

Tachometer

Activity Objectives

- To understand the function of a Tachometer
- To compare automobile and airplane tachometers
- To find the ratio of engine speed to propeller speed
- To find the propeller speed
- To find the engine speed

Background

A tachometer is a device for counting. It is used to show the number of revolutions per minute (RPM) of the aircraft engine. An airplane needs one tachometer for each of its engines.

Instructions

An airplane's engines often run faster than its propellers. For example, on one airplane, the most efficient engine speed is 3,000 RPM, while the most efficient propeller speed is about 1,500 RPM. A set of reduction gears permits the engine to run at 3,000 RPM while the propeller turns at 15,000 RPM. When this happens, the ratio of engine RPM to propeller RPM is two to one (2:1). Other ratios can range from 4:3 to 3:1.

Have students answer the following:

- If an airplane runs at 3780 RPM, and the ratio of engine speed to propeller speed is 3:1, what is the speed of the propeller?
(Solution: Since this ratio of engine speed to propeller speed is 3:1, divide 3780 by 3 to find the propeller speed of 1260 RPM.)
- What is the ratio between an engine speed of 3050 RPM and a propeller speed of 1220 RPM?
(Solution: Divide 3050 by 1220 to find the ratio of 2.5. The ratio is 2.5 or may also be written as 5:2.)

Problem

Find the missing number in each of the following problems.

Engine Speed	Propeller Speed	Ratio of Engine Speed to Propeller Speed
3160 RPM	Jane	2:1
3400 RPM	John	5:2
	1450 RPM	3:2
	1250 RPM	3:1
3150 RPM	1575 RPM	
2800 RPM	1680 RPM	
1800 RPM		4:3
	1470 RPM	16:7

- What is the ratio between an engine speed of 2910 RPM and a propeller speed of 1940 RPM?
- If an airplane propeller turns at 1120 RPM and the ratio of engine speed to propeller speed is 12:7, what is the engine speed?

Extension

Display a tachometer or pictures of tachometers.

Recall the automobile odometer or tachometer. Discuss the similarity of its function with the function of an airplane tachometer.

Construct tachometer dials from paper plates and attach hand with a brass paper fastener.

Practice reading tachometers at various settings.

Discuss reasons why automobiles have only one odometer or tachometer, but airplanes may have two or more tachometers.