Quiz (30')
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An aircraft has the performance characteristics given in Table 1 in normal route operation. In normal use this aircraft will consume 11,000 lb of fuel in 1 h of flight. The normal cruising speed is 550 mil/h. Generally, alternative destinations are located within 100 mil of planned destinations, and regulations require sufficient fuel to fly to the planned destination, fly to an alternate destination, and fly for 1.25 h at the alternate destination.

a. Find the maximum passenger payload in passengers and lb which may be carried on this aircraft if 15,000 lb of cargo is also carried.
b. If a planned route distance is 2000 mil, determine the number of lb of fuel that must be boarded at the gate for this trip.
c. Plot payload versus route range for this aircraft

Aircraft Performance Characteristics, in lb

Maximum Ramp Weight	191,000
Maximum Structural Takeoff Weight	190,000
Maximum Structural Landing Weight	160,000
Zero-fuel Weight	140,000
Operating Empty Weight	100,000
Fuel Capacity	55,000
Maximum Structural Payload	45,000
Maximum Passenger Capacity	39,000
Maximum Cargo Hold Capacity	15,000

Good Luck and prepare yourself to attend and work the final exam.

Answer:
a. Maximum Passenger Payload (in passenger and lb)

Max. structural payload = Passengers + Cargo
45,000 = Passengers + 15,000
Passengers = 30,000 lb

For computing payload, passengers and their baggage are normally considered as 200-lb units (Planning and Design of Airports, R. Horonjeff & FX McKelvey, Page 101).

Thus, maximum passenger payload is 30,000 lb or 150 passengers.

b. Range to planned distance = 2000 mil

With the normal cruising speed, 550 mil/h, the aircraft needs flight time of about: 2000/550 = 3.64 h.

Number of lb of fuel to planned distance = 3.64 h × 11,000 (lb/h) = 40,000 lb

Reserve fuel: 1.25 h * 11,000 = 13,750

Number of lb of fuel to planned distance with reserve fuel = 53,750 lb

c. Payload versus range

MSTOW = OEW + max.structural payload + allowable fuel
190,000 = 100,000 + 45,000 + allowable fuel
allowable fuel = 45,000

reserve fuel = [11,000 lb/h*(100/550 mil/h)] +(11,000*1.25 h) = 15,750 lbs