

Question #2

>> Solution

To solve this problem I will be using the function [thrust_cal.mlx](#) to find the thrust for a Cessna Citation X medium business jet aircraft at different altitudes.

>> Code

Preparations

```
weight = 12000; % Weight [N]
wing_area = 50; % Wing area [m^2]
AR = 7.8; % Aspect ratio
e_oswald = 0.86; % Oswald efficiency constant
C_D0 = 0.027; % Zero lift drag coefficient
vel = 720; % Velocity [km/hr]
rho_4km = 0.81935; % Density at altitude 4km [kg/m^3]
rho_10km = 0.41351; % Density at altitude 10km [kg/m^3]

% Convert velocity to [m/s]
vel = vel * 1000 / 3600;
```

Calling Function (Calculate Thrust)

```
thrust_4km = thrust_cal(rho_4km, vel, wing_area, C_D0, weight, AR, e_oswald);
thrust_10km = thrust_cal(rho_10km, vel, wing_area, C_D0, weight, AR, e_oswald);
```

Answers

```
fprintf('The thrust required for a Citation X medium business jet aircraft at an altitude of')
```

The thrust required for a Citation X medium business jet aircraft at an altitude of

```
fprintf('4 km: %.2f N', thrust_4km);
```

4 km: 22130.79 N

```
fprintf('10 km: %.2f N', thrust_10km);
```

10 km: 11181.29 N