Aircraft Limitations and Memory Items

V Speeds in KIAS:

Vx: 62
Vy: 74
Vg (glide speed): 68
Vr: 60 approx. (not actually shown in POH)
Vs: 48
Vso: 40
Vfe 20, 30: 85
Vfe 10: 110
Vne: 163
Vno: 129
Va@max gross: 105

Aircraft info:

Powerplant
Make- Textron Lycoming
Model- IO-360-L2A
Power- 180HP @ 2700RPM
Info- Normally aspirated, direct-drive, air-cooled, horizontally opposed, fuel injected, four cylinder

Propeller
Make- McCauley
Blades- 2
Type- Fixed pitch

Fuel
Type- 100LL blue
Capacity- 56 total, 53 usable

Oil
Min/Max- 5-8 quarts (read from the dipstick, see p. 8-16)

Weights
MTOW/MLW- 2550
Max ramp weight- 2558
-baggage A - 120lbs
-baggage B- 50lbs (max 120lbs combined)

Additional general limitations:
-AC is normal or utility category dependent on weight
-Normal category for most ops, check in AFM
  - +3.8g to -1.52g for normal, +4.4 to -1.76g for utility
  - +3.0g with flaps extended
-Recommended steep turn entry speed for normal category 95 KIAS
-En-route climb 70-85 KIAS
-Takeoff is not recommended with any LOW FUEL annunciator on 😞

Systems Buzz Words

Airframe:
-all metal (aluminum), four place, high wing
-semi-monocoque
-externally braced wings

Flight controls, trim, and flaps:
-Conventional controls
-Dual controls
-Actuated with cables and pulleys
-Elevator trim has its own smaller cable and pulley
-Ground adjustable rudder trim tab
-Electrically operated slotted flaps

Powerplant and propeller:
-Normally aspirated, direct-drive, air-cooled, horizontally opposed, fuel-injected, four cylinder
-Fixed pitch propeller
-Aluminum prop

Landing gear:
-Tricycle gear
-Fixed gear
-Spring steel main gear struts
-Oleo strut (air + oil) on nose wheel
-Steerable nose wheel

Fuel system:
-fuel injected
-Gravity fed
-2 "integral" tanks in the wings
-Tanks are interconnected by a vent line
-Fuel flow - tanks→fuel selector→reservoir tank→aux pump→fuel SOV→fuel strainer→engine pump→fuel air control unit→distribution valve (spider)→engine
-Aux pump - priming, vapor suppression, emergencies

Hydraulic system:
-Hydraulically actuated disc brakes
-Pilot controls brakes independently with the top of the left and right rudder pedals

Electric System:
-28v 60a alternator
-24v lead acid battery
-Alternator provides electrical power while engine is running
-Battery is only used for starting or if the alternator fails
-Low voltage warning light comes on if running on battery power

Anti-Icing:
-Not approved for flight into known icing
-Pitot heat and window defrost for ice protection

Vacuum:
-Most S models have 2 vac pumps, runs DG, ATT ind.
Performance Charts - Walkthroughs and Gotchas

Takeoff Distance Chart:

**General Example:**
Calculate distance to clear a 50’ obstacle

**Conditions:**
- Field Elevation: 300’
- Altimeter Setting: 29.72 InHg
- Weight: Max gross 2550lbs
- Temp: 15°C
- Wind: 020°@15
- Departure RNY: 36
- RNY Condition: dry, paved, level

**Steps:**

1. Calculate Pressure Altitude - Use flight computer or the following formula:

\[ PA = (29.92 - \text{Altimeter setting}) \times 1000 + \text{field elevation} \]

Ex.

\[ PA = (29.92 - 29.72) \times 1000 + 300 \]

\[ PA = 500’ \] (watch your negatives and note PA can be a negative number)

2. Locate pressure altitude on the left of the chart and temperature on top. Follow both to find the intersection. You will see two columns, one is for ground roll, and the other is for the 50’ barrier distance. Be sure to use the appropriate column.

3. Mush the numbers (Average) – In the example, the given temp is 15°C and the calculated PA is 500’. Both lie half way between two columns and rows. This gives 4 numbers that need to be averaged.

- First, take the average of the two numbers in the 10°C column and the two numbers in 20°C column.

  Ex. (1575+1720)/2 and (1690+1850)/2 = 1648 and 1770

- Then take the average of these two numbers

  Ex. (1648+1770)/2= 1709
4. Accounting for wind – Because the given wind and the departure RNY are not aligned, the headwind component must be calculated. The crosswind component does not affect T/O distance. A flight computer or figure 5-4 from the POH on the right can be used to calculate the HW component.

- **Using 5-4** – Find the amount of degrees between the departure RNY and the wind direction. (360 and 020 gives a 20° difference) Locate the 20° spoke and follow it up until reaching the 15 Knot arc. Move left to find the HW component, which in this case is **14 Kts**.
  
  NOTE: If the Difference is more than 90°, there will be a tailwind component instead of a HW component.

- Referencing the notes section at the bottom of the T/O distance chart → **Bullet 3** says deduct 10% for each 9 knots of HW. To do this use the following formula:

\[
\text{Final Distance} = \text{TO dist.} - \frac{\text{TO dist.} \times \text{Headwind} \times 1}{9}
\]

Ex.

\[
\text{Final Distance} = 1709 - \frac{1709 \times 14 \times 1}{9}
\]

**Final distance = 1,443'**

NOTE: Remember your order of operations. You must do the right side first and then subtract that entire value from the TO distance found in step 3.

NOTE: If you come across a tail wind, use this formula:

\[
\text{Final Distance} = \text{TO dist.} + \frac{\text{TO dist.} \times \text{Tailwind} \times 1}{2}
\]

**Gotchas:**

**The negative PA Gotcha** – For you Florida and costal flyers, it is likely you will have a negative PA, especially in FL in the winter after a cold front passes. Cessna gives no guidance on what do in this case. I recommend using S.L. as your PA. This will give a more conservative answer and prevents you from using black magic to find an answer. If your PA is above 8,000', I recommend moving to a sunny place like Florida where you can breathe and your 172 doesn’t come in as hot as a Citation.
The grass runway Gotcha – This pain in the A@! question is fairly common and is extremely tricky. It basically involves adjusting for wind and runway surface to calculate a 50’ barrier distance. It seems easy, but there is a specific order in which the adjustments must be made or the answer will be incorrect. I have provided a full walkthrough here:

**Question:** Calculate the takeoff distance over a 50’ barrier given the following conditions:

1. Find the ground roll from the chart based only on pressure altitude and temperature. Moving from 1,000’ and 30°C will yield a ground roll figure of 1,170’.
2. Apply the correction to the ground roll figure for the grass runway. **Bullet 4** says to add 15% for grass:  
   \[ \text{Grass GR} = \text{Paved GR} \times 1.15 \]  
   Grass GR = 1,346’
3. Find the 50’ barrier distance from the chart based only on pressure altitude and temperature. Moving from 1,000’ and 30°C will yield a 50’ barrier distance of 1,990’.
4. Subtract the ground roll figure of 1,170’ found in step 1 from the 50’ barrier distance found in step 3. (I.e. 1,990’-1,170’=820’). 820’ is the distance the plane traveled from wheels up to reach an altitude of 50’. (See where this is going?)
5. Add the number found in step 4 to the Grass GR figure found in step 2. (I.e. 820’+1,346’=). 2,166’ is the total 50’ barrier distance not adjusted for wind.
6. Now correct the whole thing for wind. The HW component is 9 knots, so 2,166’ must be reduced by 10%. Ex.

\[ \text{Final Distance} = 2,166’ - \frac{2,166 \times 9 \times 1}{9} \]

**Final distance = 1,949’**

So there you have it. In essence, you have to correct the 50’ barrier distance by mathematically “cutting out” the original ground roll figure and adding in the one adjusted by 15%. The theory is that the grass won’t affect the aircraft when it’s in the air. Then you have to reduce the adjusted 50’ barrier distance for wind because the wind will affect the plane on and off of the grass. This question is pure punishment and I have seen it from a few different examiners.
Landing Distance Chart:

The procedure for calculating landing distance is identical to the procedure for calculating T/O distance. Refer to the takeoff distance procedure for a refresher if needed. Average the numbers in the same manner and use the same procedure for correcting for wind. The answer to the example above is 1,351'.

The procedure for correcting for grass can be a little confusing. See below:

Gotchas:

A grass runway increases my landing distance? – Logic would dictate that a grass runway decreases takeoff distance because the increased drag from the grass pushes against the tires and helps slow the plane down. Many students fall victim to this specious claim... don’t let it happen to you! Although grass does indeed add drag to the plane and help it slow, it provides a greatly reduced frictional surface for stopping. The above chart is for a maximum braking effort landing. This is accomplished by pushing on the brakes until they nearly lock up. If you tried identical braking efforts on pavement and on grass, you would skid on the grass far before you skidded on the pavement. During a normal landing, the brakes are pushed nowhere their maximum. Normally you push on them just hard enough to make the turnoff. Because of this, many pilots are not accustom to the ridiculous amount of braking action required to provide “MAX BRAKING” and forget how much traction it takes to bring the plane to a stop during that effort.

General Example:
Calculate distance required to land over a 50° obstacle

Conditions:
Field Elevation: 300’
Altimeter Setting: 29.72 InHg
Weight: Max gross 2550
Temp: 15°C
Wind: 020°@15
Departure RNY: 36

The procedure for calculating landing distance is identical to the procedure for calculating T/O distance. Refer to the takeoff distance procedure for a refresher if needed. Average the numbers in the same manner and use the same procedure for correcting for wind. The answer to the example above is 1,351'. The procedure for correcting for grass can be a little confusing. See below:
Fuel, Time, and Distance to Climb:

**General Example:**
Calculate the fuel, time, and distance to climb

**Conditions:**
- Field Elevation: 1,000'
- Cruising Altitude: 6,500'
- Altimeter Setting: 29.92 InHg
- Weight: Max gross 2550
- Temp. at Field: 28°C

1. First calculate PA. In this example, the altimeter setting is 29.92. Because this is standard pressure, the PA is equal to the FE, in this case 1,000'. If pressure were nonstandard, use a flight computer, of the formula from the takeoff distance explanation to calculate it.
2. From the “From Sea Level” box at the top right of the chart, move downward to find the time, fuel, and distance figures for 6,000’ and 7,000’ in the blue box. Averaging these to values will give the fuel, time, and distance to climb from S.L. to 6500. Ex: 
   
<table>
<thead>
<tr>
<th>Press Alt</th>
<th>Climb Speed</th>
<th>Rate of Climb</th>
<th>From Sea Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.L</td>
<td>74</td>
<td>730</td>
<td>0</td>
</tr>
<tr>
<td>1000</td>
<td>73</td>
<td>695</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>73</td>
<td>665</td>
<td>3</td>
</tr>
<tr>
<td>3000</td>
<td>73</td>
<td>620</td>
<td>4</td>
</tr>
<tr>
<td>4000</td>
<td>73</td>
<td>600</td>
<td>6</td>
</tr>
<tr>
<td>5000</td>
<td>73</td>
<td>550</td>
<td>8</td>
</tr>
<tr>
<td>6000</td>
<td>73</td>
<td>505</td>
<td>10</td>
</tr>
<tr>
<td>7000</td>
<td>73</td>
<td>455</td>
<td>12</td>
</tr>
<tr>
<td>8000</td>
<td>72</td>
<td>410</td>
<td>14</td>
</tr>
<tr>
<td>9000</td>
<td>72</td>
<td>360</td>
<td>17</td>
</tr>
<tr>
<td>10,000</td>
<td>72</td>
<td>315</td>
<td>19</td>
</tr>
<tr>
<td>11,000</td>
<td>72</td>
<td>265</td>
<td>21</td>
</tr>
<tr>
<td>12,000</td>
<td>72</td>
<td>220</td>
<td>28</td>
</tr>
</tbody>
</table>

   Ex: 11-1 = 10min. 2.4-.4 = 2gal. 14.5-2 = 12.5nm

3. Now mathematically cut out the time required to climb to 1,000’ by subtracting the time, fuel, and distance required to climb from S.L. to 1,000’. The values are highlighted in the green box. This is necessary because the climb is starting at 1000’, not S.L.

4. Correct values by adding 10% for each 10°C above standard temperature. Standard temperature at S.L is 15°C. Using the 2°C per 1,000’ rule, the derived standard temperature at 1,000’ is 13°C. The temperature at FE in the example is 28°C, or 15°C above standard. To make the correction, the following formula will work:

   \[
   \text{corrected value} = \frac{100 + \text{degrees above std.}}{100} \times \text{original value}
   \]
Ex: $1.15 \times 10 = 11.5\text{min.}$  
$1.15 \times 2 = 2.3\text{gal.}$  
$1.15 \times 12.5 = 14.4\text{nm}$

5. Apply **bullet 1** to the fuel burn figure which recommends adding **1.4gal** for startup, taxi, and takeoff. Then **multiply the 10th place decimal** of the time value for the climb by **6** to convert to seconds. The grand totals are:

00:11:30 min  
3.7gal.  
14.4nm

**Gotchas:**
**What if it’s colder than standard?** Cessna does not provide you any guidance here. If you are flying on a cold day, use the values for standard. Your answers will be conservative. Although, as an astute flight student, you have probably figured out by now that your beat up old 172 doesn’t obtain performance specs anywhere near what is listed above anyway... so your planning might actually be spot on during a cold day.😆

**Remember the 1.4gal. for startup and taxi:** Yep...

**Calculating TAS, Fuel Burn, and Cruise Power Settings:**

**General Example:**
Calculate TAS, fuel burn, and an appropriate cruise power setting

**Conditions:**
- Field Elevation: 1,000’
- Cruise PA: 5,000’
- Weight: Max gross 2550
- Temp. at field elevation: -7°C
- *No speed fairings

**Steps:**
1. First, find the temperature at cruise altitude in reference to standard. There are a couple of acceptable ways to do this. Unfortunately, it is infrequent to have instantaneous access to the exact temperature aloft, so it is somewhat of a guessing game regardless of the method chosen. Here are two common ways of finding temperature:
   - Find the temperature at FE and assume there is a constant 2°C per 1000’ lapse rate. If the standard temp at the FE of 1000’ is 13°C and the actual temp. at FE is -7°C, the temperature is exactly 20°C **below standard**. (13 – -7=20)
   - Look up the winds aloft forecast and find temperature aloft which is given after the winds. Remember, these forecasts can be almost 12 hours old and the temperature swing can be significant over a 12 hour period.
2. Follow the 20°C below standard temp. column on the left down until reaching the desired altitude. Because 5,000’ falls between 4,000’ and 6,000’, both values will have to be averaged.

3. Choose a power setting in %BHP:

- This is where I’ll throw in some personal touch. I like to choose power settings for light planes based on %BHP and seek how to attain that in RPM, rather than the other way around. The reason for this is that the engine will perform more uniformly under different conditions based on its power output rather than its RPM. Also, I have found that if you run a 172 much over 70% BHP, the engine will start to sound like Gallagher on speed smashing metal watermelons. If I don’t care too much about getting somewhere fast, I’ll shoot for a power setting somewhere between 65% and 70%. Of course, any power setting on the chart is acceptable.
- Looking at the numbers in the two green boxes for 4,000’ and 6,000’, I determined that to get a power setting of around 65%, I would have to run the engine at 2425RPM. I will use this RPM setting for the example. This means more averaging but it will be easier on the ears than a 70% cruise would be.
- In general, or if this confused you: For the 172, you can’t go wrong on a CR with 2350RPM below 4000’ and 2450RPM above.

4. Average the numbers together: Because the cruise PA is 5,000’, you will need to average the numbers for 4,000’ and 6,000’ together. I was looking to fly at a power setting of roughly 65% BHP in the example. Again, this is purely personal preference and any number on the chart is acceptable.

Ex.

For 6,000’, I averaged the two values together to get a power setting closer to 65%:

\[
\text{6,000’} \quad \frac{2500+2400}{2} = 2450\text{RPM} \quad \frac{115+109}{2} = 112\text{KTAS} \quad \frac{9.6+8.6}{2} = 9.1\text{GPH}
\]

Now, average the numbers for 4,000’ and 6,000’ to find the values for 5,000’:

\[
\text{5,000’} \quad \frac{2400+2450}{2} = 2425\text{RPM} \quad \frac{110+112}{2} = 111\text{KTAS} \quad \frac{9.1+9.1}{2} = 9.1\text{GPH}
\]

5. NOTE: Most 172 manuals have a note which states you must reduce TAS by a certain amount of knots if the aircraft is not equipped with speed fairings. After careful review of the 172S operating manual, I could not find this note. Speed fairings (A.K.A. wheel pants) are aerodynamic covers that go over the aircraft’s wheels to decrease drag. It’s not likely your training plane is equipped with these. If you do have this note in your operating manual, remember to apply the correction.

Note: You will notice that fuel flow is approximately the same in regard to %BHP but differs significantly with RPM.
The final result:

2424 RPM  112KTAS  9.1GPH

Gotchas:
Speed Fairings: Remember to apply this correction if the note is present in your operating manual and your aircraft is not equipped with them.

Sample Weight and Balance Using the Cessna Charts and Graphs

Calculating weight and balance for the 172 can be a bit tricky. This is because Cessna provides two limit charts with similar scales which are easily confused. This example will provide a walkthrough using a common CR scenario and will help to prevent the infamous Cessna 172 chart mix-up.

Conditions:
Pilot: 160lbs
Examiner: 180lbs
Pilot’s baggage: 10lbs
Examiner’s baggage: 10lbs
Fuel: Full

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>SAMPLE AIRPLANE</th>
<th>YOUR AIRPLANE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight (Lbs.)</td>
<td>Weight (Lbs.)</td>
</tr>
<tr>
<td>1. Basic Empty Weight</td>
<td>1642</td>
<td>1644</td>
</tr>
<tr>
<td>(Use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel and full oil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Usable Fuel (At 6 Lbs./Gal.)</td>
<td>6x53= 318</td>
<td>62.7</td>
</tr>
<tr>
<td>Standard Fuel 53 Gallons Maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced Fuel (30 Gallons)</td>
<td>180</td>
<td>8.6</td>
</tr>
<tr>
<td>3. Pilot and Front Passenger (FS 20 to 50)</td>
<td>340</td>
<td>160+180=540</td>
</tr>
<tr>
<td>4. Rear Passengers (FS 74)</td>
<td>340</td>
<td>10+10=20</td>
</tr>
<tr>
<td>5. Baggage &quot;A&quot; (FS 82 to 106) 120 Pounds Maximum</td>
<td>56</td>
<td>4.6</td>
</tr>
<tr>
<td>6. Baggage &quot;B&quot; (FS 108 to 142) 50 Pounds Maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. RAMP WEIGHT AND MOMENT</td>
<td>2558</td>
<td>113.2</td>
</tr>
<tr>
<td>8. Fuel allowance for engine start, taxi and runup</td>
<td>-8.0</td>
<td>-0.4</td>
</tr>
<tr>
<td>9. TAKEOFF WEIGHT AND MOMENT (Subtract Step 8 from Step 7)</td>
<td>2550</td>
<td>112.8</td>
</tr>
<tr>
<td>10. Locate this point (2550 at 112.8) on the Center-of-Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The maximum allowable combined weight capacity for baggage in areas A and B is 120 pounds.

Steps:

1. First find a weight and balance form. To prevent reinventing the wheel, this example will use the sample form from the POH. Make a few copies straight out of the POH to follow along. This form is completely acceptable for CR purposes.

2. (right) Populate the weight column of the form with the correct information

For row 1- The actual weight and moment of the aircraft must be used. This means walking out to the actual plane and looking at Section 6 of the POH. The weight and balance form will likely be a loose sheet of paper that is folded and stapled in section 6. An example of what this form should look like is located on the next page on the top right (it’s for a heavier plane). The empty weight and moment are usually located at the bottom of the form. It is important that the empty moment is used and not the empty CG. Both are usually given and if the empty CG is used, the calculations will be wrong. The empty moment is located on the right and is circled in blue. If the moment is given in its full value as it is on the from on the next page, divide the moment by 1,000.

For row 2- Multiply gallons of fuel by 6 to convert to pounds of fuel. For full fuel, multiply 53 by 6. Do not multiply the total fuel value of 56 gallons by 6. The unusable fuel is included in the empty weight.
For row 3- Add your weight to your examiner’s weight. For rows 4, 5, and 6- Total the baggage. Usually, most people put their flight bag on the back seat. If this is the case for you, place your baggage in the “rear passengers” row. If you are putting any bags in the baggage areas, use the appropriate row.

5. Use the loading graph (figure 6-4) to calculate to load moments for the different rows. This graph is shown on the following page. To use the loading graph, scroll up on the left side of the graph until reaching the desired weight. Then follow the graph paper over to the right until hitting the appropriate line for the location of the weight added. Follow the graph paper straight down to find the proper load moment. Make sure to use the appropriate line for pilot and passenger, fuel, and baggage.

If you are an astute flight student (as I’m sure you are), you might have notice the apparent typo made on fig. 6.4. On the graph, it shows 56 gallons as max fuel. The Cessna holds 56 total gallons but only 53 are usable. The 3 unusable gallons are included in the empty weight of the aircraft which you already accounted for in row 1. So… for full fuel, follow the line for 318lbs over, don’t use the top of the fuel line.
6. (below) Fill in the proper load moments into rows 2, 3, and 4. Add all of the moments in the moment column and record the total in row 7. This will give you the moment for aircraft as it sits on the ramp.

7. (below) Subtract .4 from the moment to account for the fuel burnt during start, taxi, and run-up. This will give you your takeoff moment. Record this number in row 9.

8. (right) Use the “CENTER OF GRAVITY MOMENT ENVELOPE” chart (figure 6-7) to determine if the aircraft’s weight and CG are within limits. Follow the left side of the chart until reaching the aircraft’s calculated weight. Find the calculated moment on the bottom of the chart. Use the graph paper to find the intersection of these two numbers. Place a dot at the intersection. The intersection of these two lines must fall within the box. As long as it does, the load is acceptable, and the aircraft is legal to fly.

- If utility category operations are required, the intersection must fall within the shaded region marked “utility category”.

---

![SAMPLE LOADING PROBLEM](image)

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>WEIGHT AND MOMENT TABULATION</th>
<th>SAMPLE AIRPLANE</th>
<th>YOUR AIRPLANE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WEIGHT</td>
<td>MOMENT</td>
<td>WEIGHT</td>
</tr>
<tr>
<td>1. Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel and full oil)</td>
<td>1642</td>
<td>62.6</td>
<td>1644</td>
</tr>
<tr>
<td>2. Usable Fuel (At 8 Lbs./Gall.)</td>
<td>160</td>
<td>8.6</td>
<td>318</td>
</tr>
<tr>
<td>3. Pilot and Front Passenger (FS 32 to 60)</td>
<td>340</td>
<td>12.6</td>
<td>340</td>
</tr>
<tr>
<td>4. Rear Passengers (FS 74)</td>
<td>340</td>
<td>24.8</td>
<td>20</td>
</tr>
<tr>
<td>5. Baggage “A” (FS 82 to 108)</td>
<td>56</td>
<td>4.6</td>
<td>-</td>
</tr>
<tr>
<td>6. Baggage “B” (FS 108 to 142)</td>
<td>50 Pounds Maximum</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. RAMP WEIGHT AND MOMENT</td>
<td>2558</td>
<td>113.2</td>
<td>2322</td>
</tr>
<tr>
<td>8. Fuel allowance for engine start, taxi and runup</td>
<td>-8.0</td>
<td>-0.4</td>
<td>-8</td>
</tr>
<tr>
<td>9. TAKEOFF WEIGHT AND MOMENT (Subtract Step 8 from Step 7)</td>
<td>2550</td>
<td>112.8</td>
<td>2314</td>
</tr>
</tbody>
</table>

10. Locate this point (2550 at 112.8) on the Center-of-Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.

- The maximum allowable combined weight capacity for baggage in areas A and B is 120 pounds.

---
Gotchas:

CG way out of limits? If you have done your calculations and have found the CG is way out of limits with a normal loading, you have probably fallen victim to the C-172 chart mix-up. Figure 6-8 to the right uses arm instead of load moment and will not work if you are using the Cessna weight and balance form as this form works solely with moment. Be careful!