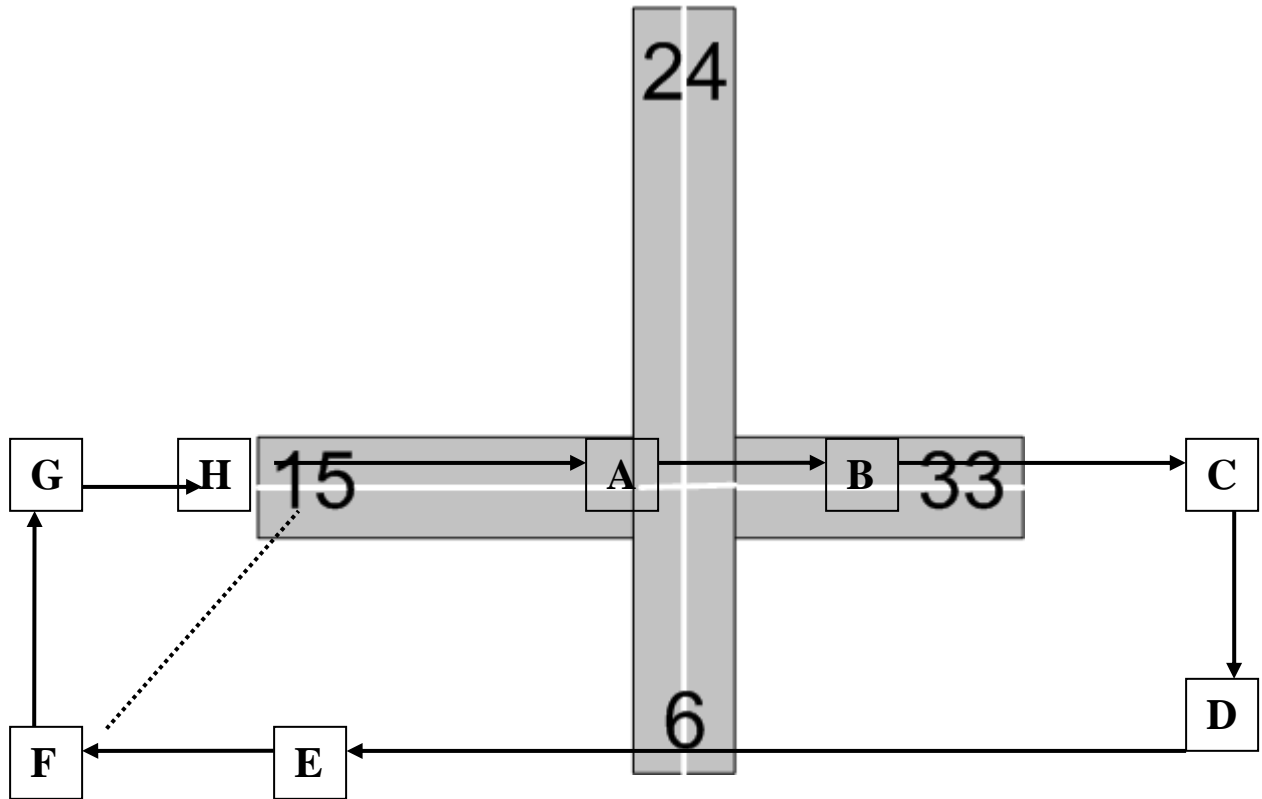


<b>Procedures</b>		
<b>A</b>	<ol style="list-style-type: none"> <li>1. Begin rotation at 55 KIAS</li> <li>2. Pitch for 60 KIAS</li> <li>3. Establish climb</li> <li>4. TC = ball centered</li> </ol>	<ol style="list-style-type: none"> <li>5. Pitch for 76 KIAS</li> <li>6. Hold runway heading 060° to 700 ft MSL</li> </ol>
<b>B</b>	<ol style="list-style-type: none"> <li>1. Make crosswind turn to 330°. May need to wait for Tower clearance.</li> <li>2. Level off at 1100 ft MSL</li> <li>3. Throttle to 2300 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Adjust trim for level flight               <ol style="list-style-type: none"> <li>a. ASI = stable in green arc</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 330°</li> <li>e. ALT = 1100</li> <li>f. VSI = 0</li> </ol> </li> </ol>
<b>C</b>	About ½ Mile from Extended Center Line. May need to wait for Tower clearance. <ol style="list-style-type: none"> <li>1. Turn downwind to heading of 240°</li> <li>2. Carb Heat – On</li> <li>3. Throttle 2000 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Maintain straight-and-level flight               <ol style="list-style-type: none"> <li>a. ASI = 90 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 240°</li> <li>e. ALT = 1000</li> <li>f. VSI = 0</li> </ol> </li> </ol>

## Procedures

<b>D</b>	<p>Abeam Base Numbers (6)</p> <ol style="list-style-type: none"> <li>1. Throttle 1500 RPM</li> <li>2. Flaps -- 10°</li> <li>3. Push yoke forward to minimize ballooning from flap extension</li> <li>4. Pitch down for 500 FPM</li> <li>5. Carb Heat – On</li> </ol>	<ol style="list-style-type: none"> <li>6. Verify Instruments             <ol style="list-style-type: none"> <li>a. ASI = 80 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 240°</li> <li>e. ALT = 1000</li> <li>f. VSI = 500 ↓ start descent</li> </ol> </li> </ol>
<b>E</b>	<p>At 45° from the runway threshold</p> <ol style="list-style-type: none"> <li>1. Turn to heading of 150°</li> <li>2. Transmit “CAP Flight 29xx, Base with the gear.”</li> <li>3. Flaps -- 20°</li> </ol>	<ol style="list-style-type: none"> <li>4. Verify instruments             <ol style="list-style-type: none"> <li>a. ASI = 75 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 150°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol> </li> </ol>
<b>F</b>	<p>When nose is about to touch extended centerline</p> <ol style="list-style-type: none"> <li>1. Turn to heading of 060°</li> <li>2. Make sure Tower has said, “CAP Flight 29xx, cleared to land.”</li> <li>3. Flaps -- 30°</li> <li>4. <b>No slips with more than 10° of flaps</b></li> </ol>	<ol style="list-style-type: none"> <li>5. Verify instruments             <ol style="list-style-type: none"> <li>a. ASI = 65-70 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 060°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol> </li> </ol>
<b>G</b>	<p>Just before crossing the threshold</p> <ol style="list-style-type: none"> <li>1. Throttle to Idle (full back)</li> <li>2. Pitch for 65 KIAS</li> <li>3. At 2 – 3 feet above runway surface             <ol style="list-style-type: none"> <li>a. Begin flare</li> <li>b. Gently apply back pressure to the yoke</li> </ol> </li> <li>4. If flare too high, add 100 RPM</li> </ol>	<ol style="list-style-type: none"> <li>5. If go-around is necessary             <ol style="list-style-type: none"> <li>a. Full power</li> <li>b. Carb heat – Off</li> <li>c. Flaps up 10°</li> <li>d. Pitch for 60 KIAS</li> <li>e. Establish positive rate of climb</li> <li>f. Flaps up 10°</li> <li>g. Establish 500 FPM ↑</li> <li>h. At 700 ft MSL retract flaps</li> <li>i. Pitch for 76 KIAS</li> </ol> </li> </ol>

**Pattern Work – Runway 15 Lakehurst NAES**  
**Cessna 172 – CAP 180 HP**



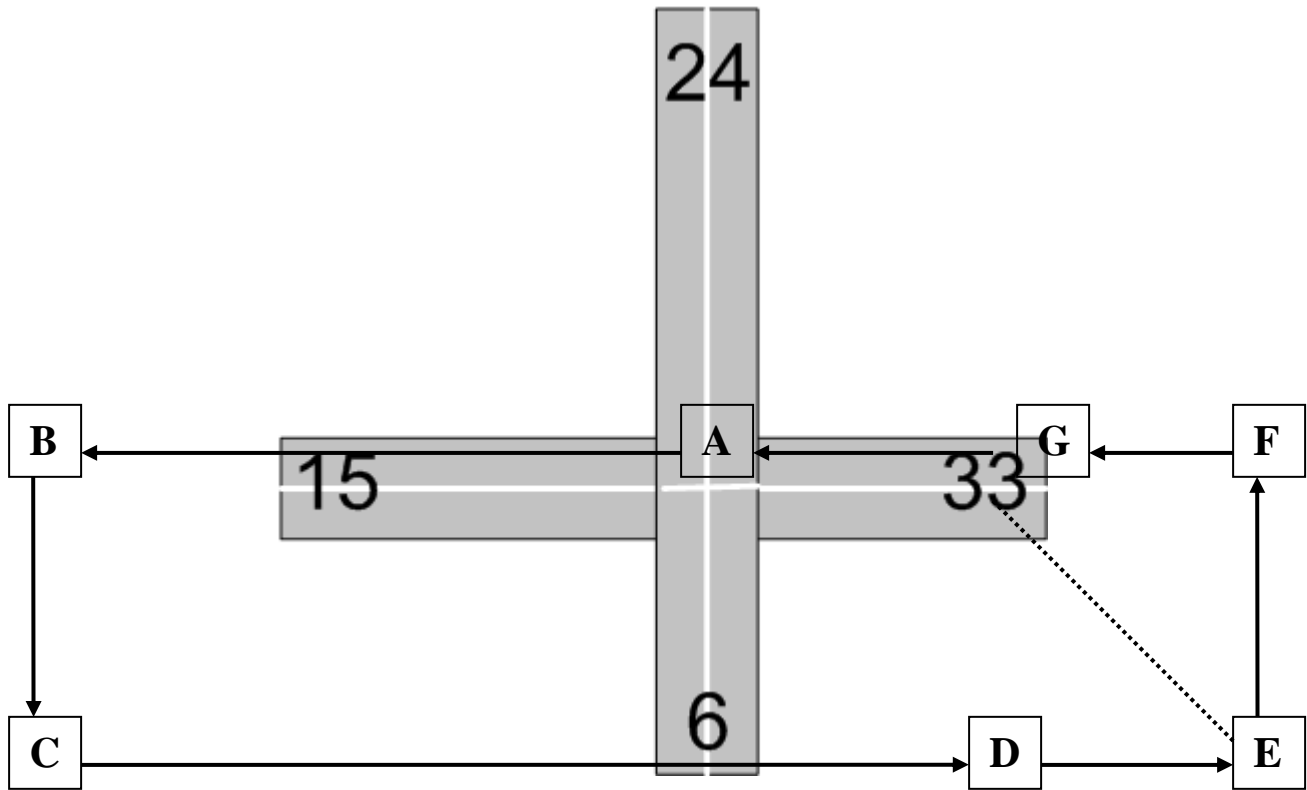
<b>Procedures</b>		
<b>A</b>	<ol style="list-style-type: none"> <li>1. Begin rotation at 55 KIAS</li> <li>2. Pitch for 60 KIAS</li> </ol>	<ol style="list-style-type: none"> <li>3. Establish climb</li> <li>4. TC = ball centered</li> </ol>
<b>B</b>	<ol style="list-style-type: none"> <li>1. Pitch for 76 KIAS</li> <li>2. Maintain runway heading of 240°</li> </ol>	<ol style="list-style-type: none"> <li>3. Climb to 700 ft MSL</li> </ol>
<b>C</b>	<ol style="list-style-type: none"> <li>1. Make crosswind turn to 240°. May need to wait for Tower clearance.</li> <li>2. Level off at 1100 ft MSL</li> <li>3. Throttle to 2300 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Adjust trim for level flight               <ol style="list-style-type: none"> <li>a. ASI = stable in green arc</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 240°</li> <li>e. ALT = 1100</li> <li>f. VSI = 0</li> </ol> </li> </ol>
<b>D</b>	About ½ Mile from Extended Center Line. May need to wait for Tower clearance. <ol style="list-style-type: none"> <li>1. Turn downwind to heading of 330°</li> <li>2. Carb Heat – On</li> <li>3. Throttle 2000 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Maintain straight-and-level flight               <ol style="list-style-type: none"> <li>a. ASI = 90 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 330°</li> <li>e. ALT = 1100</li> <li>f. VSI = 0</li> </ol> </li> </ol>

## Procedures

<b>E</b>	<p>Abeam Base Numbers (15)</p> <ol style="list-style-type: none"> <li>1. Throttle 1500 RPM</li> <li>2. Flaps -- 10°</li> <li>3. Push yoke forward to minimize ballooning from flap extension</li> <li>4. Pitch down for 500 FPM</li> <li>5. Carb Heat – On</li> </ol>	<ol style="list-style-type: none"> <li>6. Verify Instruments             <ol style="list-style-type: none"> <li>a. ASI = 80 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 330°</li> <li>e. ALT = 1100</li> <li>f. VSI = 500 ↓ start descent</li> </ol> </li> </ol>
<b>F</b>	<p>At 45° from the runway threshold</p> <ol style="list-style-type: none"> <li>1. Turn to heading of 060°</li> <li>2. Transmit “CAP Flight 29xx, Base with the gear.”</li> <li>3. Flaps -- 20°</li> </ol>	<ol style="list-style-type: none"> <li>4. Verify instruments             <ol style="list-style-type: none"> <li>a. ASI = 75 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 060°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol> </li> </ol>
<b>G</b>	<p>When nose is about to touch extended centerline</p> <ol style="list-style-type: none"> <li>1. Turn to heading of 150°</li> <li>2. Make sure Tower has said, “CAP Flight 29xx, cleared to land.”</li> <li>3. Flaps -- 30°</li> <li>4. <b>No slips with more than 10° of flaps</b></li> </ol>	<ol style="list-style-type: none"> <li>5. Verify instruments             <ol style="list-style-type: none"> <li>a. ASI = 65 - 70 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 150°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol> </li> </ol>
<b>H</b>	<p>Just before crossing the threshold</p> <ol style="list-style-type: none"> <li>1. Throttle to Idle (full back)</li> <li>2. Pitch for 65 KIAS</li> <li>3. At 2 – 3 feet above runway surface             <ol style="list-style-type: none"> <li>a. Begin flare</li> <li>b. Gently apply back pressure to the yoke</li> </ol> </li> <li>4. If flare too high, add 100 RPM</li> </ol>	<ol style="list-style-type: none"> <li>5. If go-around is necessary             <ol style="list-style-type: none"> <li>a. Full power</li> <li>b. Carb heat – Off</li> <li>c. Flaps up 10°</li> <li>d. Pitch for 60 KIAS</li> <li>e. Establish positive rate of climb</li> <li>f. Flaps up 10°</li> <li>g. Establish 500 FPM ↑</li> <li>h. At 700 ft MSL retract flaps</li> <li>i. Pitch for 76 KIAS</li> </ol> </li> </ol>



**Pattern Work – Runway 33 Lakehurst NAES**  
**Cessna 172 – CAP 180 HP**



<b>Procedures</b>		
<b>A</b>	<ol style="list-style-type: none"> <li>1. Begin rotation at 55 KIAS</li> <li>2. Pitch for 60 KIAS</li> <li>3. Establish climb</li> <li>4. TC = ball centered</li> </ol>	<ol style="list-style-type: none"> <li>5. Pitch for 76 KIAS</li> <li>6. Hold runway heading 330° to 700 ft MSL</li> </ol>
<b>B</b>	<ol style="list-style-type: none"> <li>1. Make crosswind turn to 240°. May need to wait for Tower clearance.</li> <li>2. Level off at 1100 ft MSL</li> <li>3. Throttle to 2300 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Adjust trim for level flight               <ol style="list-style-type: none"> <li>a. ASI = stable in green arc</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 240°</li> <li>e. ALT = 1100</li> <li>f. VSI = 0</li> </ol> </li> </ol>
<b>C</b>	About ½ Mile from Extended Center Line. May need to wait for Tower clearance. <ol style="list-style-type: none"> <li>1. Turn downwind to heading of 150°</li> <li>2. Carb Heat – On</li> <li>3. Throttle 2000 RPM</li> </ol>	<ol style="list-style-type: none"> <li>4. Maintain straight-and-level flight               <ol style="list-style-type: none"> <li>a. ASI = 90 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 150°</li> <li>e. ALT = 1000</li> <li>f. VSI = 0</li> </ol> </li> </ol>

## Procedures

<b>D</b>	Abeam Base Numbers (33) <ol style="list-style-type: none"> <li>1. Throttle 1500 RPM</li> <li>2. Flaps -- 10°</li> <li>3. Push yoke forward to minimize ballooning from flap extension</li> <li>4. Pitch down for 500 FPM</li> <li>5. Carb Heat – On</li> </ol>	6. Verify Instruments <ol style="list-style-type: none"> <li>a. ASI = 80 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = level on horizon</li> <li>d. HI = 150°</li> <li>e. ALT = 1000</li> <li>f. VSI = 500 ↓ start descent</li> </ol>
<b>E</b>	At 45° from the runway threshold <ol style="list-style-type: none"> <li>1. Turn to heading of 060°</li> <li>2. Transmit “CAP Flight 29xx, Base with the gear.”</li> <li>3. Flaps -- 20°</li> </ol>	4. Verify instruments <ol style="list-style-type: none"> <li>a. ASI = 75 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 060°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol>
<b>F</b>	When nose is about to touch extended centerline <ol style="list-style-type: none"> <li>1. Turn to heading of 330°</li> <li>2. Make sure Tower has said, “CAP Flight 29xx, cleared to land.”</li> <li>3. Flaps -- 30°</li> <li>4. <b>No slips with more than 10° of flaps</b></li> </ol>	5. Verify instruments <ol style="list-style-type: none"> <li>a. ASI = 65-70 KIAS</li> <li>b. TC = wings level, ball centered</li> <li>c. AI = about 5° below horizon</li> <li>d. HI = 330°</li> <li>e. ALT = descending</li> <li>f. VSI = 500 FPM ↓</li> <li>g. Tachometer = 1500 RPM</li> </ol>
<b>G</b>	Just before crossing the threshold <ol style="list-style-type: none"> <li>1. Throttle to Idle (full back)</li> <li>2. Pitch for 65 KIAS</li> <li>3. At 2 – 3 feet above runway surface                         <ol style="list-style-type: none"> <li>a. Begin flare</li> <li>b. Gently apply back pressure to the yoke</li> </ol> </li> <li>4. If flare too high, add 100 RPM</li> </ol>	5. If go-around is necessary <ol style="list-style-type: none"> <li>a. Full power</li> <li>b. Carb heat – Off</li> <li>c. Flaps up 10°</li> <li>d. Pitch for 60 KIAS</li> <li>e. Establish positive rate of climb</li> <li>f. Flaps up 10°</li> <li>g. Establish 500 FPM ↑</li> <li>h. At 700 ft MSL retract flaps</li> <li>i. Pitch for 76 KIAS</li> </ol>

# V-Speeds for Cessna 172 – CAP 180 HP

Vspeed	Airspeed in KIAS
<b>V<sub>X</sub></b>	<b>60</b>
<b>V<sub>Y</sub></b>	<b>76</b>
<b>V<sub>A</sub></b>	<b>105</b>
<b>V<sub>S</sub></b>	<b>50</b>
<b>V<sub>SO</sub></b>	<b>40</b>
<b>V<sub>FE</sub></b>	<b>85</b>
<b>V<sub>NO</sub></b>	<b>127</b>
<b>V<sub>NE</sub></b>	<b>158</b>
<b>V<sub>Rotate</sub></b>	<b>60</b>
<b>V<sub>Final</sub></b>	<b>65 – 70</b>
<b>V<sub>Glide</sub></b>	<b>70</b>

## Terms, Definitions, Abbreviations

### Cessna 172 – CAP 180 HP

<b>Term</b>	<b>Definition</b>
<b>AGL</b>	Above Ground Level
<b>AI</b>	Attitude Indicator or Artificial Horizon
<b>Alignment</b>	Ground crew member who uses hand signals to provide taxiing instructions
<b>ALT</b>	Altimeter
<b>ASI</b>	Airspeed Indicator
<b>ASOS</b>	Automated Surface Observation System
<b>AWOS</b>	Automated Weather Observation System. Predecessor of ASOS
<b>CTAF</b>	Common Traffic Advisory Frequency
<b>DG</b>	Directional Gyro or Heading Indicator
<b>FBO</b>	Fixed Base Operator
<b>Ground</b>	Frequency used to contact Ground Control
<b>HI</b>	Heading Indicator or Directional Gyro
<b>Interval</b>	Aircraft in front of your aircraft in the pattern
<b>MSL</b>	Mean Sea Level
<b>PCL</b>	Pilot-controlled Lighting
<b>TC</b>	Turn Coordinator
<b>Tower</b>	Frequency used to contact the Control Tower
<b>TPA</b>	Traffic Pattern Altitude
<b>Unicom</b>	Usually same as CTAF. Used to call for fuel or other services, e.g. Miller Unicom
<b>VASI</b>	Visual Approach Slope Indicator White/White   Above glideslope (high)      [You'll fly all night] Red/White     On glideslope                    [You're all right] Red/Red       Below glideslope (low)         [You're dead]
<b>VSI</b>	Vertical Speed Indicator