The JETS Challenge

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Challenge 100— The Spirit of St. Louis Challenge

Problem:

Eighty-one years ago on May 21, 1927, Charles Augustus Lindbergh completed the first solo nonstop flight across the Atlantic Ocean from New York to Paris. Flying the Spirit of St. Louis, a plane he helped design, he took off from New York on the morning of May 20 and landed late the next day near Paris with an estimated 175 liters of fuel remaining. The airplane weighed 975 kg empty and 2330 kg loaded with 1703 liters of fuel. The engine produced 166 kw. The 5810 km trip took 33 hr 30 m 30 sec.

Find the rate of fuel consumption in kilometers per kilogram (km/kg) of fuel.

Solution:

Plane
975 kg empty
2330 kg loaded
1703 liters of fuel

175 liters remained

50 1528 liters used

Rate of fuel consumption (km/kg)

$$\frac{5810\ km}{?\ kg\ fuel}$$

Fuel

$$\frac{1528\ liters\ used}{1703\ liters\ total} = \frac{x\ kg\ used}{1385\ kg\ total} = (2330 - 975)$$

$$x = 1215.76426\ kg\ used$$

$$50\quad \frac{rate\ of\ fuel\ consumption}{\frac{5810}{1215.76426\ kg\ used}}$$

= 4.7789 km/kg