

Expression Evaluator

The *Tools* menu provides access to an *Expression Evaluator* that may be used to display the value of any STATGRAPHICS Expression. It is controlled by the following dialog box:



To evaluate an expression, enter it in the *Expression* field and then push the *Enter* key. The result of the calculation will be displayed in the *Result* field. If the expression results in more than one value, the first 20 values will be displayed (space permitting).

STATGRAPHICS expressions may include algebraic symbols, variable names, or mathematical operators. Variable names and available operators may be placed in the *Expression* field by double-clicking on a name in the combo boxes. In the case of the operators, the ? marks are placeholders for arguments and should be replaced by the desired values.

Some of the more useful expressions that you may evaluate are:

1. **Algebraic expressions** – any algebraic expressions may be entered using the following symbols:

Symbol	Definition
+	addition
-	subtraction
*	multiplication
/	division
^	exponentiation
&	Boolean and
	Boolean or
=	Boolean equal
<>	Boolean not equal
<	Boolean less than
<=	Boolean less than or equal
>	Boolean greater than
>=	Boolean greater than or equal

The Boolean operators result in 1 if true and 0 if false. The precedence rules are:

- Exponentiation is done first.
- Multiplication and division are done next.
- Addition and subtraction are done next.
- Boolean operators are applied last.

Parentheses may be used to override the normal order of evaluation.

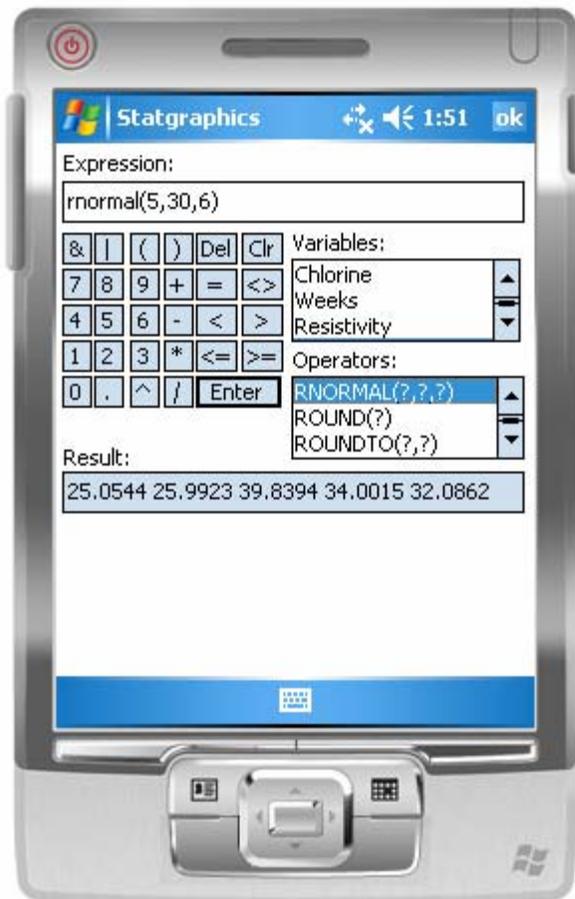
2. **Mathematical transformations** – a single value or entire column of data may be transformed. Some of the most commonly used operators are:

Operator	Definition
SQRT	Square root
LOG	Natural logarithm
LOG10	Base 10 logarithm
EXP	Exponential function
ABS	Absolute value

3. **Random number generators** – you can generate random numbers from selected distributions. For example, type expression

RNORMAL(5,30,6)

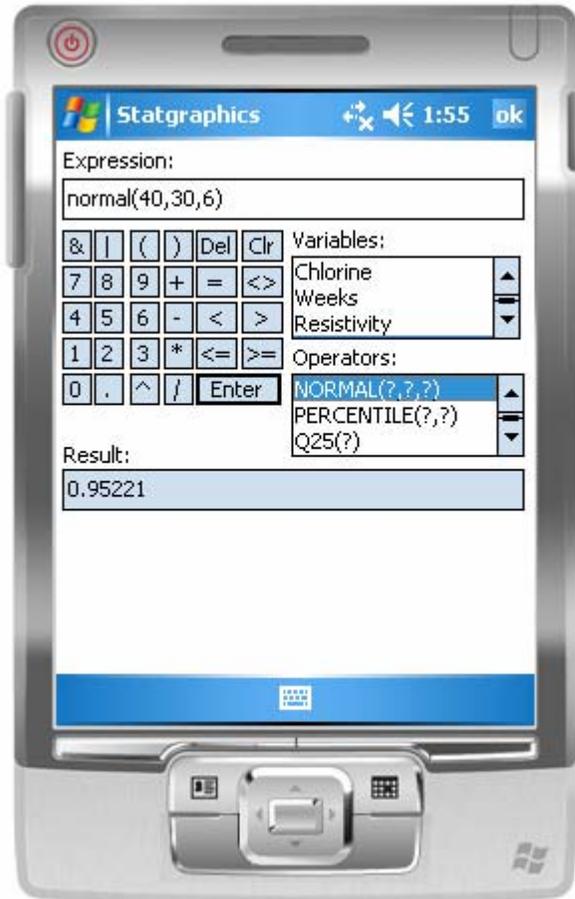
Generates 5 random number from a normal distribution with a mean of 30 and a standard deviation equal to 6.



4. **Cumulative probabilities for probability distributions** – cumulative probabilities can be determined for popular probability distributions. For example, the expression

$$\text{NORMAL}(40,30,6)$$

calculates the c.d.f. at $x = 40$ for a normal distribution with mean $\mu = 30$ and standard deviation $\sigma = 6$.



5. **Critical values for probability distributions** – the inverse c.d.f. can also be determined for popular probability distributions. For example, the expression

$\text{INVSTUDENT}(0.975,15)$

calculates the value of Student's t distribution with 15 degrees of freedom at which the cumulative distribution function equals 0.975.

