

Relation of  $P(x)$  and  $Z^{(m)}(x)$  to Other Functions

<i>Function</i>	<i>Relation</i>	
26.2.29 Error function	$\operatorname{erf} x = 2P(x\sqrt{2}) - 1$	$(x \geq 0)$
26.2.30 Incomplete gamma function (special case)	$\frac{\gamma\left(\frac{1}{2}, x\right)}{\Gamma\left(\frac{1}{2}\right)} = [2P(\sqrt{2x}) - 1]$	$(x \geq 0)$
26.2.31 Hermite polynomial	$He_n(x) = (-1)^n \frac{Z^{(n)}(x)}{Z(x)}$	
26.2.32 “	$H_n(x) = (-1)^n 2^{n/2} \frac{Z^{(n)}(x\sqrt{2})}{Z(x\sqrt{2})}$	
26.2.33 <i>Hh</i> function	$Hh_{-n}(x) = (-1)^{n-1} \sqrt{2\pi} Z^{(n-1)}(x)$	$(n > 0)$
26.2.34 “	$Hh_n(x) = \frac{(-1)^n}{n!} Hh_{-1}(x) \frac{d^n}{dx^n} \left( \frac{Q(x)}{Z(x)} \right)$ *	$(n > 0)$
26.2.35 Tetrachoric function	$\tau_n(x) = \frac{(-1)^{n-1}}{\sqrt{n!}} Z^{(n-1)}(x)$	
26.2.36 Confluent hypergeometric function (special case)	$M\left(\frac{1}{2}, \frac{3}{2}, -\frac{x^2}{2}\right) = \frac{\sqrt{2\pi}}{x} \left\{ P(x) - \frac{1}{2} \right\}$	$(x > 0)$
26.2.37 “	$M\left(1, \frac{3}{2}, \frac{x^2}{2}\right) = \frac{1}{xZ(x)} \left\{ P(x) - \frac{1}{2} \right\}$	$(x > 0)$
26.2.38 “	$M\left(\frac{2m+1}{2}, \frac{1}{2}, -\frac{x^2}{2}\right) = \frac{Z^{(2m)}(x)}{Z^{(2m)}(0)}$	$(x \geq 0)$
26.2.39 “	$M\left(\frac{2m+2}{2}, \frac{3}{2}, -\frac{x^2}{2}\right) = \frac{Z^{(2m-1)}(x)}{xZ^{(2m)}(0)}$	$(x \geq 0)$
26.2.40 Parabolic cylinder function	$U\left(-n - \frac{1}{2}, x\right) = e^{-\frac{1}{2}x^2} (-1)^n \frac{Z^{(n)}(x)}{Z(x)}$	$(n > 0)$

Repeated Integrals of the Normal Probability Integral

26.2.41  $I_n(x) = \int_x^\infty I_{n-1}(t) dt \quad (n \geq 0)$

where  $I_{-1}(x) = Z(x)$

26.2.42

$I_{-n}(x) = \left(-\frac{d}{dx}\right)^{n-1} Z(x) = (-1)^{n-1} Z^{(n-1)}(x)$   
 $(n \geq -1)$

26.2.43  $\left(\frac{d^2}{dx^2} + x \frac{dx}{dn} - n\right) I_n(x) = 0$

26.2.44

$(n+1)I_{n+1}(x) + xI_n(x) - I_{n-1}(x) = 0 \quad (n > -1)$

\*See page 11.