Some Common Pilot Rule of Thumbs

Time/ Distance/ fuel - Time, distance and ground speed formula

To find distance D = GS X T

example **GS** = 90 **T** = 30 minutes (.5 hrs) **D** = 90 X .5 = 45nm

To find time T = D/R

example **D** = 30nm **GS** = 100kts T= 30/100 **T** = .3 hrs X 6 min = 18 minutes (.1 hour = 6 minutes)

To find ground speed GS= D/T

example **D** = 50nm **T** = 25minutes **GS** = 50/25 = 2nm per minute

2nm x 60minutes = 120 nm per hour

To determine fuel burn (gallons per hour)

Gallons per hour (GPH) = Gallons used / hours flown

example- duration of flight 2 hours, gallons used 18 gallons

18/2 = 9 gallons per hour

To determine fuel required

Fuel required = Time enroute X fuel burn

example- time enroute - 2 hours fuel burn 8 gallons per hour

8 X 2 = 16 gallons required (then add on reserve requirements!)

Rule of thumb:

Fixed pitch non turbo aircraft climb performance decreases 8% for each 1000ft of density altitude above sea level. (7% for variable pitch non turbo aircraft)

example -Sea level climb = 700 ft per minute Density altitude = 5000 ft

8% X 5 = 40% decrease

.40 X 700 - 280 foot per minute

700 - 280 = 420 foot per minute climb rate (obstacles around runway! weight and balance!)

To reduce affects of a headwind climb, climb at cruise climb speed

To take advantage of tailwind climb at Vy (best rate of climb)

Takeoff performance ; A headwind of 10% takeoff speed will reduce ground roll by 20%. A tailwind of 10% of takeoff speed will increase takeoff roll by 20%.

A 10% change in aircraft weight will result in a 20% change in takeoff distance. (high density altitude!)

Abort the takeoff if 70% of takeoff speed by 50% of available runway.

A soft field or deep grass can increase takeoff distance by 50%. Wet snow or slush can double takeoff distance or impossible.

Available horsepower decreases 3% for each 1000ft of altitude above sea level.
example- Altitude = 5000ft msl Sea level horsepower = 100%
5(thousand) X 8% = 15% = available horsepower = 85% (consider when at high altitude airports, or flying around mountains)

A slippery or wet runway may increase your landing distance by 50%

A 10% change in airspeed will cause a 20% change in stopping distance. (this will affect your float time in the flare mode)

Plan to touch down in first third of the runway or go around.

For every knot of airspeed above Vref (the approach speed used till flare) will result in the touchdown point 100 feet further down the runway. (airspeed control is critical in aircraft control which is a sign of a responsible pilot)