

Mathematics of Flight

Statute and Nautical Miles



Statute and Nautical Miles

A mile on the ground (sm) is 5,280 feet. A mile in the air (nm) is 6076.1 feet. To convert between the units, we use the formula:

$$\text{nm} = \text{sm} \times 1.15$$

Therefore, 6076.1 feet = 5280 feet x 1.15

Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Example:

Find the distance in nautical miles given a distance of 1000 statute miles, the approximate distance from Miami FL to Washington, D.C.

Solution:

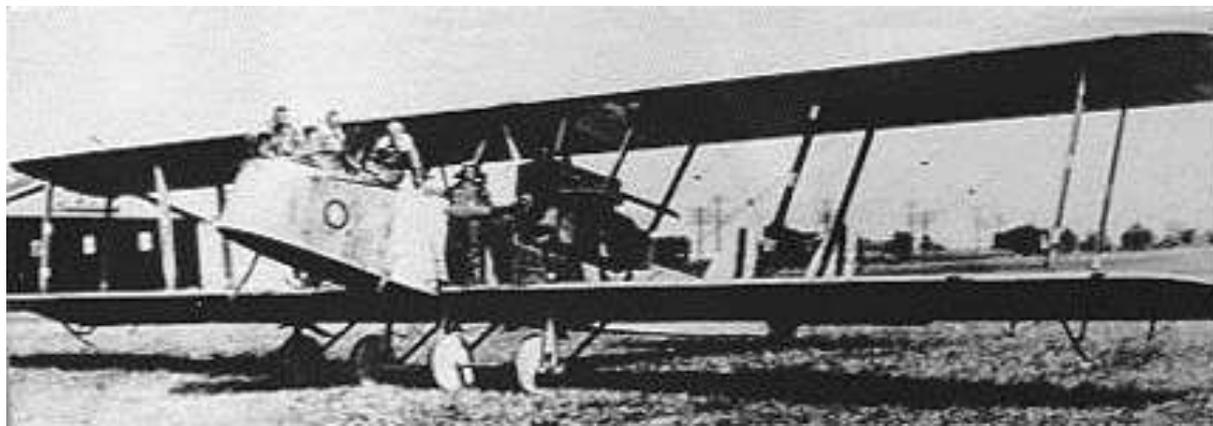
$$\text{nm} = \text{sm} \times 1.15$$

$$\text{nm} = 1,000 \text{ miles} \times 1.15$$

$$\text{nm} = 1,150 \text{ miles}$$

Round-the-Rim Flight

In its desire to test the long-range capabilities of the airplane, the Air Service decided to fly a Glenn Martin bomber completely around the periphery of the U.S. The flight, which began at Bolling Field, Washington, D.C., on July 24, 1919, was made in a counterclockwise direction. Since time and speed were not factors, the flight proceeded leisurely westward across the northern states, down the Pacific Coast, and eastward along the Mexican border and across the southern states, arriving back at Bolling on Nov. 9, 1919. The total distance of approximately 10,000 miles was flown in 114 hours, 45 minutes. This was a tremendous achievement for such an early period in the development of the multi-engine bomber.



Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Find the distance in nautical miles given the distance 10,000 statute miles, the distance of the round-the-rim flight in 1919.

Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Find the distance in nautical miles given the distance 10,000 statute miles, the distance of the round-the-rim flight in 1919.

Solution:

$$\text{nm} = \text{sm} \times 1.15$$

$$\text{nm} = 10,000 \text{ miles} \times 1.15$$

$$\text{nm} = 11,500 \text{ miles (rounded to the nearest tenth)}$$

Doolittle's Atlantic to Pacific Flight

The first transcontinental flight across the United States within a single day (24-hour period) was made by Lt. Jimmy Doolittle on Sept. 4, 1922. Flying a DH-4B, Lt. Doolittle took off from Pablo Beach, Fla., and landed at Rockwell Field near San Diego, Calif., covering a distance of 2,163 miles in 21 hours, 20 minutes flying time. He made one refueling stop at Kelly Field near San Antonio, Texas.



Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Find the distance in nautical miles given the distance 2,163 statute miles, the distance of the first transcontinental flight across the United States by Lt. Jimmy Doolittle in 1922.

Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Find the distance in nautical miles given the distance 2,163 statute miles, the distance of the first transcontinental flight across the United States by Lt. Jimmy Doolittle in 1922.

Solution:

$$\text{nm} = \text{sm} \times 1.15$$

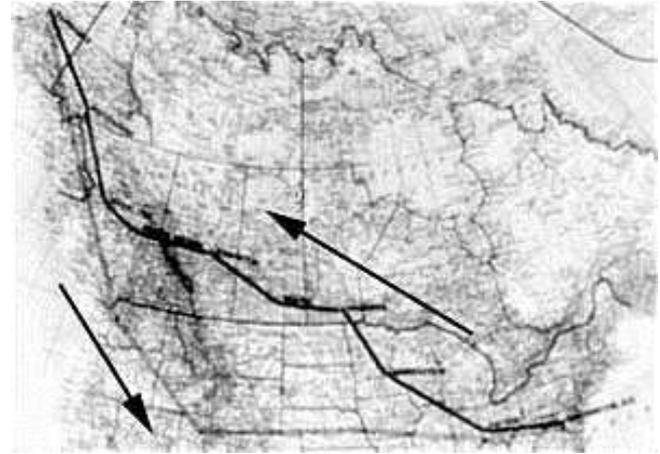
$$\text{nm} = 2163 \text{ miles} \times 1.15$$

$$\text{nm} = 2,487.5 \text{ miles (rounded to the nearest tenth)}$$

B-10 Alaskan Flight - 1934

Ten B-10s, under the command of Lt. Col. H.H. Arnold, left Bolling Field near Washington, D.C., on July 19, 1934. Flying by way of Winnipeg and Edmonton, they arrived safely in Fairbanks, Alaska, on July 24. For the next month numerous exploratory flights were made over Alaska, including missions for aerial photography of 23,000 square miles of territory in only three days.

The planes took off from Fairbanks on Aug. 16 and returned to Washington, D.C., by way of Seattle, Wash., and Omaha, Neb. They landed at Bolling Field on Aug. 20, completing a round trip of more than 7,000 miles, much of it over uncharted wilderness. For commanding this flight, Arnold won the 1934 Mackay Trophy.



Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Find the distance in nautical miles given the distance 4,153 statute miles, the approximate distance a flight of B-10 bombers flew from Washington, DC to Fairbanks, AK in 1934. Find the distance in nautical miles for the round trip.

Statute and Nautical Miles

$$\text{nm} = \text{sm} \times 1.15$$

Find the distance in nautical miles given the distance 4,153 statute miles, the approximate distance a flight of B-10 bombers flew from Washington, DC to Fairbanks, AK in 1934. Find the distance in nautical miles for the round trip.

Solution:

$$\text{nm} = \text{sm} \times 1.15$$

$$\text{nm} = 4,153 \text{ miles} \times 1.15$$

$$\text{nm} = 4,775.95 \text{ miles rounded up to } 4,776 \text{ miles}$$

$$\text{Round trip: } 4,776 \text{ nm} \times 2 = 9,552 \text{ nm}$$

More Resources

**Additional Resources
are available online at**

www.nationalmuseum.af.mil/education/teacher/index.asp