Diamond DA42
Proficiency Exam

Pilots Name: _____

Date: _____

CORRECTED TO 100%

Instructor Name: _____

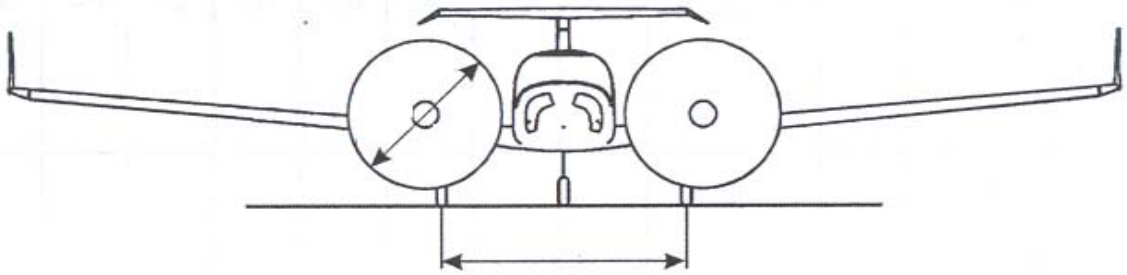
Instructor Signature: _____

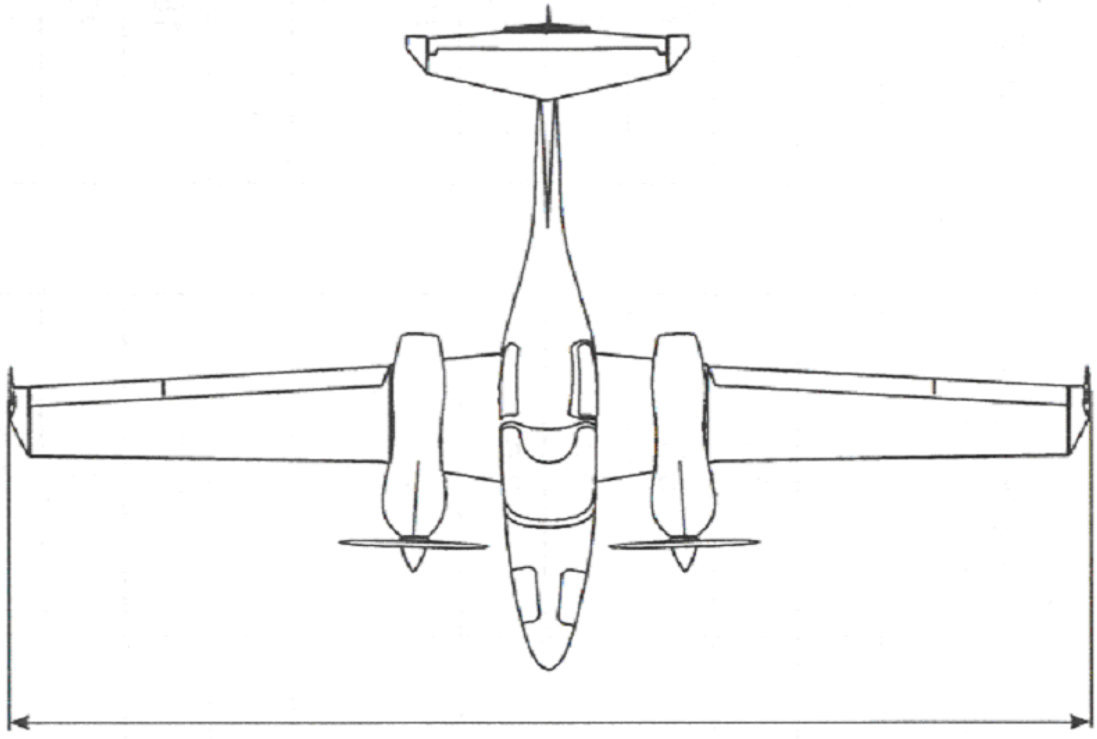
Pilots Signature: _____

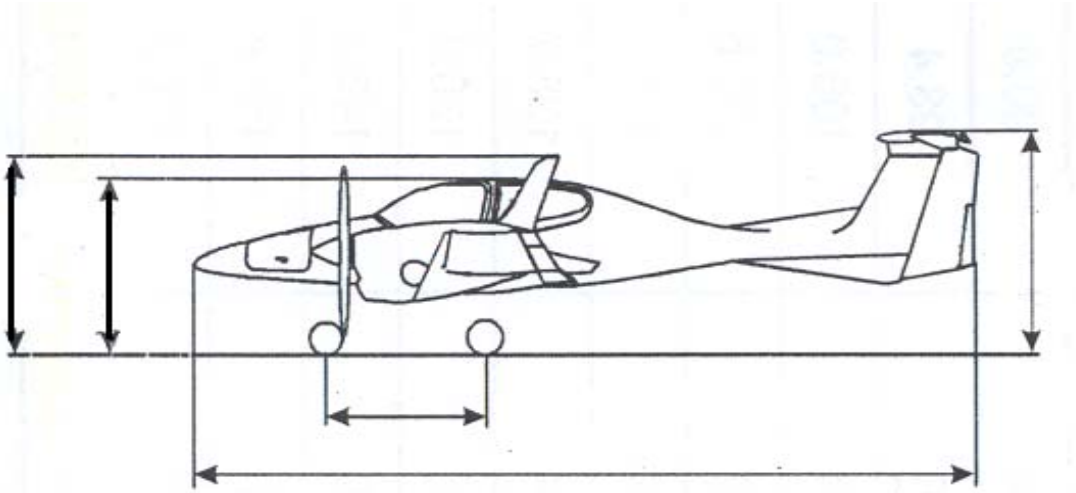
CHAPTER 1 GENERAL

DIMENSIONS

1) Fill in all the numbers where arrows are located.







2) What type of engines are on the DA42 Twin star?

_____

_____

3) What type of propellers are installed on the DA42 Twin star?

_____

_____

4) The DA42 has a maximum rated horsepower for each engine what is the horsepower and at what RPM (Revolutions Per Minute).

_____

_____

5) Define the following with respect to the DA42 Twin star.

CFRP: _____

GFRP: _____

ECU: _____

FADEC: _____

EPU: _____

GIA: _____

CHAPTER 2 OPERATING LIMITATIONS

1) Define and list the following airspeeds for the DA42 Twin star.

V-SPEED	DEFINITION	SPEED
Vs		
Vso		
Vmca		
Vx		
Vy		
Vyse		
Vfe		
Vle		
Vlo		
Va		
Vno		
Vne		

2) Airspeed indicator markings:
White Arc: _____

Green Arc: _____

Yellow Arc: _____

Blue Radial: _____

Red Radial (Min): _____

Red Radial (Max): _____

3) Power-plant limitations:

RPM (Max): _____

RPM (Max overspeed): _____

Max take-off power/ % Load: _____/_____

Max cont. power/ % Load: _____/_____

Fuel Temp Max: _____

Fuel Temp Min: _____

Oil Pressure Max: _____

Oil Pressure Min: _____

Oil Quantity Max: _____

Oil Quantity Min: _____

Gearbox Temp Max: _____

Coolant Temp Max: _____

Coolant Temp Min: _____

Voltage Max: _____

Voltage Min: _____

Amperage Max: _____

Propeller Pitch Angle: Low Pitch: _____

Start Lock Position: _____

Feathered Position: _____

Approved Fuel Grades: _____

Oil Grades: _____

Total Useable Fuel: _____

Max Fuel Quantity: _____

Gearbox Oil (Propeller Gearbox): _____

Coolant Type: _____

Maximum Restart Altitude: _____

Restart Airspeed: _____

Forward Center of Gravity: 2756 – 3236 lbs _____

3748 lbs _____

Rearward Center of Gravity: 2756lbs _____

3527 -3748 lbs _____

Max Take-off Weight: _____

Zero Fuel Weight: _____

Max Landing Weight: _____

Min Flight Weight: _____

Max Baggage Weight: Nose: _____

Cockpit Baggage: _____

Baggage Extension: _____

Maneuvering Load Factors

	@ Va	@ Vne	Flaps APP or LDG
Positive			
Negative			

CHAPTER 3 EMERGENCIES

One engine inoperative minimum control speed (Air) Vmca	
One engine inoperative speed for best rate of climb Vyse	

1) One engine inoperative during flight:
-Engine troubleshooting
1)

2)

3)

4)

5)

6)

2) Engine securing (feathering) procedure:
1)

2)

3)

4)

3) Unfeathering and restarting engine in flight:
1)

2)

3)

4)

5)

6)

7)

4) Engine failure during takeoff:
-During the ground roll
1)

2)

3)

4)

5)

6)

5) Engine failure during takeoff:
-After lift-off
1)

2)

3)

4)

5)

6)

6) Engine failure in flight:
-During climb @ airspeeds below Vmca
1)

2)

3)

4)

5)

7) Engine failure in flight:
-During speeds above Vmca
1)

2)

3)

4)

8) Landing with one engine inoperative:
1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

11)

12)

13)

Continuation of Landing with one engine inoperative continued on next page:

10) Balked landing with one engine inoperative:
14)

15)

16)

17)

18)
***If no positive rate of climb**
19)

20)

21)

11) Flight with one engine inoperative:

1)

2)

3)

4)

12) Landing gear system failures:
-Landing gear unsafe warning
1)

2)

13) Landing gear system failures:
-Manual gear extension of landing gear
1)

2)

3)

4)

5)

6)

7)

14) Failures of the electrical system:
-Complete failure of the electrical system
1)

2)

3)

4)

5)

6)

15) Failures of the electrical system:
-High current
1)

2)

3)

16) Failures of the electrical system:
-Starter malfunction
1)

2)

3)

17) Smoke and fire
-Engine fire on the ground
1)

2)

3)

4)

5)

17) Smoke and fire
-Engine fire during take-off
1)

18) Smoke and fire
-Engine fire in flight
1)

19) Smoke and fire
-Electrical fire on ground
1)

2)

3)

4)

5)

6)

20) Smoke and fire
-Electrical fire in flight
1)

2)

3)

4)

5)

6)

21) Defective propeller RPM regulating system
-Oscillating RPM
1)

2)

22) Defective propeller RPM regulating system
-Propeller over speed
1)

2)

23) Fuel supply failure
1)

2)

24) Recovery from unintentional spin
1)

2)

3)

4)

5)

6)

7)

8)

25) Emergency descent
1)

2)

3)

4)

CHAPTER 4 NORMAL PROCEDURES

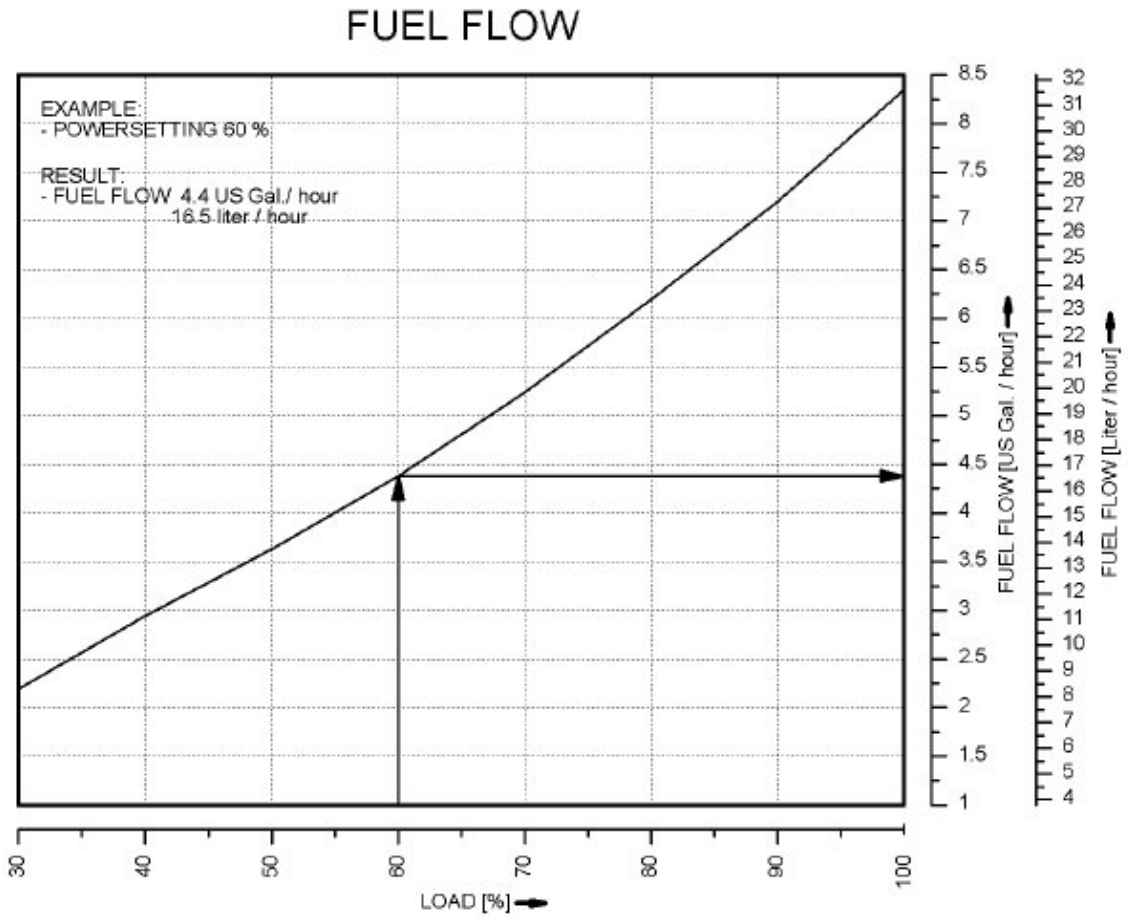
Airspeed for rotation	
Airspeed for take-off climb (best rate of climb speed)	
Airspeed for best angle of climb (NOTE)	
Airspeed for cruise climb	
Reference landing approach speed	
Final approach speed	
Minimum speed during go-around	
Max. structure cruising speed Do not exceed this speed except in smooth air, and then only with caution	

1) What does the NOTE signify in the chart above?

2) What are the main points of a daily check, done before the first flight of the day?
   *
   *
   *
   *
   *

CHAPTER 5 PERFORMANCE

1) Fuel flow:



EXAMPLE:

What is the fuel flow @ 60 % load?

ANSWER:

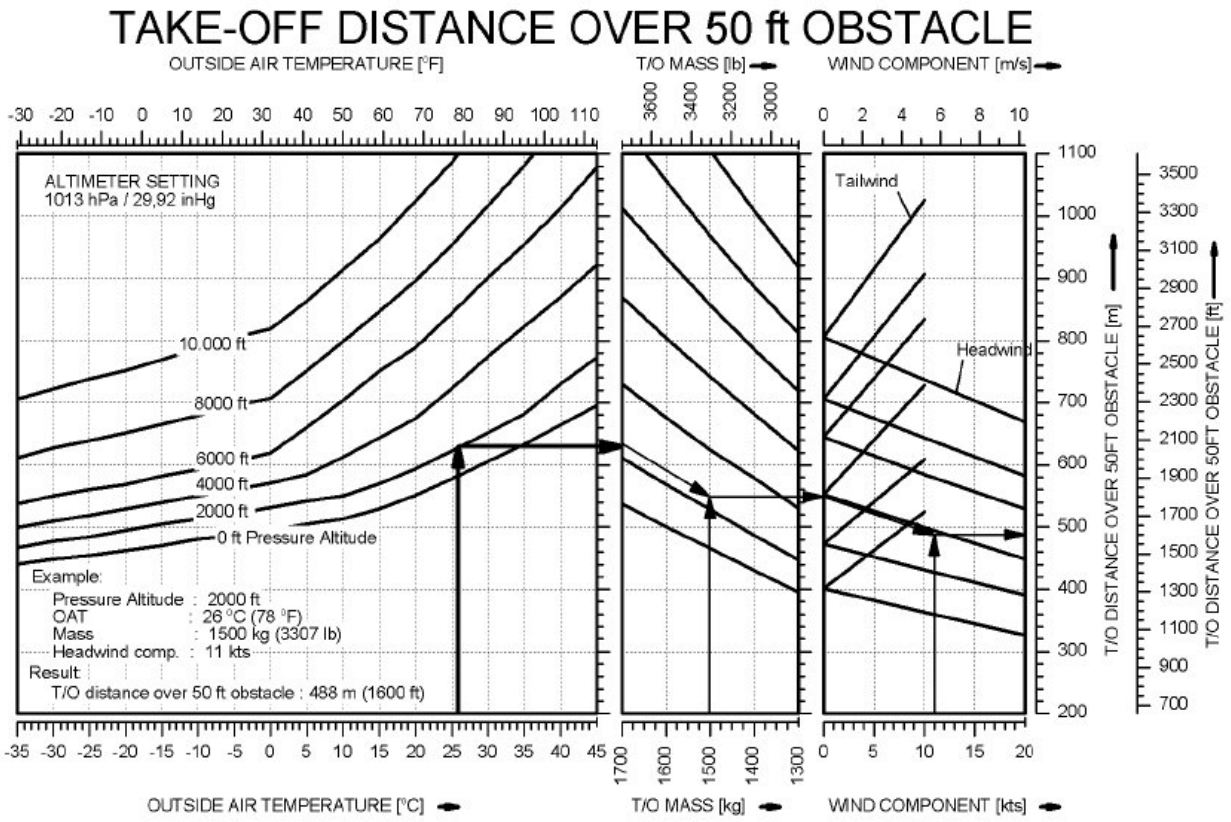
4.4 US Gal. / hour

YOUR QUESTION:

What is the fuel flow @ 80 % load?

ANSWER: _____

2) Take-off distance over a 50 ft obstacle



EXAMPLE:

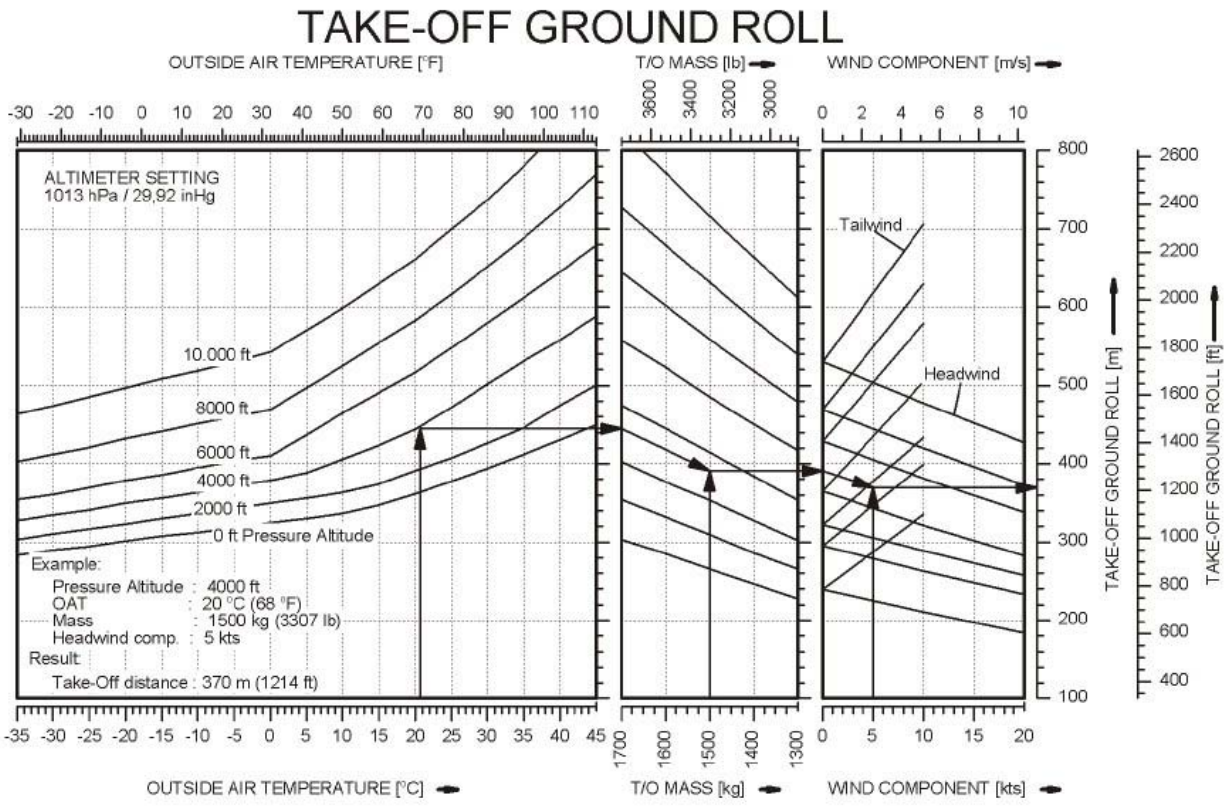
OAT:	26 degrees celcius
PRESSURE ALTITUDE:	2000 feet
TAKE-OFF WEIGHT:	1500 kilograms
WIND COMPONENT:	11 knots (Headwind)
ANSWER:	1600 feet

YOUR QUESTION:

OAT:	15 degrees celcius
PRESSURE ALTITUDE:	3000 feet
TAKE-OFF WEIGHT:	1600 kilograms
WIND COMPONENT:	5 knots (Headwind)

ANSWER: _____

3) Take-off ground roll



EXAMPLE:

OAT:	20 degrees celcius
PRESSURE ALTITUDE:	4000 feet
TAKE-OFF WEIGHT:	1500 kilograms
WIND COMPONENT:	5 knots (Headwind)

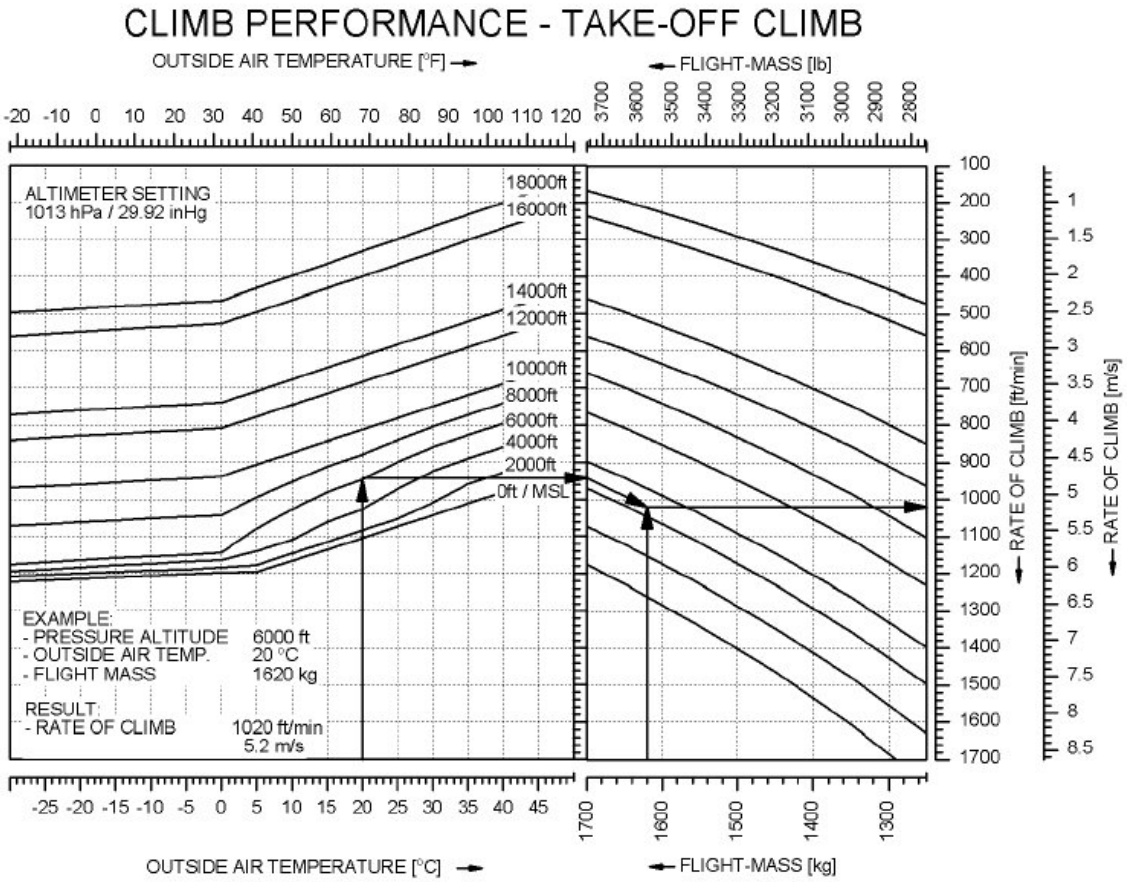
ANSWER: 1214 feet

YOUR QUESTION:

OAT:	25 degrees celcius
PRESSURE ALTITUDE:	1000 feet
TAKE-OFF WEIGHT:	1650 kilograms
WIND COMPONENT:	10 knots (Headwind)

ANSWER: _____

4) Climb performance – take-off climb



EXAMPLE:

OAT:	20 degrees celcius
PRESSURE ALTITUDE:	6000 feet
TAKE-OFF WEIGHT:	1620 kilograms
ANSWER:	1020 feet/ minute

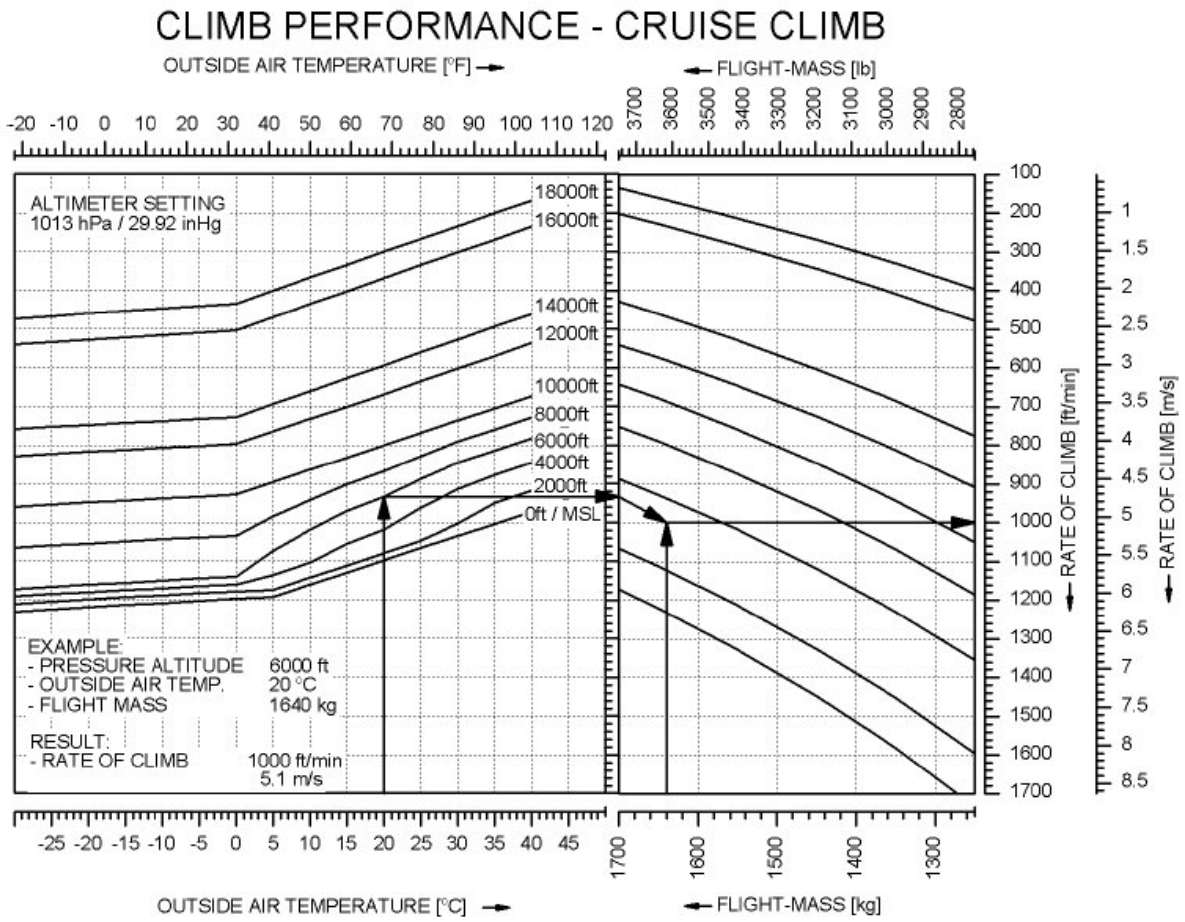
YOUR QUESTION:

OAT:	10 degrees celcius
PRESSURE ALTITUDE:	3000 feet
TAKE-OFF WEIGHT:	1450 kilograms

ANSWER: _____

DA42 PROFICIENCY EXAM

5) Climb performance – cruise climb



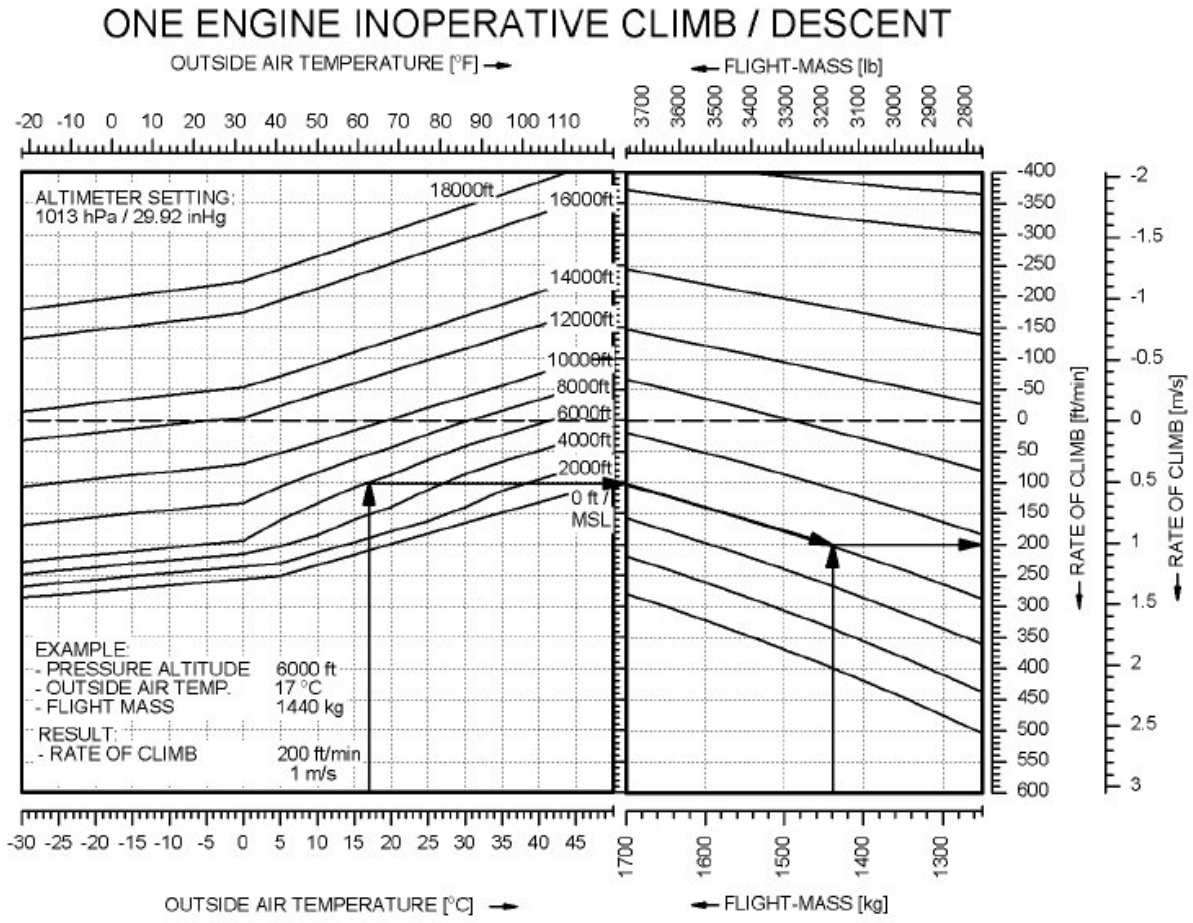
EXAMPLE:

OAT:	20 degrees celcius
PRESSURE ALTITUDE:	6000 feet
TAKE-OFF WEIGHT:	1640 kilograms
ANSWER:	1000 feet/ minute

YOUR QUESTION:

OAT:	15 degrees celcius
PRESSURE ALTITUDE:	2000 feet
TAKE-OFF WEIGHT:	1500 kilograms
ANSWER:	_____

6) One engine inoperative climb / descent



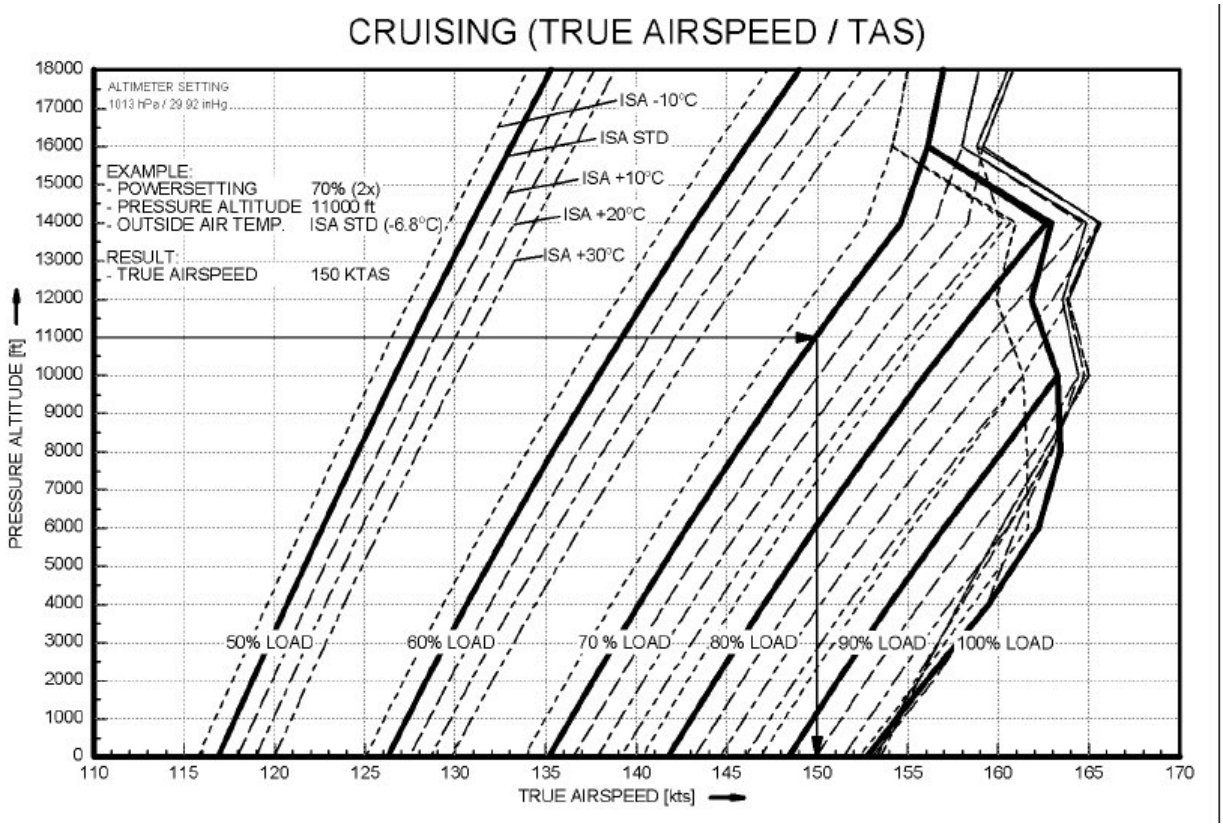
EXAMPLE:

OAT:	17 degrees celcius
PRESSURE ALTITUDE:	6000 feet
TAKE-OFF WEIGHT:	1440 kilograms
ANSWER:	200 feet/ minute

YOUR QUESTION:

OAT:	15 degrees celcius
PRESSURE ALTITUDE:	8000 feet
TAKE-OFF WEIGHT:	1600 kilograms
ANSWER:	_____

7) Cruising (True airspeed / TAS)



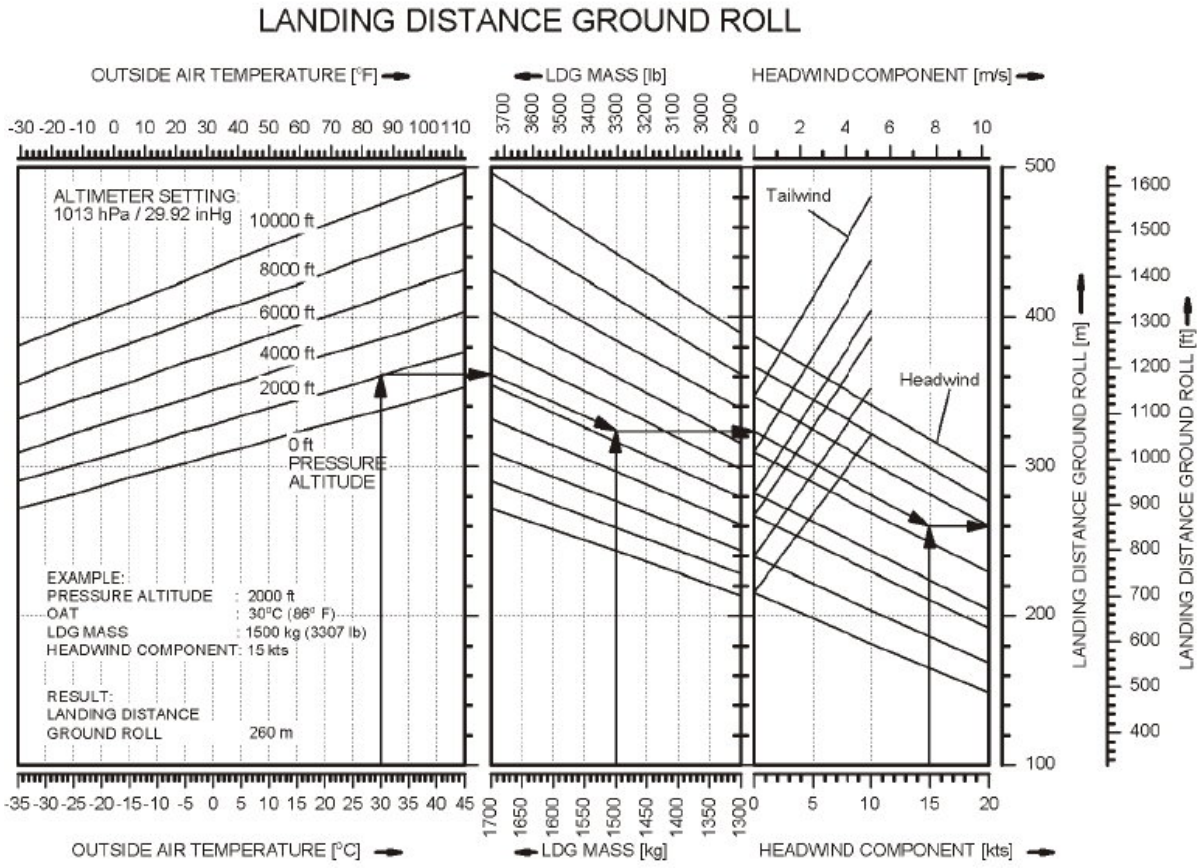
EXAMPLE:

POWERSETTING:	70%
PRESSURE ALTITUDE:	11000 feet
OAT:	ISA STD
ANSWER:	150 knots

YOUR QUESTION:

POWER SETTING:	60% / 70% / 80%
PRESSURE ALTITUDE:	8000 feet
OAT:	ISA – 10 degrees celcius
ANSWER: _____/_____/_____	

8) Landing distance ground roll



EXAMPLE:

PRESSURE ALTITUDE:	2000 feet
OAT:	30 degrees celcius
LANDING WEIGHT:	1500 kilograms
HEADWIND COMPONENT:	15 knots
ANSWER:	850 feet

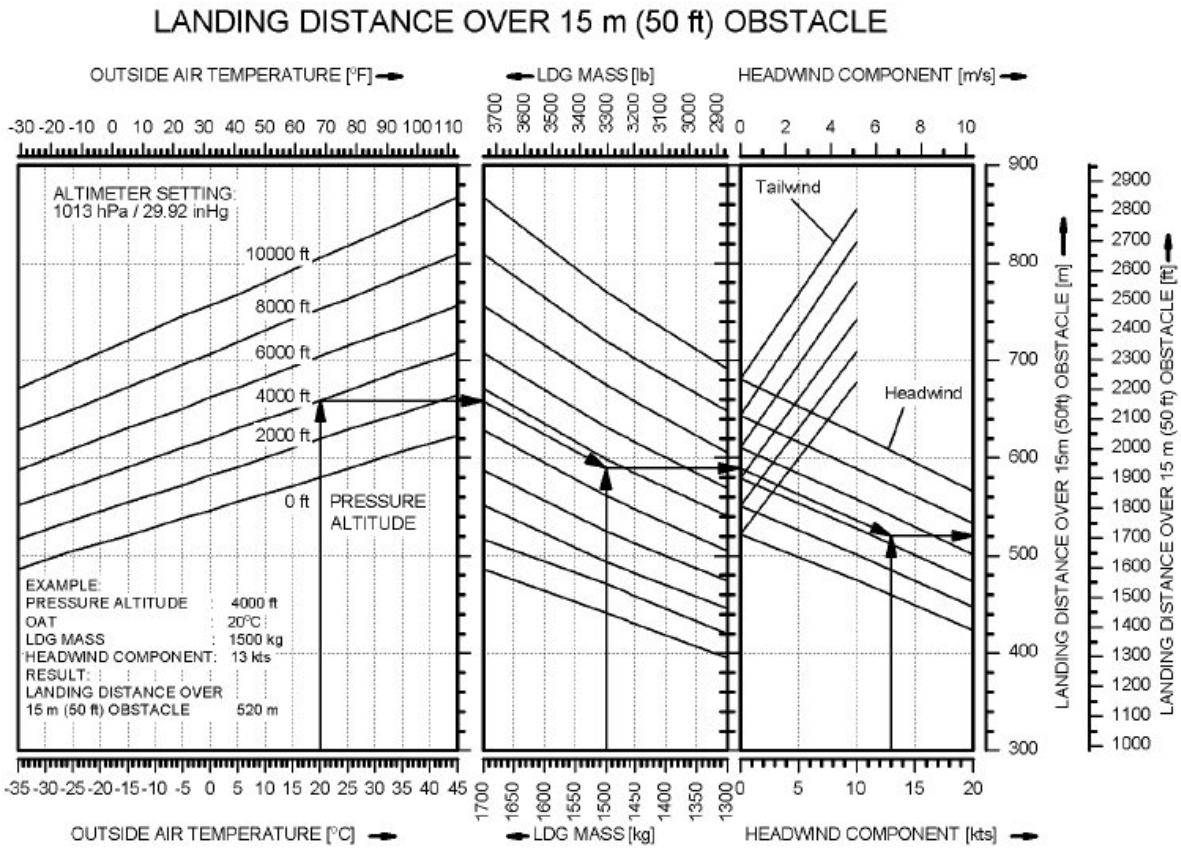
YOUR QUESTION:

PRESSURE ALTITUDE:	4000 feet
OAT:	15 degrees celcius
LANDING WEIGHT:	1450 kilograms
HEADWIND COMPONENT:	10 knots

ANSWER: _____

DA42 PROFICIENCY EXAM

9) Landing distance over a 50 foot obstacle



EXAMPLE:

PRESSURE ALTITUDE:	4000 feet
OAT:	20 degrees celcius
LANDING WEIGHT:	1500 kilograms
HEADWIND COMPONENT:	13 knots
ANSWER:	1700 feet

YOUR QUESTION:

PRESSURE ALTITUDE:	2000 feet
OAT:	10 degrees celcius
LANDING WEIGHT:	1600 kilograms
HEADWIND COMPONENT:	15 knots
ANSWER: _____	

CHAPTER 6 WEIGHT AND BALANCE

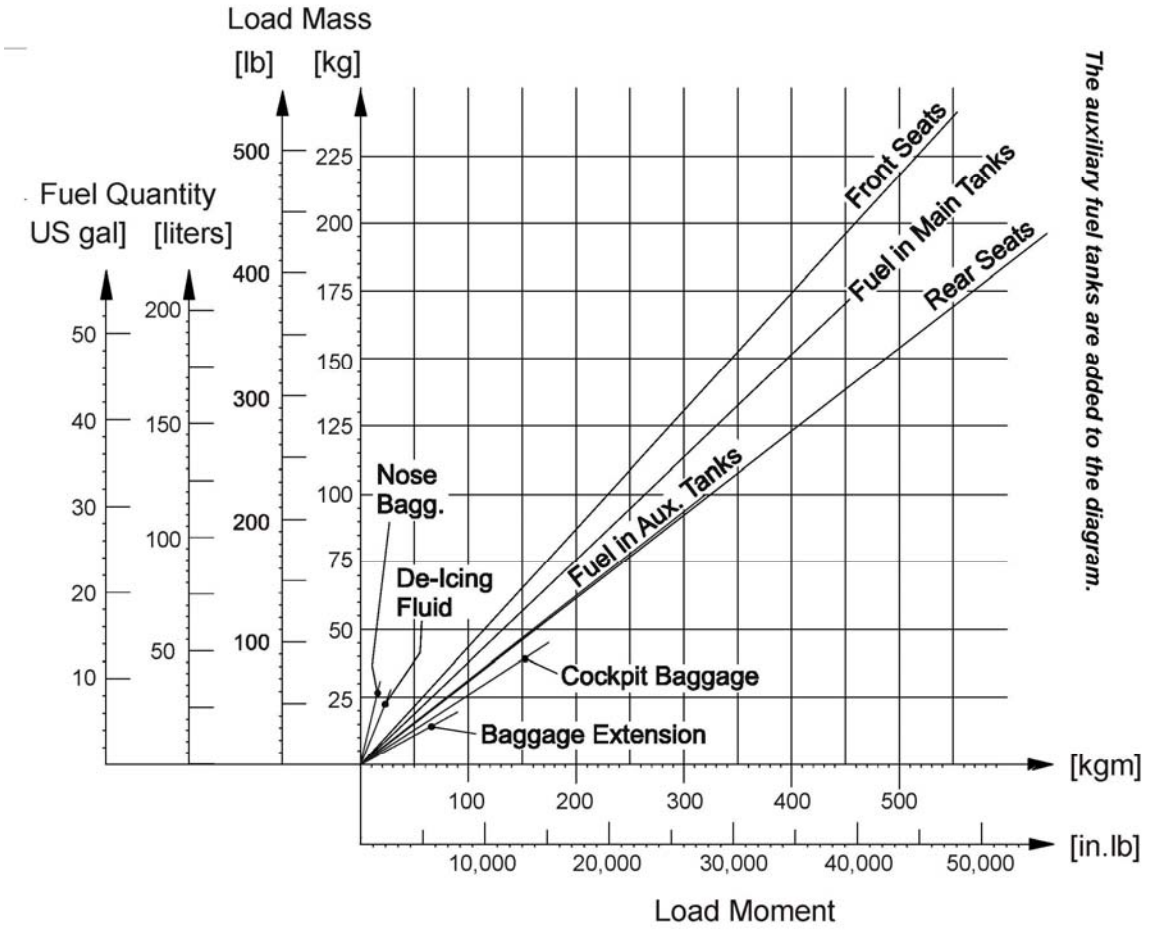
1) Complete the weight and balance for your own personal airplane, using the charts below.

2) INFORMATION:

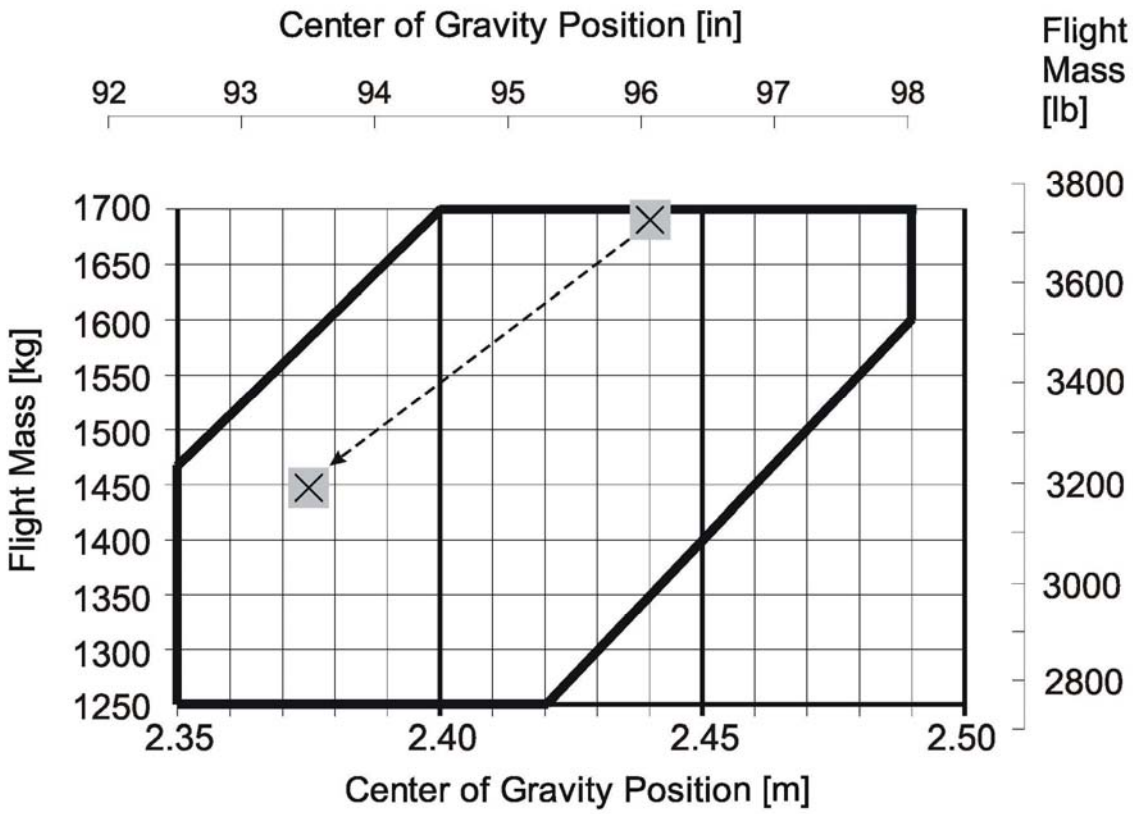
FRONT PASSENGERS:	360 lbs
REAR PASSENGERS:	240 lbs
NOSE BAGGAGE:	40 lbs
BAGGAGE COMPARTMENT:	60 lbs (Cockpit)
FUEL:	? Gallons Total

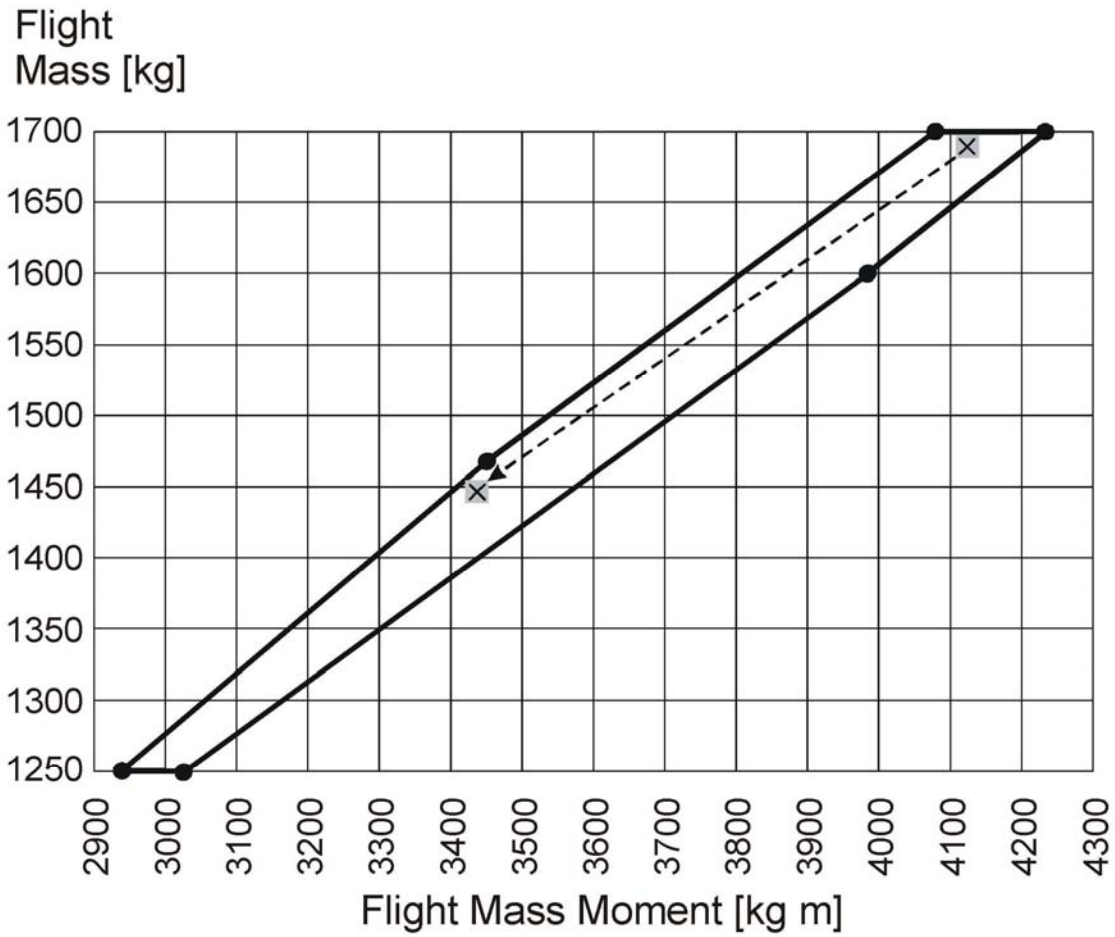
QUESTIONS:

1) How much fuel can you take?
2) What is your → Take-off weight?
   → Zero fuel weight?



CALCULATION OF LOADING CONDITION	DA 42 (Example)		Your DA 42	
	Mass [kg] [lb]	Moment [kgm] [in.lb]	Mass [kg] [lb]	Moment [kgm] [in.lb]
1. Empty mass (from Mass and Balance Report)	1170 *2579*	2749.5 *238,647*		
2. Front seats Lever arm: 2.30 m *(90.6 in)*	160 *353*	368.0 *31,982*		
3. Rear seats Lever arm: 3.25 m *(128.0 in)*	70 *154*	227.5 *19,712*		
4. Nose baggage compt. Lever arm: 0.60 m *(23.6 in)*	5 *11*	3.0 *260*		
5. Cockpit baggage compt. Lever arm: 3.89 m *(153.1 in)*	10 *22*	38.9 *3,368*		
6. Baggage extension Lever arm: 4.54 m *(178.7 in)*	5 *11*	22.7 *1,966*		
7. De-icing fluid (if installed; see to NOTE on previous page) (1.1 kg/liter) *(9.2 lb/US gal)* Lever arm: 1.00 m *(39.4 in)*	27.5 *61*	27.5 *2,403*		
8. Total mass & total moment with empty fuel tanks (Total of 1.-7.)	1447.5 *3191*	3437.1 *298,338*		
9. Usable fuel, main tanks (0.84 kg/liter) *(7.01 lb/US gal)* Lever arm: 2.63 m *(103.5 in)*	159 *351*	418.2 *36,329*		
10. Usable fuel, auxiliary tanks (if installed) (0.84 kg/liter) *(7.01 lb/US gal)* Lever arm: 3.20 m *(126.0 in)*	84 *185*	268.8 *23,310*		
11. Total mass & total moment with fuel & de-icing fluid (Total of 8. through 10.)	1690.5 *3727*	4124.1 *357,977*		


Center of Gravity Position [in]
92
93
94
95
96
97
98
Flight Mass [lb]
3800
3600
3400
3200
3000
2800
Flight Mass [kg]
1700
1650
1600
1550
1500
1450
1400
1350
1300
1250
2.35
2.40
2.45
2.50
Center of Gravity Position [m]


Flight
Mass [kg]
1700
1650
1600
1550
1500
1450
1400
1350
1300
1250
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
4100
4200
4300
Flight Mass Moment [kg m]

CHAPTER 7 DESCRIPTION OF AIRPLANE AND ITS SYSTEMS

1) How many fuel tanks are in your DA42 Twin star _____

2) How many compartments does each tank have _____

3) How many fuel pumps total are in the Twin star _____

4) What is the purpose of each fuel pump _____

5) The DA42 has a _____ volt system powered by _____, _____ Ampere alternators (fill in the blanks)

6) In your own words write about the Variable elevator stop on the DA42
_____
_____
_____

7) On the DA42 twin star what happens when the pilots brakes fail.
_____
_____
_____

8) Give a brief summary of the heating system on board the Twin star
_____
_____
_____

9) Give a brief summary for each of the following:
Pressure Accumulator:
_____
_____

Operating Controls:
_____
_____

ECU Test:
_____
_____

Alternate Air:
_____
_____

10) The diesel engine contains a cooling system on board for heating and cooling of components of the engine and cabin, explain the thermostat and how it works within the cooling system.

_____
_____
_____

11) Explain how the Turbo charger system works on the DA42.

_____
_____
_____

12) When the pitot heat is turned on inside the cockpit, what other system is provided heat from the switch: _____

13) What is the correct tire pressures for the main wheels: _____
nose wheel: _____