FLY AVIATION

Training aid only, not flight instruction. Review it with your CFI and get their approval before you use it in training or in the airplane. Check every number against the POH and current FAA sources. Last reviewed Nov 7, 2026.

CROSS-COUNTRY PLANNING AID

Cherokee 140 · Day VFR · Southeast Michigan

The practical side of a cross-country in our kind of airplane: the order to plan in, the numbers to carry in your head, and a full worked example from KONZ to Jackson and back. Pair it with the Cross-Country Study Guide for the knowledge-test theory.

PLANNING STEPS

In this order, every trip

#	Step	What to do
1	**Define the trip**	Route, legs, landings, passengers and bags, departure window. Check sunset and where you will buy fuel.
2	**Weather**	Get a briefing (1800wxbrief.com or your EFB). METAR and TAF for departure, destinations and alternates. Winds aloft, AIRMETs, PIREPs, radar, freezing level. Go or no-go against your personal minimums.
3	**NOTAMs, TFRs, airspace**	Airport and runway NOTAMs, tower hours, TFRs, Class B, C and D on the route, special use airspace.
4	**Aircraft**	Documents and inspections (AVIATES, below). Open squawks. Oil, fuel quantity, known defects.
5	**Weight, balance, performance**	Actual weight and balance for this load. Takeoff and landing distance at today's density altitude. Climb and obstacle clearance.
6	**Route and altitude**	Checkpoints every 10 to 20 nm, one visual and one electronic. Go around Class B and D, or plan to talk to them. Pick a cruise altitude for airspace, winds, terrain and cloud base.
7	**Nav log and fuel**	Course, wind correction, heading, groundspeed, time and fuel for every leg. Legal reserve is 30 minutes by day, 45 at night (§ 91.151). Plan a bigger number of your own.
8	**Tell someone**	File a VFR flight plan, or at least give a person your route and ETA. Ask for flight following when it helps.
9	**Brief and fly**	Passenger brief, checklist, ground track against the plan, a time check at every checkpoint, revise ETA and fuel, and always keep an out.

PAPERS AND INSPECTIONS

§ 91.203 · § 91.409 · § 91.411 · § 91.413 · § 91.207

AVIATES: inspections

- Annual inspection, within 12 calendar months.
- VOR check, within 30 days (IFR only).
- Inspection, 100-hour (only when carrying people for hire or giving flight instruction for hire).
- Airworthiness directives complied with.
- Transponder, 24 calendar months.
- ELT, inspected every 12 calendar months, battery in date.
- Static system and altimeter, 24 calendar months (IFR).

ARROW: documents on board

- Airworthiness certificate
- Registration
- Radio station license (international flights only)
- Operating limitations and POH
- Weight and balance

WEATHER MINIMUMS

§ 91.155 · day VFR

Legal minimums

- **Class B:** 3 sm, clear of clouds.
- **Class C, D, and E below 10,000 MSL:** 3 sm, 500 below, 1,000 above, 2,000 horizontal from clouds.
- **Class G, 1,200 AGL or less:** 1 sm, clear of clouds.

These are the floor, not the target. Your own limits should be much tighter.

My personal minimums (fill in)

- Ceiling _____ ft AGL · Visibility _____ sm
- Surface wind _____ kt · Crosswind _____ kt
- Fuel reserve _____ min · Longest leg _____ nm
- Freezing level, visible moisture, icing _____
- On the ground by _____ (sunset minus 30 minutes)

NUMBERS AND RULES OF THUMB

Knots and nautical miles unless noted

Time, distance, fuel

- **Groundspeed** = distance ÷ time
- **ETE (min)** = distance × 60 ÷ groundspeed
- **Fuel (gal)** = gph × hours. 100LL is about 6 lb/gal.
- **1 kt = 1.15 mph.** 100 kt is 115 mph.
- If real groundspeed is off the plan by more than about 10%, redo ETA and fuel for the rest of the trip.

Heading chain (TVMDC)

- True course + WCA = true heading
- TH + variation = magnetic heading. **West is best** (add), **east is least** (subtract).
- MH + deviation (compass card) = compass heading
- Southeast Michigan variation is about **7° W**, so magnetic is about 7° more than true.

Wind correction in your head

- **Crosswind** = wind speed × clock factor: 15° = ¼, 30° = ½, 45° = ¾, 60° or more = all of it.
- **WCA (°)** ≈ crosswind ÷ (TAS ÷ 60). At 100 kt, divide by 1.7.
- Headwind or tailwind uses the other half of the clock.
- Wind 260/15, course 300: 40° off, about 10 kt of crosswind, WCA about 6°.

Descent planning

- **Top of descent** = thousands of feet to lose × 3 = nm out.
- **Descent rate** = groundspeed × 5 = fpm for a 3° path. 90 kt is about 450 fpm.
- Start down early. Level off, then slow down.

Density altitude

- **PA** = field elevation + (29.92 – altimeter) × 1,000
- **ISA** = 15 – 2 × (PA ÷ 1,000) °C
- **DA** = PA + 120 × (OAT – ISA)
- A fixed-pitch 150 hp airplane loses climb fast as DA rises. Recheck takeoff distance.

VFR cruising altitudes

- Applies above 3,000 ft AGL (§ 91.159).
- Magnetic course 0–179: odd thousands + 500.
- Magnetic course 180–359: even thousands + 500.
- Michigan terrain is 600 to 1,200 ft, so the rule starts around 4,000 MSL.

Lost? The five Cs

- **Climb** for radio and radar coverage, if the cloud base allows.
- **Communicate** on 121.5 or the last ATC frequency. Squawk 7700 if in distress.
- **Confess** early. Controllers can find you.
- **Comply** with their headings.
- **Conserve** fuel. Lean for best range.

At every checkpoint

- Time, position, new ETA, fuel burned against the plan.
- Altimeter set. Engine instruments. Carb heat check.
- Weather ahead and behind. Where is the nearest airport?

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CHEROKEE 140 NUMBERS

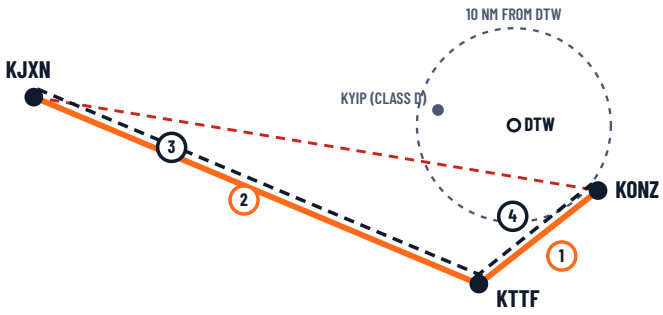
Planning numbers · verify in the PA-28-140 POH

Plan cruise	At	Plan fuel burn	Usable fuel
100 KTAS	**2,500 MSL · 2,350 RPM**	**9.0 gph**	**48 gal**
Endurance (plan)	**Max gross**	**Vy · Vfe**	**Vno**
About 5 hr	**2,150 lb**	**89 · 115 mph**	**140 mph**

The fuel burn is set a little high on purpose. Use the airplane's own weight and balance, never a sample. Pattern speeds are on the KONZ Runway 22 pattern page.

EXAMPLE: KONZ TO KJXN AND BACK

Day VFR · four legs · three departures



North up, schematic. Orange: outbound legs 1–2. Navy dashed: return legs 3–4. Red dashed: the direct line, which passes about 5 nm from DTW. Don't plan it.

Why this route

- **Outbound** KONZ to KTTF to KJXN, 65 nm, stays south of Detroit Metro and Willow Run.
- **Return via KTTF**, 65 nm. The direct line is 59 nm but passes about 5 nm from DTW, through the Class B core.
- **2,500 MSL** keeps you low and under the shelves on most days. Check the shelf floors on the Detroit sectional before you commit.
- **Detroit Approach 134.3** for flight following, then Great Lakes Approach 127.3 near Jackson.
- **KJXN tower** is open 0700–2100 local. Outside those hours it is a CTAF airport.

Airport	Elev	Runways	Frequencies	Fuel	Notes
KONZ Grosse Ile Muni	**591**	4/22 4,846×100 (4 right, 22 left traffic; 22 threshold displaced 428 ft). 17/35 closed.	CTAF 123.0 · AWOS 119.675 · Detroit App/Dep 134.3	100LL, Jet A	No tower. PAPIs reported inoperative. Birds, deer, ultralights nearby. See the KONZ Airport Guide.
KTTF Custer, Monroe	**616**	3/21 4,997×100, grooved. Left traffic both ends.	CTAF 122.7 · AWOS 119.075 · Detroit App 134.3 · CRL VOR 115.70	100LL	No tower. Deer and large birds. Noise-sensitive areas: climb at max rate to pattern altitude.
KJXN Jackson County–Reynolds	**1,001**	7/25 5,351×100 (ILS 25). 14/32 4,000×100. Left traffic all.	Tower 128.475 · Ground 121.9 · ATIS 125.725 · UNICOM 122.95 · Great Lakes App 127.3	100LL, Jet A	Tower 0700–2100 local. Taxiway D to A turn is a trap. Deer, large birds. AWOS at KTEW 119.425.

Airport data as of late 2026, for the example only. Always use the current Chart Supplement.

EXAMPLE NAV LOG

TAS 100 kt · example wind 260/15 at 2,500 · variation 7° W · 9.0 gph

Leg	From – to	Alt	TC	WCA	TH	MH	Dist	GS	ETE	+Climb, pattern	Leg time	Fuel	ETA / ATA
1	KONZ – KTTF	2,500	232	4R	236	243	15.5	87	11	+3	14	2.1	____ / ____
2	KTTF – KJXN	2,500	293	5L	288	295	49.7	87	34	+3	37	5.6	____ / ____
3	KJXN – KTTF	2,500	112	5R	117	124	49.7	112	27	+3	30	4.5	____ / ____
4	KTTF – KONZ	2,500	052	4L	048	055	15.5	113	8	+3	11	1.6	____ / ____
	Totals						**130.3**				**92 (1:32)**	**13.8**	

TC is true course. Work out TH from the wind, add 7° of west variation for MH, then add deviation from the compass card for CH. The winds here are invented: redo the wind triangle with the real winds aloft.

FUEL, RADIO AND GO/NO-GO

§ 91.151 · AIM 4-1 · AIM 6-4

Fuel plan

Cruise and allowances	**13.8 gal**
Start, taxi, run-up (1.0 × 3)	**3.0 gal**
Trip fuel	**16.8 gal**
Legal day reserve, 30 min	**4.5 gal**
Personal reserve, 45 min	**6.8 gal**
Required, with personal reserve	**23.6 gal**

Leave KONZ with **at least 25 gallons**. Usable is 48, so a top-off at KJXN is optional. Fuel prices are posted online, but call before you divert for fuel.

Radio plan

- **KONZ:** AWOS 119.675, CTAF 123.0. Departure call, then Detroit Approach 134.3 for flight following.
- **KTTF:** AWOS 119.075, CTAF 122.7. Call 10 nm out, enter the left pattern.
- **En route:** stay with 134.3 until released, then Great Lakes Approach 127.3.
- **KJXN:** ATIS 125.725, then Tower 128.475. Ground 121.9 after landing.
- **Return:** the same in reverse. Cancel flight following; AWOS and CTAF at KTTF, then KONZ.
- **Emergency:** 121.5, squawk 7700.

Go / no-go and diversions

- **Example go limits** (set your own): ceiling 3,500 ft or higher, visibility 7 sm or more, surface wind 12 kt or less, crosswind 8 kt or less.
- **No-go:** forecast or reported icing, visible moisture at or below freezing, a ceiling less than 1,000 ft above your planned altitude.
- **Diversions:** KONZ and KTTF back each other up. KTEW is 18 nm north of KJXN. Pick more from the chart.
- **Decision points:** at KTTF before the 50 nm leg, and again about halfway. If the weather is worse than forecast, turn around while you still have fuel and daylight.
- **Alternate for KJXN:** KTTF, 50 nm back. Check KJXN ATIS before you leave KTTF.

Training aid only, not flight instruction. Verify every number against the PA-28-140 POH, current charts, the Chart Supplement, NOTAMs and a legal weather briefing. The example winds are invented.