6.7 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

(a) Add the weight of all items to be loaded to the basic empty weight.

(b) Use the Loading Graph (Figure 6-13) to determine the moment of all items to be carried in the airplane.

(c) Add the moment of all items to be loaded to the basic empty weight moment.

(d) Divide the total moment by the total weight to determine the C.G. location.

(e) By using the figures of item (a) and item (d) (above), locate a point on the C.G. range and weight graph (Figure 6-15). If the point falls within the C.G. envelope, the loading meets the weight and balance requirements.

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight			
Pilot and Front Passenger	340.0	85.5	29070
Passengers (Center Seats) (Forward Facing)		118.1	
Passengers (Center Seats) (Aft Facing) (Optional)		119.1	
Passengers (Rear Seats)	340.0	157.6	53584
Passenger (Jump Seat) (Optional)		118.1	
Fuel (94 Gallon Maximum)		93.6	
Baggage (Forward)		42.0	
Baggage (Aft)		178.7	
Moment due to Retraction of Landing Gear			819
Total Loaded Airplane			

The center of gravity (C.G.) of this sample loading problem is at inches aft of the datum line. Locate this point ( ) on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)

Figure 6-9

MODEL PA-32R-300 CHEROKEE LANCE

Airplane Serial Number [redacted]

Registration Number [redacted]

Date 5/17/77

AIRPLANE BASIC EMPTY WEIGHT

Item	Weight (Lbs)	x	C. G. Arm (Inches Aft of Datum)	=	Moment (In-Lbs)
Standard Empty Weight* Actual [redacted]	1975.2		79.9		157833
Optional Equipment	163.0		105.7		17234
Basic Empty Weight	2138.2		81.9		175067

*The standard empty weight includes full oil capacity and 4.0 gallons of unusable fuel.

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

(Gross Weight) - (Basic Empty Weight) = Useful Load

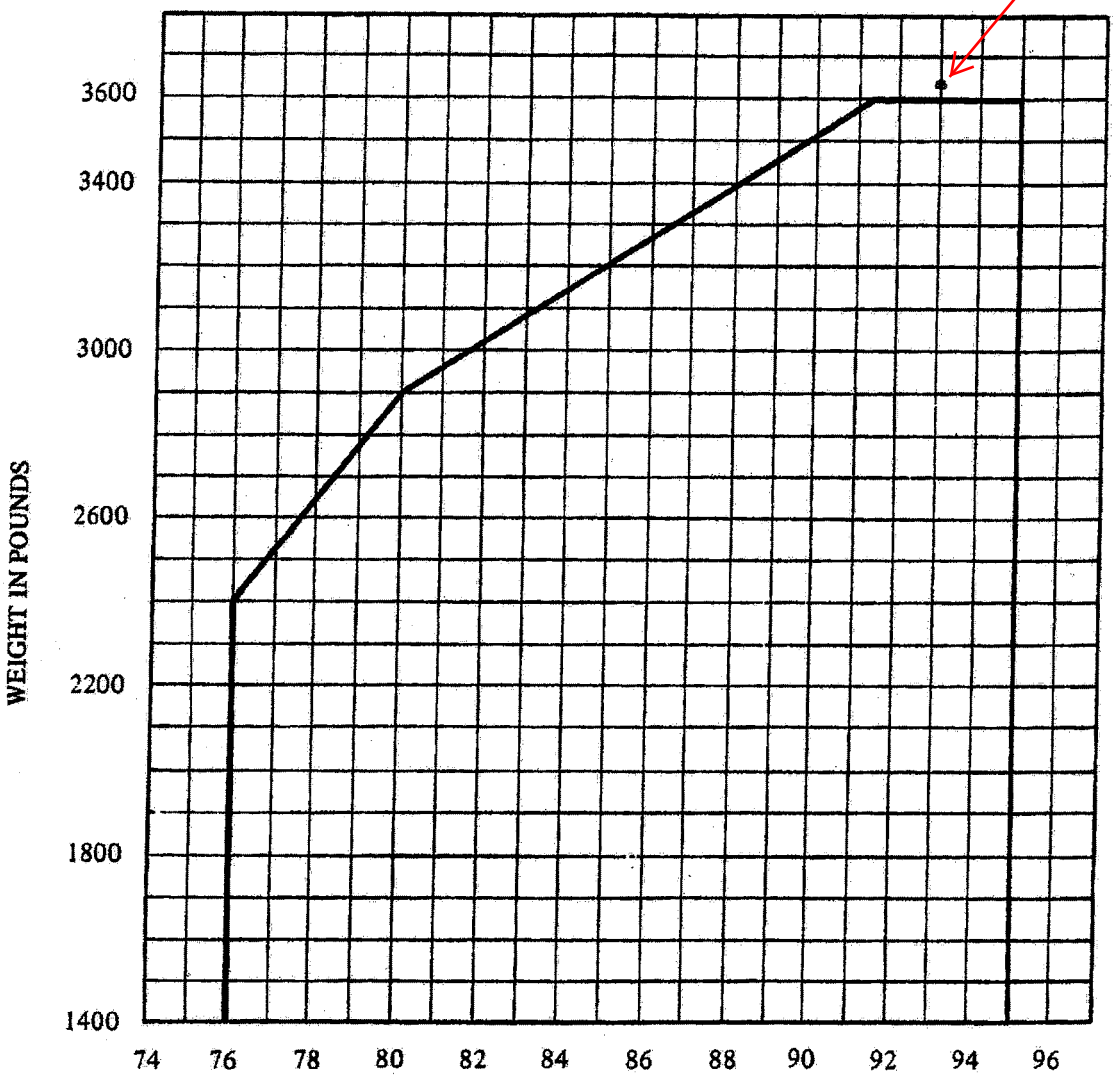
(3600 lbs) - [redacted] lbs) [redacted] lbs.

THIS BASIC EMPTY WEIGHT, C.G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD WHEN ALTERATIONS HAVE BEEN MADE.

WEIGHT AND BALANCE DATA FORM

Figure 6-5

Estimated total weight 3,624.0



Moment due to retracting landing gear = +819 in. lbs.

C. G. RANGE AND WEIGHT

Figure 6-15

ALANCE RECORD

DATE: 24-Aug-99

WNER

MAKE/MODEL	PA32R-300
S/N	32R7780365
N#	N5802V

GROS

OLD		**NEW**	
EMPTY	2162.06	EMPTY	2154.58
CG	82.26	CG	82.31
MOMENT	177858.09	MOMENT	177334.79
USEFUL	1437.94	USEFUL	1445.43

ACTION TAKEN	**WEIGHT**	**ARM**	**MOMENT**
REMOVED			
KING KN62	-2.40	63.10	-151.44
KING KX170B	-7.50	61.60	-462.00
KING KI214	-3.30	64.90	-214.17
KING KI201	-2.50	64.90	-162.25
KING KMA20	-3.70	74.90	-277.13
KING KT76	-3.10	63.10	-195.61
INSTALLED			
GARMIN GMA340	1.63	74.90	121.71
GARMIN GNS430	6.50	60.60	393.90
GARMIN GTX320	2.24	63.10	141.34
GARMIN GI106	1.10	64.90	71.39
GARMIN GA56	0.25	110.40	27.60
AMERI-KING AK550	2.30	51.50	118.45
KING KI208	1.00	64.90	64.90

PA-32R-300, N5802V, SN 32R-7780365

10/28/2015 WEIGHT AND BALANCE CHART

ITEM	WT. (LBS.)	ARM (IN.)	MOMENT (IN. LBS.)
BASIC AIRPLANE	2,154.0	82.3	177,334.8 *
PILOT'S SEAT	235.0	85.5	20,092.5
COPILOT'S SEAT	175.0	85.5	14,962.5
SEAT NO. 3	150.0	119.1	17,865.0
SEAT NO. 4	130.0	119.1	15,483.0
SEAT NO. 5			0.0
SEAT NO. 6			0.0
SEAT NO. 7			0.0
SEAT NO. 8			0.0
FUEL GAL. (MAIN)***	564.0	93.6	52,790.4
FUEL GAL. (AUX)			0.0
BAGGAGE FORWARD			0.0
BAGGAGE AFT**	216.0	178.7	38,599.2
TOTAL WEIGHT	3,624.0	CG 93.0	TOTAL MOMENT 337,127.4

The information in Green was provided by the NTSB

* 177,334.79 was obtained from Weigth and Balance Record 8/24/1999
** Estimated Baggage including a dog.
*** Full fuel 94 galllons useable

PDK WX AT 1353
Temperature 24° Celsius (C), or 75.2° Fahrenheit (F), dew point 16° C (60.8° F), relative humidity 61%.
Elevation of 998 feet at Dekalb-Peachtree Airport would have the density altitude at 2,259 feet.
Runway 030
Winds 080 at 4 kts
Altimeter 30.14
Pressure Altitude 998-220= 778

25 degree Flap Takeoff Performance (50ft Barrier) (figure 5-7) **2000 ft.** Takeoff distance over 50 ft. barrier

25 degree Flaps Takeoff Ground Roll (figure 5-9)	**1050 ft.**	Takeoff ground roll distance.
Gear Down Rate of Climb (figure 5-17)	**660 F.PM**.	Rate of Climb