**BASH Math Cheatsheet**

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| --- | --- |
| **Mathematical forms** | |
| Function | Notes |
| VAL=$((4+4)) | Assigns result of expression to a variable |
| VAL=$(echo "scale=2; 4 / 3" | bc) | Assigns result of floating point math using external *bc* command |
| (( VAL = 4 + 4 )) | Assigns result of expression to a variable and provides return code |
| if (( 4+4=8 )) ;then | Tests mathematical expression and provides return code |

| **Calculations** | | | |
| --- | --- | --- | --- |
| Operator | Description | Operator | Description |
| **\*** | Multiplication | **/** | Division |
| **+** | Addition | **-** | Subtraction |
| **%** | Remainder (modulo) | **\*\*** | Exponentiation |

| **Mathematical Comparisons** | | | |
| --- | --- | --- | --- |
| Operator | Description | Operator | Description |
| **<** | Less than | **<=** | Less than or equal to |
| **>** | Greater than | **>=** | Greater than or equal to |
| **==** | Equality | **!=** | Inequality |

| **Bitwise Operations** | | | |
| --- | --- | --- | --- |
| Operator | Description | Operator | Description |
| **~** | Bitwise negation | **<<** | Bitwise shifting left |
| **>>** | Bitwise shifting right | **&** | Bitwise AND |
| **^** | Bitwise Exclusive OR (XOR) | **|** | Bitwise OR |

| **Miscellaneous** | | | |
| --- | --- | --- | --- |
| Operator | Description | Operator | Description |
| **id++** | Post Increment | **id--** | Post Decrement |
| **++id** | Pre Increment | **--id** | Pre Decrement |
| **=** | Normal assignment | **\*=** | Evaluate and assign |
| **&&** | Logical AND | **||** | Logical OR |
| **!** | Logical Negation | **( <EXPR> )** | subexpression (to force precedence) |