



Navigation

3.04 TDV Scenarios

References:  
Nil

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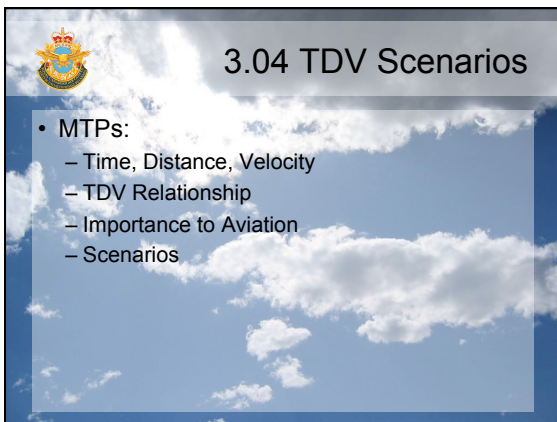
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3.04 TDV Scenarios

- MTPs:
  - Time, Distance, Velocity
  - TDV Relationship
  - Importance to Aviation
  - Scenarios

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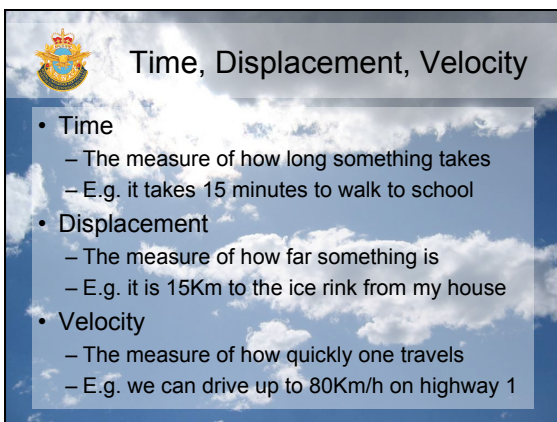
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Time, Displacement, Velocity

- Time
  - The measure of how long something takes
  - E.g. it takes 15 minutes to walk to school
- Displacement
  - The measure of how far something is
  - E.g. it is 15Km to the ice rink from my house
- Velocity
  - The measure of how quickly one travels
  - E.g. we can drive up to 80Km/h on highway 1

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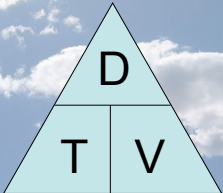
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 **TDV Relationship**

- A mathematical relationship exists between time, displacement, and velocity
  - $V = D/T$
  - $D = TV$
  - $T = D/V$
- Memory triangle →




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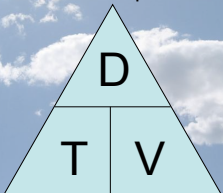
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 **TDV Relationship**

- How to use the memory triangle:
  - Cover what you're looking for
  - Look at how the other pieces are arranged
  - Math it!




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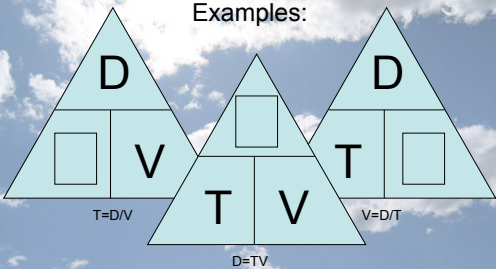
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 **TDV Relationship**

Examples:




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## Importance to Aviation

- The TDV relationship is important to aviation for several reasons
  - Based on distance covered over the ground and time, it is possible to calculate **groundspeed**, which is not available in the cockpit without sophisticated GPS
  - Based on groundspeed and distance remaining, it is possible to calculate **flight time** remaining, and thus **fuel required**
  - Based on fuel (maximum flight time) remaining, and groundspeed, it is possible to calculate **maximum range** available

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## Scenarios

- You rented a brand new C182JT-A for the weekend to fly from Nanaimo (YCD) to Sechart-Gibsons (AP3) and pick up your friend, and you want to tell your friend when you will arrive
  - The distance from YCD to AP3 is 21nm
  - Your cruise speed is 155kn
  - About how long should your flight take?

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## Scenarios

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### Scenarios

- 21nm
- 155kn
- $T = D/V$
- $T = 21/155$
- $T = 0.1354$  hours
- $0.1354 * 60 = 8.1$  minutes

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### Confirmation

- Now that you picked up your friend, you're ready to continue from Sechelt-Gibsons (AP3) to Pitt Meadows for gliding (YPK)
  - The distance from AP3 to YPK is 43nm
  - Your cruise speed is 155kn
  - About how long should your flight take?

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### Scenarios

- While flying to YPK you are diverted to Boundry Bay due to a police incident on the airfield. Your friend is flying, and you notice you appear to be fighting a headwind.
  - You pick a known distance, and find that you cover **half a mile** in **15 seconds**.
  - What is your **ground speed**?

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### Scenarios

- 0.5nm
- $15\text{sec}/60=0.25\text{min}$   $0.25\text{min}/60=0.00416\text{hr}$
- $V=D/T$
- $V=0.5/0.00416$
- $V=120\text{kn}$

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### Confirmation

- A few minutes later, you check your groundspeed again and find that you covered a half mile in 13 seconds.
  - What is your new groundspeed?

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### Scenarios

- You want to know the distance of the Port Mann bridge, so you take a quick detour to figure it out.
  - You fly the length of the span in 26 seconds
  - Assume calm winds and a cruise airspeed of 155kn
  - How long is the bridge?

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### Scenarios

- 155kn
- $26\text{sec}/60=0.43\text{min}$   $0.43\text{min}/60=0.00722\text{hr}$
- $D=VT$
- $D=(155)(0.00722)$
- $D=1.1\text{nm}$

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### Confirmation

- You're curious now about how long the Pattullo Bridge is, so you decide to check it out too.
  - It takes you 15 seconds to fly the span.
  - Assume calm winds and a cruise speed of 155kn.
  - How long is the bridge?

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### Cessna 182 JT A



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