


Our Goal

16.687

- From: Hanscom Field, Bedford, MA (BED)
- To: Morse State Apt., Bennington, VT (DDH)

Source: Public Domain



Private Pilot Ground School

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Tools

16.687

- New York sectional chart
 - alternatively, use www.skyvector.com
- Plotter
- E6B calculator (mechanical or electronic)
- Four function calculator
- Pencil
- Flight planning sheet

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Plan for Our Plan

16.687

1. Check Sectional Chart for terrain and airspace
2. Research airport info in Chart Supplement
3. Check weather, including obtaining winds aloft
4. Estimate likely time and fuel burn
5. Verify weight and balance
6. Verify sufficient performance for takeoff and landing on suitable-in-light-of-weather runways

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Review Sectional

16.687

- 4100' will clear terrain (ergo, 4500 or 6500')
- Stay under the Boston Bravo climbing out
- Class E Airspace; No restricted areas
- Plenty of VORs if our GPS fails

Source: Public Domain



Good Alternate after crossing mountains: KALB

16.687



Source: Public Domain

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Chart Supplement KBED

16.687

BEDFORD

LAWRENCE G HANSCOM FLD (BED)(K)(BD) P (AF) 0 NE UTC-5(-4DT) N42°28.20' W71°17.34' NEW YORK
 132 B 34 FUEL 100LL, JET A NEW YORK
 031, 2, 3, 4 TPA -See Remarks LRA Class I, ARFF Index B H-118, 124, L-330, 340
 RWY 11-29 H3701X150 (ASPH-GRVD) S-120, D-250, 25-127, NOTAM FILE BED
 20-455 FCN 82 FICWIT MRL
 RWY 11: MALSR, PAPI(P4L)—GA 3.0° TCH 67'. HL
 RWY 29: MALSR, PAPI(P4R)—GA 3.0° TCH 67'. HL
 RWY 29: HD107X150 (ASPH-GRVD) S-120, D-250, 25-149, 20-436 FCN 79 FICWIT MRL
 RWY 29: REIL, VASIV4L—GA 3.75° TCH 62'.
 RWY 29: REIL, VASIV4R—GA 3.9° TCH 56'.
LAND AND HOLD-SHORT OPERATIONS
 LDG RWY HOLD-SHORT POINT RWL LDG DIST
 RWY 29 11-29 3000
 RWY 11 09-33 2650
 RWY 29 05-23 3662
RUNWAY DECLARED DISTANCE INFORMATION
 RWY 29: TORA-5107 TODA-5107 ASDA-5107 LDA-5107
 RWY 11: TORA-7011 TODA-7011 ASDA-7011 LDA-7011
 RWY 29: TORA-5107 TODA-5107 ASDA-5107 LDA-5107
 RWY 11: TORA-7011 TODA-7011 ASDA-7011 LDA-7011
MILITARY SERVICE (ASR 31A)(32A-86) (21MA-1A) FUEL A, A+
 (1100-0400Z), C781-274-0010. After Hr, 4 hr Pn, call out fee \$75 per hr, 0617-438-9864 (NYC-100LL) **TRAIN**
ALERT Op 1200-0400Z wkly, 1400-2000Z Sun, PPR OT and hel 038-845-3389/9590. On-ramp and fr vendor. LDG
 hgr noise and extremely hd maint. Fleet svc avbl fr vendor.
AIRPORT REMARKS: Attended continuously. Birds and wildlife on and invol arpt. PPR for all acft carrying explosives, call
 781-869-8000. No practice low approach and go hgr for acft 12,500 lbs and over. No practice low approach and
 go hgr for acft under 12,500 lbs between 0400-1200Z. Noise rules in effect. Helicopters opr within controlled airspace
 are not to maintain hgrdlt above alt. Surcharge for each hgr and/or departure 0400-1200Z. Be alert for small acft
 carried on ramp. Pn 1132-1100Z head wind, 1400-1100Z headwind, 1932-1800Z heavy at acft. Clsd fr PAPI 121 air
 carrier ops with over 60 seats exc 24 hour PPR call 781-869-8000. Tey N unusbl Nov 15-Apr 1. Tey N and B clsd
 to air carrier acft. Tey B between Rwy 11-29 and Rwy 29-23 rdst, no acft with wingspan greater than 118'. Tey C,
 Tey J, Tey M, Tey N, Tey S, Tey T clsd greater than 118' wingspan. Rwy 29 VGS and descent engine not
 coincident. Rwy 11 VGS and ILS glidepath not coincident. Rwy 11 VGS and RNAV glidepath not coincident. ACTIVATE
 MRL, Rwy 29-23, MRL, Rwy 11-29, MALSR Rwy 11 and 29, and Tey lgs—118.5. Surcharge for each hgr and/or
 departure 0400-1200Z. Commercial and taxi fee. Flight notification Service (ACU)S avbl.
AIRPORT MANAGER: 781-869-8000
WEATHER DATA SOURCES: ASOS 781-274-9733 LAMRS
COMMUNICATIONS: CTAF/UNICOM 122.95
UNICOM: 118.5 ATIS 124.6 781-274-6253 UNICOM 122.95
BOSTON APP/DEP CON: 124.4
HANSCOM TOWER: 118.5 (1200-0400Z) UNICOM 121.7 CLNC DEL 121.8
AIRSPACE: CLASS G avl 1200-0400Z other times CLASS G.
 CONTINUED ON NEXT PAGE



CONTINUED FROM PRECEDING PAGE

VOR TEST FACILITY (VOT) 110.0
RADIO AIDS TO NAVIGATION: NOTAM FILE LWM.
LAWRENCE (L) VOR/DME 112.5 LWM Chan 72 N42°44.42' W71°05.69' 223° 18.4 NM to fld. 302°15W.
DME unusable:
 160°-190° bnd 23 NM bto 2,500'
BOSTON (B) VOR/DME 112.7 BOS Chan 74 N42°21.45' W70°59.37' 313° 14.9 NM to fld. 20°16W. NOTAM
 FILE BOS.
VOR unusable:
 061°-104° bnd 18 NM bto 2,000'
 061°-104° bnd 18 NM bto 2,000'
 271°-060° bnd 25 NM bto 2,000'
 271°-060° bnd 25 NM bto 3,500'
SHAKER HILL NDB (SHRN) 251 SKR N42°27.34' W71°10.71' 296° 5.0 NM to fld. NOTAM FILE BED. NDB
 unmonitored indet.
NDB unusable:
 bnd 10 NM
BEDS NDB (L) 332 BE N42°28.78' W71°23.34' 113° 4.5 NM to fld.
ILS/DME 111.15 I-BED Chan 480Y Rwy 11: Class IA, LOM BEDS NDB.
ILS/DME 111.15 I-LULJ Chan 480Y Rwy 29: Class IB.

Source: Public Domain

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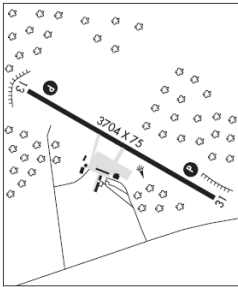


Chart Supplement KDDH

16.687

BENNINGTON

WILLIAM H MORSE STATE (DDH)(KDDH) 3 W UTC-5(-4DT) N42°53.47' W73°14.77' NEW YORK
 827 B NOTAM FILE DDH L-326, 338, 34J
 RWY 13-31: H3704X75 (ASPH) S-12.5 MRL 0.9% up SE IAP
 RWY 13: REIL, PAPI(P4L)—GA 4.0° TCH 45'. Hill.
 RWY 31: REIL, PAPI(P4R)—GA 4.0° TCH 45'. Ground, Rgt tfc.
SERVICE: FUEL 100LL, JET A Lgt ACTIVATE MRL Rwy 13-31 and
 REIL Rwy 13 and Rwy 31 and PAPI Rwy 13 and Rwy 31—CTAF.
AIRPORT REMARKS: Attended Mon-Fri 1200-2200Z. Sat-Sun on call. For
 arpt attendance call 1-802-442-5503 or 1-802-595-5830 for
 on-call svcs only. Rwy conditions may not be monitored or reported
 when the arpt is unattended. 100LL self-svc avbl 24 hrs. Mountains all
 quadrants. Geese on and invol arpt. Rwy 13 thld hazardous bird
 activity. NS ABTMT procedures in effect. Avoid overflying homes SE of
 arpt. Noise sensitive area AER 31. Preferred use rwy is Rwy 13. If
 practical acft departing Rwy 13 use best climb rate and when above
 400' AGL turn left within 1 mile of departure end of Rwy 13. Air tfc pat
 ops prohibited south of Rwy 13 and Rwy 31. Cold temperature rstd
 arpt. Altitude correction required at or bto -17C.
AIRPORT MANAGER: 802-442-5503
WEATHER DATA SOURCES: ASOS 135.925 (802) 442-6059.
COMMUNICATIONS: CTAF/UNICOM 122.8
 (ALBANY APP/DEP CON 132.825)
 GOO 121.725 (BTV CD and FLIGHT SERVICES. OTS INDEFLY)
RADIO AIDS TO NAVIGATION: NOTAM FILE BTV.
CAMBRIDGE (L) VOR/DME 115.0 CAM Chan 97 N42°59.66' W73°20.64' 159° 7.5 NM to fld. 1490/14W.
HIWAS.
DME portion unusable:
 040°-130° bto 9,000'



Source: Public Domain

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MIT
AEROASTRO

Old School: Flight Service Stations

16.687

- Disseminate weather and aeronautical data
- Accept flight plans
- Initiate search & rescue
- Contact by phone or radio
 - 1-800-WX-BRIEF
 - “Bridgeport Radio” on 122.6
 - Can always contact local FSS on 122.2 in the US
- New School: the Web and app options from the Weather Data lecture.



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BOSS WA 272045
AIRMET SIERRA UPDT 3 FOR IFR AND MTN OBSCN VALID UNTIL 280300
.
AIRMET IFR...ME NH VT MA RI CT NY LO AND CSTL WTRS
FROM 70NW PQI TO 20ENE HUL TO 60ENE ACK TO PVD TO ALB TO 50NE
SYR TO YOW TO YSC TO 70NW PQI
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.
.
AIRMET MTN OBSCN...ME NH VT MA NY
FROM 70NW PQI TO PQI TO MLT TO CON TO ALB TO 70SSW SYR TO MSS TO
YSC TO 70NW PQI
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.
BOST WA 272045
AIRMET TANGO UPDT 3 FOR TURB VALID UNTIL 280300
.
AIRMET TURB...ME NH VT MA RI CT NY LO NJ PA OH LE WV MD DC DE VA
AND CSTL WTRS
FROM YSC TO ACK TO 110S HTO TO SBY TO HNN TO CLE TO YYZ TO YOW
TO YSC
MOD TURB BLW 080. CONDS CONTG BYD 03Z THRU 09Z.

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***** Surface Observations *****

METAR KBOS 280054Z 30013G22KT 10SM FEW060 BKN075 OVC090 06/01 A2942
 RMK AO2 SLP962 T00560006

METAR KBVY 280053Z AUTO 30008KT 10SM -RA FEW020 OVC060 04/02 A2940
 RMK AO2 RAE07B49 SLP952 P0000 T00440022

METAR KOWD 280053Z 29005KT 10SM OVC060 05/02 A2943 RMK AO2 SLP964
 T00500022

METAR KLWM 280054Z 29006KT 10SM BKN070 OVC085 04/02 A2943 RMK AO2
 RAB24E44 SLP965 P0000 T00440017

METAR KBED 280056Z 28008KT 10SM OVC075 04/01 A2941 RMK AO2 RAE01
 SLP973 P0000 T00440006

METAR KMHT 280053Z 27004KT 10SM FEW034 BKN080 BKN100 04/02 A2940 RMK
 AO2 RAB00E09 SLP970 P0000 T00390017

METAR KASH 280051Z AUTO 28003KT 10SM OVC080 04/01 A2942 RMK AO2
 T00440005 SLP966

METAR KBDR 280052Z 31012G22KT 10SM SCT080 08/M05 A2950 RMK AO2 PK
 WND 33028/0000 SLP991 T00781050

METAR KPIT 280052Z AUTO 30012KT 10SM CLR 04/M03 A2944 RMK AO2 SLP972
 T00391028

METAR KORH 280054Z AUTO 31009G19KT 10SM CLR 02/M03 A2942 RMK AO2
 SLP969 LAST AUGMENTED OBS T00221028

METAR KAFN 280052Z AUTO 31010G16KT 260V340 10SM BKN050 02/M04 A2941
 RMK AO2 SLP971 T00171039

METAR KORE 280052Z AUTO 00000KT 10SM SCT042 02/M02 A2945 RMK AO2
 SLP976 T00221017

METAR KEEN 280055Z AUTO 35003KT 10SM SCT035 BKN045 OVC050 03/M04
 A2945 RMK AO1

METAR KEEN 280115Z AUTO 29003KT 10SM SCT035 SCT050 03/M03 A2945 RMK
 AO1

METAR KEEN 280135Z AUTO 00000KT 10SM BKN050 02/M02 A2945 RMK AO1

METAR KAQW 280052Z AUTO 25007KT 10SM FEW026 SCT033 BKN041 03/00
 A2947 RMK AO2 UPB33E37RAB37E47 SLP983 P0000 T00280000

METAR KDDH 280054Z AUTO 30005KT 10SM BKN070 02/M03 A2946 RMK AO2
 SLP981 T00221028



***** Terminal Forecasts *****

TAF AMD KBOS 280119Z 2801/2906 30013G22KT P6SM FEW060 BKN080
 OVC090
 FM280600 27012KT P6SM SCT050
 FM281400 28013G22KT P6SM BKN040
 FM281800 31018G26KT P6SM VCSH BKN025
 FM282100 31021G29KT P6SM OVC035
 FM290400 29017KT P6SM SCT040

TAF KMHT 272332Z 2800/2824 29007KT P6SM VCSH OVC035
 FM280100 31008KT P6SM OVC035
 FM281300 30010G20KT P6SM -SHRA BKN025
 FM281800 32014G27KT P6SM -SHRA OVC025
 FM282300 32014G25KT P6SM OVC025

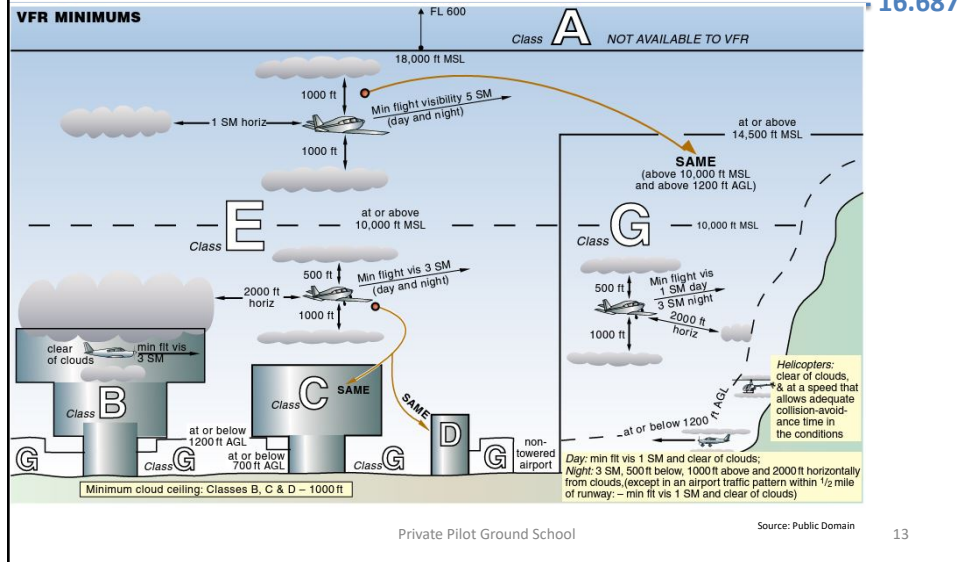
TAF KBDR 272342Z 2800/2824 32014G22KT P6SM SCT040 BKN070
 FM280500 31010KT P6SM FEW040
 FM281200 30016G26KT P6SM FEW040
 FM281500 31022G32KT P6SM SCT040 BKN100

TAF KORH 272332Z 2800/2824 33012G20KT P6SM OVC050
 FM280600 27012G22KT P6SM SCT090
 FM281300 28015G25KT P6SM BKN030
 FM281800 31019G29KT P6SM VCSH OVC020
 FM282100 31021G30KT P6SM OVC045

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VFR Weather Minimums



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***** FD Winds Aloft Forecast *****
DATA BASED ON 271800Z
VALID 280000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000
FT 3000 6000 9000 12000 18000 24000 30000 34000 39000
ACK 2719 2914-02 2523-06 2331-09 2242-20 2352-32 226047 236950 245348
PWM 1605 9900-04 2109-08 2328-13 2245-21 2249-31 214948 214551 234247
BOS 3121 2511-04 2223-08 2344-11 2244-21 2347-32 214448 224950 244647
BDL 3128 3223-08 2728-11 2344-13 2453-22 2355-32 233948 234449 254346
ALB 3227 3328-10 3232-14 3028-20 2459-22 2367-32 235946 223849 263446
    
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!BOS 07/322 BOS NAV VOR/DME 061-104 UNUSBL BYD 18 BLW 2000  
!BOS 07/323 BOS NAV VOR/DME 271-060 UNUSBL BYD 25 BLW 3500  
!BDR 04/234 GDM AIRSPACE R4102B ACT WEF 1004280900-1004282200  
!BDR 04/233 GDM AIRSPACE R4102A ACT WEF 1004280900-1004282200  
!BTW 09/028 VWD NAV NDB OTS  
!DDH 04/003 DDH RWY 31 VASI OTS
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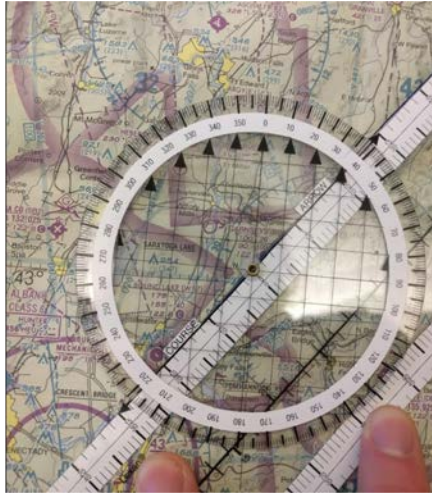
Using the Plotter

16.687



Using the Plotter

16.687



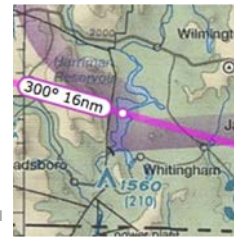
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Route Checkpoints

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- Prominent landmarks 15-25 NM apart



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Checkpoints (Fixes)	NavAids		Route and Course (OBS)	Altitude	Wind		CAS	TC -L +R WCA	TH -E +W Var.	MH +/- Dev.	CH	Dist Leg. Rem.	GS				Time off	
	Ident.	Freq.			Dir.	Vel.							Est.	ETE	ETA	ATE	ATA	
	Temp.				TAS	Act.							ETA	ATA				
BED							287											
TOC							287											
Abeam FIT							287											
N of Baldwinville							287											
River							287											
Reservoir							287											
TOD							287											
DDH							287											
Total																		

Source: Public Domain



Altitude

16.687

- Must be at appropriate VFR cruising altitude
 - Eastbound: Odd thousands + 500ft.
 - Westbound: Even thousands + 500ft.
- Clear terrain
- Adjust for weather

Brandon Abel



91.159 - VFR Cruising Altitudes

16.687

- When > 3,000 feet above surface (AGL)
 - Magnetic course between 0 and 179 deg.
 - Odd 1000' s + 500 feet
 - E.g. 3,500 feet MSL
 - Mag. course between 180 and 359 deg.
 - Even 1000' s + 500 feet
 - E.g. 4,500 feet MSL

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91.211 - Supplemental Oxygen

16.687


Cabin Pressure Altitude (Feet)	Pilot	Passengers
≤ 12,500	None	None
> 12,500 ≤ 14,000	After 30 min.	None
> 14,000	Required	None
> 15,000	Required	Provided

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Checkpoints (Fixes)	NavAids Ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC -L +R WCA	TH -E +W Var.	MH +/- Dev.	CH	Dist Leg. Rem.	GS EstL Act.	Time off	
				Dir.	Vel.								ETE	ETA
				Temp.	TAS									
BED														
TOC			Climb			287								
Abeam FIT			6500			287								
N of Baldwinville			6500			287								
River			6500			287								
Reservoir			6500			287								
TOD			6500			287								
DDH			Descent			287								
Total														

Source: Public Domain



Wind

16.687

- Choose nearby winds aloft reporting points
- Interpolate, if necessary

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***** FD Winds Aloft Forecast *****
DATA BASED ON 271800Z
VALID 280000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000
FT 3000 6000 9000 12000 18000 24000 30000 34000 39000
ACK 2719 2914-02 2523-06 2331-09 2242-20 2352-32 226047 236950 245348
PWM 1605 9900-04 2109-08 2328-13 2245-21 2249-31 214948 214551 234247
BOS 3121 2511-04 2223-08 2344-11 2244-21 2347-32 214448 224950 244647
BDL 3128 3223-08 2728-11 2344-13 2453-22 2355-32 233948 234449 254346
ALB 3227 3328-10 3232-14 3028-20 2459-22 2367-32 235946 223849 263446
    
```

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Checkpoints (Fixes)	NavAids		Route and Course (OBS)	Altitude	Wind		CAS	TC	TH	MH	CH	Time off							
	Ident. Freq.				Dir.	Vel.						-L	-E	Rem.	Est.	ETE	ETA		
					Temp.							+R WCA	+W Var.					+/- Dev.	Leg.
BED					310	21		287											
TOC				6500	250	11		287											
Abeam FIT				6500	250	-4		287											
N of Baldwinville				6500	250	11		287											
River				6500	320	23		287											
Reservoir				6500		-8		287											
TOD				6500	330	28		287											
DDH				Descent	320	27		287											
Total																			

Source: Public Domain



Piper Warrior Performance

16.687

- **Climb:**
 - BED: +4 degC, 132 ft. field elevation = 642 ft. press. alt.
 - TOC: -4 degC, 6500 ft. cruise alt. = 7010 ft. press. alt.
 - 2.5 gal., 12.5 min., 16.5 NM (still air)
 - 75 KIAS = 75-80 KTAS
- **Descent:**
 - TOD: -10 degC, 6500 ft. cruise alt. = 6960 ft. press. alt.
 - DDH: 2 degC, 827 ft. field elevation = 1287 ft. press. alt.
 - 2 gal., 6.5 min., 15 NM (still air)
 - 124 KIAS = 124-134 KTAS

Checkpoints (Fixes)	NavAids Ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC -L +R WCA	TH -E +W Var.	MH +/- Dev.	CH	Dist Leg.	GS Est.	Time off	
				Dir.	Vel.								ETE	ETA
				Temp.	TAS	Rem.	Act.	ATE	ATA					
BED				310	21	80	287				12.5	60	12.5	
TOC			Climb	250	11		287							
Abeam FIT			6500	250	11		287							
N of Baldwinville			6500	-4			287							
River			6500	250	11		287							
Reservoir			6500	320	23		287							
TOD			6500	-8			287							
DDH			Descent	330	28		287							
				320	-10	130	287				11.5	106	6.5	
							7							
Total														

Source: Public Domain



Cruise Performance

16.687

How fast will Piper PA28-151 go?

- Use performance charts or tables
- Pressure altitude = 7000 ft.
- PA28-151 @ 75% power: 112 KTAS
- Fuel Flow: 9.2 gallons per hour

Piper Cherokee Warrior with 150 hp Lycoming O-320 engine. Higher gross weight (2325 lbs.) than 1961 PA-28-150 (2150 lbs.)

Checkpoints (Fixes)	NavAids Ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC -L +R WCA	TH -E +W Var.	MH +/- Dev.	CH	Dist		GS		Time off	
				Dir.	Vel.						Leg.	Est.	ETE	ETA		
				Temp.		TAS	Rem.	Act.	ATE		ATA					
BED				310	21	80	287				12.5	60	12.5			
TOC			Climb	250	11	112	287				9.5					
Abeam FIT			6500	250	-4	112	287				15					
N of Baldwinville			6500	250	-4	112	287				18					
River			6500	320	23	112	287				21					
Reservoir			6500	330	-8	112	287				4.5					
TOD			6500	320	-10	112	287				11.5	106	6.5			
DDH			Descent	320	27	130	287				7					
Total											92					

Source: Public Domain



Wind Correction Angle

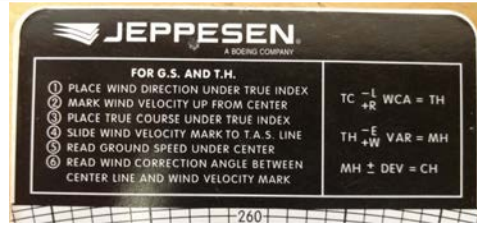
16.687

- Use E6B (whiz wheel) or calculator
 - If you are reading wind direction: True
 - If you are hearing wind direction: Magnetic
- Fill in True Heading and Ground Speed



Using the E6B: Wind Side

16.687

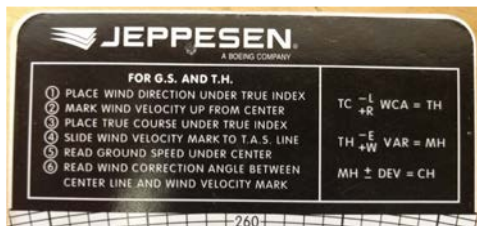


Wind Direction: 210°
 Wind Speed: 20 knots
 True Course: 180°
 True Airspeed: 147 knots



Using the E6B: Wind Side

16.687



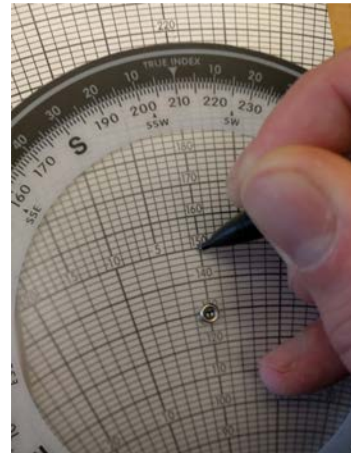
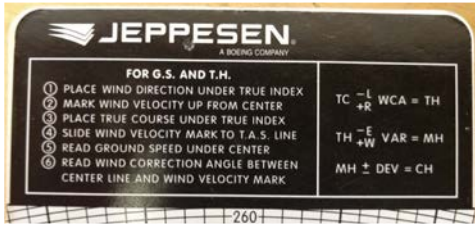
Wind Direction: 210°
 Wind Speed: 20 knots
 True Course: 180°
 True Airspeed: 147 knots





Using the E6B: Wind Side

16.687



Wind Direction: 210°
 Wind Speed: 20 knots
 True Course: 180°
 True Airspeed: 147 knots

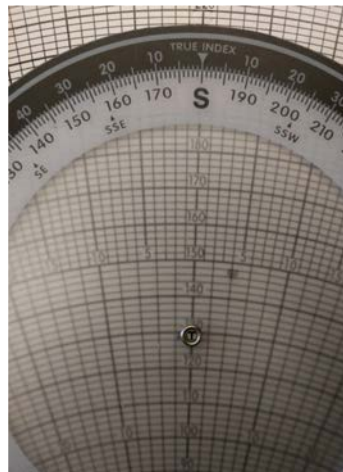
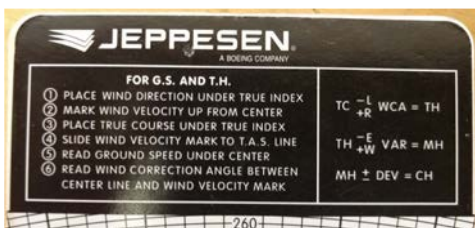
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Using the E6B: Wind Side

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Wind Direction: 210°
 Wind Speed: 20 knots
 True Course: 180°
 True Airspeed: 147 knots
 Groundspeed: 129 knots
 Wind Correction Angle: 4°

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Checkpoints (Fixes)	NavAids Ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC	TH	MH	CH	Dist	GS	Time off			
				Dir.	Vel.								Leg.	Est.	ETE	ETA
				Temp.									TAS	-L +R WCA	-E +W Var.	+/- Dev.
BED				310	21	80	287	293			12.5	60	12.5			
TOC			Climb	250	11	112	287	283			9.5	102				
Abeam FIT			6500	250	11	112	287	283			15	102				
N of Baldwinville			6500	250	11	112	287	283			18	102				
River			6500	320	23	112	287	294			21	92				
Reservoir			6500	330	28	112	287	297			4.5	90				
TOD			6500	320	27	130	287	294			11.5	106	6.5			
DDH			Descent	320	27	130	287	294			7					
Total											92					


Source: Public Domain



Magnetic Declination (Variation)

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- Read off chart (dashed magenta lines)



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Checkpoints (Fixes)	NavAids Ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC	TH	MH	CH	Dist		Time off	
				Dir.	Vel.						Leg.	Est.	ETE	ETA
				Temp.		TAS	-L +R WCA	-E +W Var.	+/- Dev.		Rem.	Act.	ATE	ATA
BED				310	21	80	287	293	308		12.5	60	12.5	
TOC			Climb	250	11	112	8	15			9.5	102		
Abeam FIT			6500	-4			287	283	298					
N of Baldwinville			6500	250	11	112	287	283	298		15	102		
River			6500	-4			-4	15			18	102		
Reservoir			6500	320	23	112	287	294	309		21	92		
TOD			6500	-8			7	15			4.5	90		
DDH			Descent	330	28	112	287	297	312					
				320	-10		10	15			11.5	106	6.5	
					27	130	287	294	309					
							7	15						
										Total	92			

Source: Public Domain



Magnetic Deviation

16.687

- Depends on specific aircraft
- Compass correction card shows values



Checkpoints (Fixes)	NavAids Ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC	TH	MH	CH	Dist		Time off	
				Dir.	Vel.						Leg.	Est.	EYE	ETA
				Temp.		TAS	-L +R WCA	-E +W Var.	+/- Dev.		Rem.	Act.	ATE	ATA
BED			Climb	310	21	80	287	293	308	308	12.5	60	12.5	
TOC			6500	250	11	112	287	283	298	298	9.5	102		
Abeam FIT			6500	250	11	112	287	283	298	298	15	102		
N of Baldwinville			6500	250	11	112	287	283	298	298	18	102		
River			6500	320	23	112	287	294	309	309	21	92		
Reservoir			6500	330	28	112	287	297	312	312	4.5	90		
TOD			Descent	320	27	130	287	294	309	309	11.5	106	6.5	
DDH							7	15	0					
Total										92				

Source: Public Domain



Calculate Time

16.687

- For each cruise leg, calculate time based on leg distance and ground speed



Checkpoints (Fixes)	Nav aids ident. Freq.	Route and Course (OBS)	Altitude	Wind		CAS	TC -L +R WCA	TH -E +W Var.	MH +/- Dev.	CH	Dist Rem.	GS Est. Act.	Time off		
				Dir.	Vel.								TAS	ETE	ETA
				Temp.											
BED				310	21	80	287	293	308	308	12.5	60	12.5		
TOC			Climb	250	11	112	6	15	0	298	9.5	102	5.5		
Abeam FIT			6500	250	11	112	-4	15	0	298	15	102	9		
N of Baldwinville			6500	250	11	112	-4	15	0	298	18	102	10.5		
River			6500	320	23	112	-4	15	0	309	21	92	13.5		
Reservoir			6500	330	-10	112	7	15	0	312	4.5	90	3		
TOD			6500	330	-10	112	287	297	312	312	11.5	106	6.5		
DDH			Descent	320	27	130	10	15	0	309	11.5	106	6.5		
Total										92		60.5			

Source: Public Domain



Fuel Burn

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- Add up: Climb, Cruise, and Descent Fuel
- 2 gal. + 6.3 gal. + 2 gal. = 10.8 gallons
- Required Reserve: 30 minutes = 4.6 gallons
- 15.4 gallons min. required at departure

Most pilots consider a **one-hour reserve** to be the minimum for a cross-country flight. Add 2 gallons to get to the alternate (KALB) and another 4.6 of reserve = 22 gallons.

Brandon Abel



91.151 - VFR Fuel Requirements

16.687

- Don't forget to order fuel!
- Minimum by regulation (FAR 91.151): Fly to first intended point of landing plus
 - 30 minutes reserve (day)
 - 45 minutes reserve (night)

Wiser to land with at least one hour of fuel.

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Weight and Balance

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- Empty weight: 1452.30 @ 87.53 in.
- Fuel: 22 gal @ 95 in. (6.01 lbs./gallon)
- Pilot + Pax: 400 lbs. @ 80.5 in.
- Pax: 300 lbs. @ 118.1 in.
- Baggage: 50 lbs. @ 142.8 in.

Max gross weight for PA-28-151: 2325 lbs.



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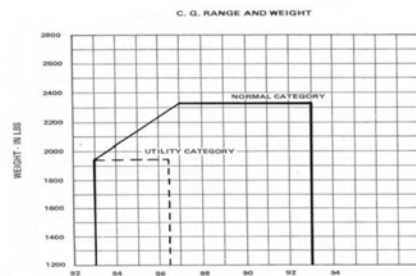
Weight and Balance

16.687

Item	Weight	Arm	Moment
Empty Warrior	1452.3	87.53	127120
Fuel	132.22	95.00	12561
Pilot & Pax	400	80.50	32200
Pax	300	118.10	35430
Baggage	50	142.80	7140
Total	2334.52	91.86	214451

Overweight! Leave the box of Travels with Samantha in the hangar and we're under 2325 lbs.

Private Pilot Ground



Takeoff Performance

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- Use Performance Charts, Weather Info. and Airport Info
 - Ground Roll: 1000 ft.
 - Over 50 ft.: 2000 ft.
- KBED runway 29 is 7000 ft. long

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Landing Performance

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- Use Performance Charts, Weather Info. and Airport Info
 - Ground Roll: 600 ft.
 - Over 50 ft. obstacle: 1500 ft.
- KDDH runway is 3700 ft. long
- Ergo: book says we can land in 40 percent of runway.

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Sample Flight Plan Form

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- VFR
- Aircraft Number
- Aircraft Type
- Departure Point
- Departure Time
- Altitude
- Route of Flight
- Destination
- Estimated Time Enroute

1. TYPE		2. AIRCRAFT IDENTIFICATION		3. AIRCRAFT TYPE / SPECIAL EQUIPMENT		4. TRUE AIRSPEED		5. DEPARTURE POINT		6. DEPARTURE TIME		7. CRUISING ALTITUDE	
<input type="checkbox"/> VFR	<input type="checkbox"/> IFR						KTS			PROPOSED (Z)	ACTUAL (Z)		
8. ROUTE OF FLIGHT													
9. DESTINATION (Name of airport and/or)										10. EST. TIME ENROUTE		11. REMARKS	
										HOURS		MINUTES	
12. FUEL ON BOARD				13. ALTERNATE AIRPORT(S)				14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE				15. NUMBER ABOARD	
HOURS				MINUTES									
17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)													
16. COLOR OF AIRCRAFT													
<small>CIVIL AIRCRAFT PILOTS: 14 CFR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed \$1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 91 for requirements concerning DVFR flight plans.</small>													
FAA Form 7233-1 (8-82)				CLOSE VFR FLIGHT PLAN WITH _____				FSS ON ARRIVAL					

Source: Public Domain

Fun in-class exercise: Google "ICAO flight plan form"

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Now let's do it the real way...

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- 1800wxbrief.com
- [Fltplan.com](http://fltplan.com)
- ForeFlight iOS app (and plan.foreflight.com)
- Garmin Pilot Android or iOS app
- skyvector.com (navlog, briefing, filing)
- www.aopa.org/flightplanner/

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Suggested Reading

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FAR 61/91 allow for a lot of dangerous stuff, e.g.:

- flying at night with no instrument rating
- flying single-pilot IFR with no autopilot
- planning to land on a minimum-length runway

Look at the operating limitations for FAR 135 (charter) and FAR 121 (airlines) and consider adopting some of these as personal minimums.

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Questions?

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