

# OpenSCAD

## Cheat Sheet

Version 2021.01

<b>Syntax</b> <pre> obj = union() {   obj1 = cone(z=10, r1=10, r2=5, h=10, f1=45);   obj2 = cylinder(r=5, h=10);   obj3 = sphere(r=5); } obj1 = sphere(r=5); obj2 = sphere(r=5); obj3 = sphere(r=5); </pre>	<b>Modifier Characters</b> <pre> ! absolute % relative \$ absolute / relative % absolute / relative </pre>	<b>Lists</b> <pre> list([1,2,3,4,5], 10, 20, 30) list("a", "b", "c", "d", "e") list(1, 2, 3, 4, 5, 6, 7, 8, 9, 10) </pre>	<b>Functions</b> <pre> abs(x) acos(x) asin(x) atan(x) atan2(x, y) ceil(x) cos(x) cylinder(r, h) cylinder(r1, r2, h) cylinder(r, h, \$f) cylinder(r, h, \$f, \$a) cylinder(r, h, \$f, \$a, \$l) cylinder(r, h, \$f, \$a, \$l, \$p) cylinder(r, h, \$f, \$a, \$l, \$p, \$t) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y) cylinder(r, h, \$f, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y, \$z) </pre>
<b>Constants</b> <pre> PI </pre>	<b>2D</b> <pre> circle(r) circle(r, \$a) circle(r, \$a, \$l) circle(r, \$a, \$l, \$p) circle(r, \$a, \$l, \$p, \$t) circle(r, \$a, \$l, \$p, \$t, \$c) circle(r, \$a, \$l, \$p, \$t, \$c, \$d) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y) circle(r, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y, \$z) </pre>	<b>Boolean operations</b> <pre> intersect() difference() union() </pre>	<b>Mathematical</b> <pre> sqrt(x) log(x) log10(x) exp(x) exp2(x) exp10(x) sin(x) cos(x) tan(x) cot(x) sec(x) csc(x) sinh(x) cosh(x) tanh(x) coth(x) sech(x) csch(x) </pre>
<b>Operators</b> <pre> + - * / % ^ ~ &amp;   ! &amp;&amp;    !&amp;&amp; !   </pre>	<b>3D</b> <pre> cube(x, y, z) cube(x, y, z, \$a) cube(x, y, z, \$a, \$l) cube(x, y, z, \$a, \$l, \$p) cube(x, y, z, \$a, \$l, \$p, \$t) cube(x, y, z, \$a, \$l, \$p, \$t, \$c) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y) cube(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y, \$z) </pre>	<b>List Comprehensions</b> <pre> [expression for item in iterable if condition] </pre>	<b>Flow Control</b> <pre> if (condition) {   // code } else {   // code } for (i = 0; i &lt; n; i++) {   // code } while (condition) {   // code } do {   // code } while (condition); break; continue; return; </pre>
<b>Special variables</b> <pre> \$fn \$fs \$fa \$fl \$fd \$ff \$ffr \$ffs \$fffa \$fffd \$fffr \$fffs \$fffa \$fffd \$fffr \$fffs </pre>	<b>Transformations</b> <pre> translate(x, y, z) translate(x, y, z, \$a) translate(x, y, z, \$a, \$l) translate(x, y, z, \$a, \$l, \$p) translate(x, y, z, \$a, \$l, \$p, \$t) translate(x, y, z, \$a, \$l, \$p, \$t, \$c) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y) translate(x, y, z, \$a, \$l, \$p, \$t, \$c, \$d, \$e, \$f, \$g, \$h, \$i, \$j, \$k, \$l, \$m, \$n, \$o, \$p, \$q, \$r, \$s, \$t, \$u, \$v, \$w, \$x, \$y, \$z) </pre>	<b>Type Test Functions</b> <pre> isBool(x) isList(x) isString(x) isNumber(x) isVector(x) isMatrix(x) isText(x) isColor(x) isFile(x) isImage(x) </pre>	

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