

## 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 nautical mile over a distance of 60 miles.

Example – 3 degrees off track will cause an aircraft to be 3 nautical 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