

- 1) Adrien Marie Legendre, "Elements de geometrie"
- 2) Victor Poncelet, "Traite des proprietes projectives des figures". Contains essential concepts underlying the new form of geometry like cross ratio, perspectivity, projectivity, involution, circular points at infinity.
- 3) Mojon
- 4) Balzac Honore de Balzac

5) a)

$$\int_{-\infty}^{\infty} e^{-x^2/2} dx = \sqrt{2\pi}$$

b) Let $V = \int_{-\infty}^{\infty} e^{-x^2/2} dx$

$$V^2 = \left(\int_{-\infty}^{\infty} e^{-x^2/2} dx \right) \left(\int_{-\infty}^{\infty} e^{-y^2/2} dy \right)$$

$$= \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} e^{-x^2/2} \cdot e^{-y^2/2} dx dy$$

$$= \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} e^{-(x^2+y^2)/2} dx dy$$

$$r^2 = x^2 + y^2$$

$$r dr d\theta = dx dy$$

$$= \int_0^{\infty} \int_0^{2\pi} e^{-r^2/2} r d\theta dr$$

$$= 2\pi \int_0^{\infty} e^{-r^2/2} r dr = 2\pi \left[-e^{-r^2/2} \right]_0^{\infty} = \boxed{2\pi}$$

$$V^2 = 2\pi \Rightarrow V = \sqrt{2\pi}$$