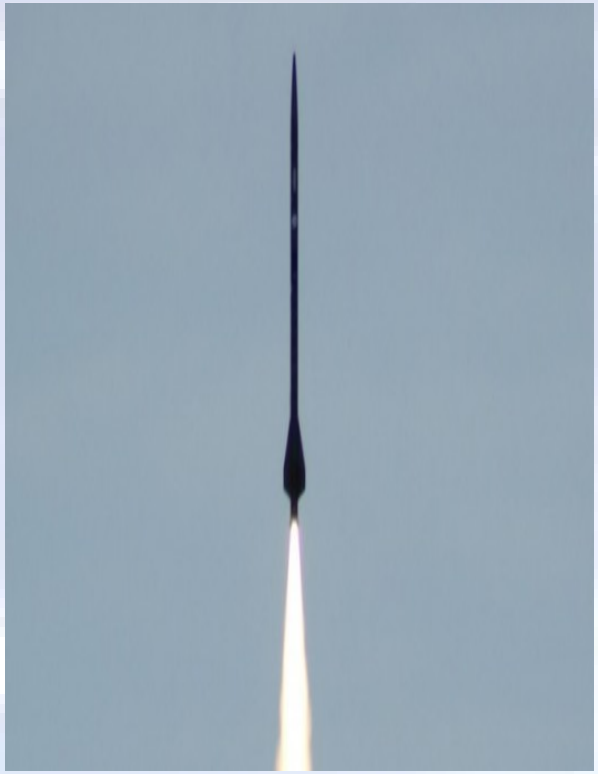
Introduction to Numerical Integration

$$I = 4\int_0^1 \sqrt{1-x^2}\,dx$$

As thy a difficult a problem as finding quadrature of a circle

PHYSICAL EXAMPLES

Distance Covered By Rocket



$$x = \int_{t_0}^{t_1} \left[u \log_e \left(\frac{m_0}{m_0 - qt} \right) - gt \right] dt$$

$$x = \int_{8}^{30} \left(2000 \ln \left[\frac{140000}{140000 - 2100t} \right] - 9.8t \right) dt$$

Concentration of Benzene

$$erfc(x) = \int_{\infty}^{x} e^{-z^2}\, dz$$

$$c(x,t) = \frac{c_0}{2}\left[erfc\left(\frac{x-ut}{2\sqrt{Dt}}\right) + e^{\frac{ux}{D}} erfc\left(\frac{x+ut}{2\sqrt{Dt}}\right)\right]$$

u= velocity of ground water flow in the x -direction (m/s)

D = dispersion coefficient (m^2/s)

C_0= initial concentration (kg/m^3)

Is Wal*** "short shifting" you?

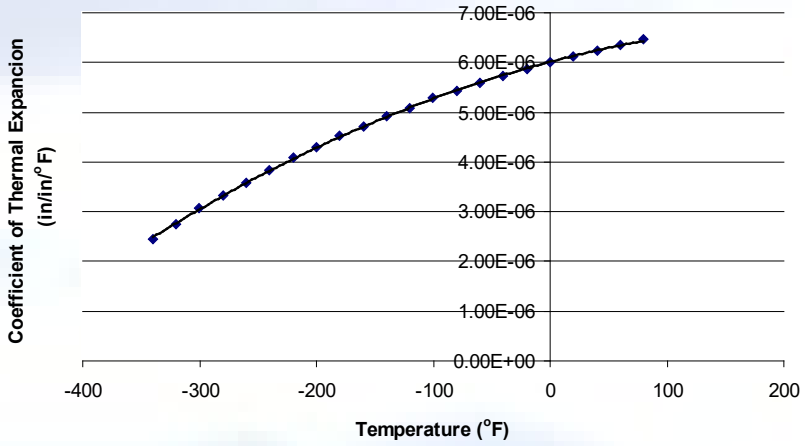
$$P(y \geq a) = \int_a^{\infty} f(y)dy = \int_a^{\infty} \frac{1}{\sigma\sqrt{2\pi}} e^{-(1/2)[(y-\mu)/\sigma]^2} dy$$

Roll	Number of sheets
1	253
2	250
3	251
4	252
5	253
6	253
7	252
8	254
9	252
10	252

$$P(y \geq 250) = \int_{250}^{\infty} 0.3515e^{-0.3881(y-252.2)^2} dy$$

Calculating diameter contraction for trunnion-hub problem

$$\Delta D = D \int_{T_{room}}^{T_{fluid}} \alpha dT$$

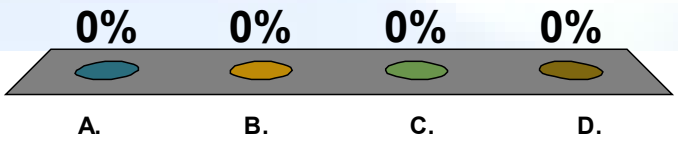


The distance covered by a rocket from t=8 to t=34 seconds is calculated using multiple segment trapezoidal rule by integrating a velocity function. Below is given the estimated distance for different number of segments, n.

n	1	2	3	4	5
Value	16520	15421	15212	15138	15104

The number of significant digits at least correct in the answer for n=5 is

- 1
- 2
- 3
- 4



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