

Speed/Time/Distance

Speed, time and distance are related by the equation:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Given any two of the three variables, the other can be calculated using this equation.

If distance and time are given, simply place the values in the equation.

Example $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$$\text{Speed} = \frac{150 \text{ KM}}{3 \text{ HRS}}$$

$$\text{Speed} = 50 \text{ KPH}$$

If speed and time are given, the equation needs to be modified.

Example $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$$\text{Time} \times \text{Speed} = \text{Distance}$$

Now that speed and time are given for the simple equation, place the values in the equation.

$$\begin{aligned} \text{Distance} &= \text{Time} \times \text{Speed} \\ \text{Distance} &= 3 \text{ Hrs} \times 75 \text{ KPH} \\ \text{Distance} &= 225 \text{ KM} \end{aligned}$$

Speed Conversions

- Knots to MPH Multiply by 1.15
- MPH to Knots Divide by 1.15
- KPH to Knots Multiply by 0.54
- KPH to MPH Multiply by 0.62

Time Conversions

- Hours to Minutes Multiply by 60
- Minutes to Hours Divide by 60

The Appleyard Scale

The outside ring is distance and velocity

The inside ring is time.

All calculations can be done without using the flight computer by using the following formula:

$$V = \frac{D}{T}$$

V-velocity
D-distance
T-time

Time scale - The number 9 stands for 9 min, 90 min, 900 min, etc. You must use common sense to figure out which one applies. Notice on the time scale under the 9, 1:30 and 15:00h are also written. They stand for 90 min and 900 min respectively.

Distance Scale - Same as time scale in that the number 6 stands for 6, 60, 600, 6000 etc.

Once again common sense applies.

However the appleyard scale is a simple quick method to convert.

The Appleyard Scale is the same for the CR-3 and E6-B Flight Computer. The CR-3 will be used to show conversions. However, as mentioned above the E6-B can be used as well.

EXERCISE # 1

Find the missing element.

speed = 120 mph
distance = 170 NM
time = ?

- If speed is given point arrow towards the speed. Remember that 12 is also 120 and 1200. Any multiple of 10.
- Second, follow the outside scale to 17 for 170 NM and read the inside scale.
- The inside scale will align with 85.
- This number could mean 8.5, 85 or 850.
- Use common sense to calculate correct answer.

- Flying at 120 knots or 120 nautical miles per hour for 170 NM means the aircraft will be airborne for 85 minutes or 1 hour and twenty-five minutes.

Lets try a few examples:

Given

Speed = 210 MPH
 Time = 40 minutes
 Distance = ?

Use flight computer to calculate.

Speed = 210 MPH
 Time = 40 minutes
 Distance = 140 Miles

Point arrow to 210. Read time on inside scale. View reading aligned with 40 min.
 Answer 140 miles.

Lets try a few examples:

Given

Speed = ?
 Time = 90 minutes
 Distance = 120 NM

Use the flight computer to calculate.

Speed = 80 knots
 Time = 90 minutes
 Distance = 120 NM

Align 90 min to 120 NM. Read speed from pointing arrow. Answer 80 knots.

Fuel

Given

Fuel = 8 GPH
 Time = 45 minutes
 Consumption = ?

- If fuel is given, point arrow towards fuel.
- Remember that 80 is also 800. Any multiple of 10.
- Second, follow the inside scale to 45 and read outside scale.
- The outside scale will align with 60.
- This number could mean 6, 60 or 600.

- Use common sense to calculate correct answer.
- Burning 8 GPH or 8 gallons per hour for 45 minutes means the aircraft will consume 6 gallons

Conversions

Many conversions are possible with the flight computer. Some of the conversions are:

a) MPH	To	KPH
b) KPH	To	MPH
c) US GAL	To	IMP GAL
d) LBS.	To	Kg
e) SM	To	NM

- To convert units simply place under proper location.
- If statute miles are given, place SM under statute mile location.
- Once SM is in the correct position, read nautical miles under the NM location.
- Also, you can read kilometers under the KM location.

One – in – Sixty Rule

An error in the track of one degree will cause an error in position of about one mile on a distance of 60 miles.

Example – 3 degrees off track will cause an aircraft to be 3 miles out to the side.

Wind Side of the E6-B Flight Computer:

Steps to use the E6-B Flight Computer:

- i. Set wind direction opposite true index
- ii. Place grommet over 100
- iii. Mark wind dot up from grommet
- iv. Place true Course under true index
- v. Slide true airspeed under wind dot
- vi. Read ground speed under grommet
- vii. Read WCA under wind dot
- viii. Complete problem by using formula