Formula sheet exam TTT4234 Space Technology I, December 8th, 2014

Useful and not so useful formulas and constants (not all are necessary for solving the problems):

The speed of light = $3 \cdot 10^8$m/s

Gravitational acceleration at sea level = 9.81m/s^2

$\mu = 3.986 \cdot 10^5$ km^3/s^2

$F = m \cdot a$

$F = \Delta p / \Delta t$

$F = GMm/r^2$

$F = mv^2/r$

$G = 6.67 \cdot 10^{-11}$Nm^2/kg^2

$M = 5.98 \cdot 10^{24}$kg

$R_E = 6370$km

X in deciBel (dB): $X_{dB} = 10\log_{10}(X_{lin})$

The semi major axis in an ellipsoid = ½ (R_a+R_p)

$e = (R_a-R_p) / (R_a+R_p) = c/a$

$\Delta v = v_e \cdot \ln (M_i/M_f)$

$v = \sqrt{\mu(2/r - 1/a)}$

Boltzmann's constant $k = 1.38 \times 10^{-23}$ J/K

The sunlight needs about 8 minutes to travel the distance from the Sun to Earth.

$T^2 = 4\pi^2 a^3/\mu$

$R=2.44*\lambda*h/D$

$S/N = (EIRP/L_0) * (G_r / N_0B) * 1/L_a$

$G = \eta \times 4\pi A / \lambda^2$

$L_0=(4\pi d/\lambda)^2$

$E_k = mv^2/2$