7

a

CONSIDER,

$$\int_0^1 x e^{-x^2}\,dx$$

MUST BE TRUE GAUSSIAN QUAD. RULE

4 POINT RULE

$$I(g(x)) = \int_{-1}^{1} g(x)\,dx \approx \dots$$

n	≈ x_n	≈ ω_n
1	-0.8612	0.3479
2	-0.3400	0.6521
3	0.3400	0.6521
4	0.8612	0.3479

$$\dots \approx \omega_1 g(x_1) + \omega_2 g(x_2) \dots$$

$$\dots$$

$$= G_4(g(t(x))) \approx I(g)$$

Ex. 8.4

2 POINT RULE

$$I(f) = \int_{-1}^{1} f(x)\,dx \approx \dots$$

$$\dots \approx \omega_1 f(x_1) + \omega_2 f(x_2)$$

$$= G_2(f(x))$$

FROM '7.PY'

... SEEMS VERY INCORRECT ...

$$-\int_{-1}^{1} 2x\, e^{-(-2x)^2}\,dx \approx -\Big[(0.3479)2(-0.8612)\, e^{-(-2\cdot(-0.8612))^2}$$

$$+ (0.6521)2(-0.3400)\, e^{-(-2\cdot(-0.3400))^2}$$

$$+ (0.6521)2(0.3400)\, e^{-(-2\cdot(0.3400))^2}$$

$$+ (0.3479)2(0.8612)\, e^{-(-2\cdot(0.8612))^2}\Big] \approx 3.470 \times 10^{-18}$$

...looks like I am approximating if the interval were [-1,1] for the non transformed xe^-x^2, which would be zero--f is odd