# Upper Critical Values for the Kruskal-Wallis Test

| Group Sizes | | | Nominal size $\alpha$ | | | |
|---|---|---|---|---|---|---|
| | | | 0.10 | 0.05 | 0.025 | 0.01 |
| 2 | 2 | 2 | 4.571 (.06667) | - - | - - | - - |
| 3 | 2 | 1 | 4.286 (.10000) | - - | - - | - - |
| 3 | 2 | 2 | 4.500 (.06667) | 4.714 (.04762) | - - | - - |
| 3 | 3 | 1 | 4.571 (.10000) | 5.143 (.04286) | - - | - - |
| 3 | 3 | 2 | 4.556 (.10000) | 5.361 (.03214) | 5.556 (.02500) | - - |
| 3 | 3 | 3 | 4.622 (.10000) | 5.600 (.05000) | 5.956 (.02500) | 7.200 (.00357) |
| 4 | 2 | 1 | 4.500 (.07619) | - - | - - | - - |
| 4 | 2 | 2 | 4.458 (.10000) | 5.333 (.03333) | 5.500 (.02381) | - - |
| 4 | 3 | 1 | 4.056 (.09286) | 5.208 (.05000) | 5.833 (.02143) | - - |
| 4 | 3 | 2 | 4.511 (.09841) | 5.444 (.04603) | 6.000 (.02381) | 6.444 (.00794) |
| 4 | 3 | 3 | 4.709 (.09238) | 5.791 (.04571) | 6.155 (.02476) | 6.745 (.01000) |
| 4 | 4 | 1 | 4.167 (.08254) | 4.967 (.04762) | 6.167 (.02222) | 6.667 (.00952) |
| 4 | 4 | 2 | 4.555 (.09778) | 5.455 (.04571) | 6.327 (.02413) | 7.036 (.00571) |
| 4 | 4 | 3 | 4.545 (.09905) | 5.598 (.04866) | 6.394 (.02476) | 7.144 (.00970) |
| 4 | 4 | 4 | 4.654 (.09662) | 5.692 (.04866) | 6.615 (.02424) | 7.654 (.00762) |
| 5 | 2 | 1 | 4.200 (.09524) | 5.000 (.04762) | - - | - - |
| 5 | 2 | 2 | 4.373 (.08995) | 5.160 (.03439) | 6.000 (.01852) | 6.533 (.00794) |
| 5 | 3 | 1 | 4.018 (.09524) | 4.960 (.04762) | 6.044 (.01984) | - - |
| 5 | 3 | 2 | 4.651 (.09127) | 5.251 (.04921) | 6.004 (.02460) | 6.909 (.00873) |
| 5 | 3 | 3 | 4.533 (.09697) | 5.648 (.04892) | 6.315 (.02121) | 7.079 (.00866) |
| 5 | 4 | 1 | 3.987 (.09841) | 4.985 (.04444) | 5.858 (.02381) | 6.955 (.00794) |
| 5 | 4 | 2 | 4.541 (.09841) | 5.273 (.04877) | 6.068 (.02482) | 7.205 (.00895) |
| 5 | 4 | 3 | 4.549 (.09892) | 5.656 (.04863) | 6.410 (.02496) | 7.445 (.00974) |
| 5 | 4 | 4 | 4.668 (.09817) | 5.657 (.04906) | 6.673 (.02429) | 7.760 (.00946) |
| 5 | 5 | 1 | 4.109 (.08586) | 5.127 (.04618) | 6.000 (.02165) | 7.309 (.00938) |
| 5 | 5 | 2 | 4.623 (.09704) | 5.338 (.04726) | 6.346 (.02489) | 7.338 (.00962) |
| 5 | 5 | 3 | 4.545 (.09965) | 5.705 (.04612) | 6.549 (.02436) | 7.578 (.00968) |
| 5 | 5 | 4 | 4.523 (.09935) | 5.666 (.04931) | 6.760 (.02490) | 7.823 (.00978) |
| 5 | 5 | 5 | 4.560 (.09952) | 5.780 (.04878) | 6.740 (.02475) | 8.000 (.00946) |

| Group Sizes | | | Nominal size $\alpha$ | | | |
|---|---|---|---|---|---|---|
| | | | 0.10 | 0.05 | 0.025 | 0.01 |
| 6 | 1 | 1 | - - | - - | - - | - - |
| 6 | 2 | 1 | 4.200 (.09524) | 4.822 (.04762) | 5.600 (.02381) | - - |
| 6 | 2 | 2 | 4.545 (.08889) | 5.345 (.03810) | 5.745 (.02063) | 6.655 (.00794) |
| 6 | 3 | 1 | 3.909 (.09524) | 4.855 (.05000) | 5.945 (.02143) | 6.873 (.00714) |
| 6 | 3 | 2 | 4.682 (.08528) | 5.348 (.04632) | 6.136 (.02294) | 6.970 (.00909) |
| 6 | 3 | 3 | 4.590 (.09773) | 5.615 (.04968) | 6.436 (.02229) | 7.410 (.00779) |
| 6 | 4 | 1 | 4.038 (.09437) | 4.947 (.04675) | 5.856 (.02424) | 7.106 (.00866) |
| 6 | 4 | 2 | 4.494 (.09986) | 5.340 (.04906) | 6.186 (.02453) | 7.340 (.00967) |
| 6 | 4 | 3 | 4.604 (.09997) | 5.610 (.04862) | 6.538 (.02498) | 7.500 (.00966) |
| 6 | 4 | 4 | 4.595 (.09847) | 5.681 (.04881) | 6.667 (.02495) | 7.795 (.00990) |
| 6 | 5 | 1 | 4.128 (.09271) | 4.990 (.04726) | 5.951 (.02453) | 7.182 (.00974) |
| 6 | 5 | 2 | 4.596 (.09807) | 5.338 (.04729) | 6.196 (.02481) | 7.376 (.00982) |
| 6 | 5 | 3 | 4.535 (.09932) | 5.602 (.04956) | 6.667 (.02452) | 7.590 (.00999) |
| 6 | 5 | 4 | 4.522 (.09974) | 5.661 (.04991) | 6.750 (.02473) | 7.936 (.00998) |
| 6 | 5 | 5 | 4.547 (.09835) | 5.729 (.04973) | 6.788 (.02484) | 8.028 (.00988) |
| 6 | 6 | 1 | 4.000 (.09774) | 4.945 (.04779) | 5.923 (.02381) | 7.121 (.00932) |
| 6 | 6 | 2 | 4.438 (.09824) | 5.410 (.04993) | 6.210 (.02443) | 7.467 (.00982) |
| 6 | 6 | 3 | 4.558 (.09948) | 5.625 (.04999) | 6.725 (.02462) | 7.725 (.00985) |
| 6 | 6 | 4 | 4.548 (.09982) | 5.724 (.04950) | 6.812 (.02458) | 8.000 (.00998) |
| 6 | 6 | 5 | 4.542 (.09987) | 5.765 (.04993) | 6.848 (.02489) | 8.124 (.00990) |
| 6 | 6 | 6 | 4.643 (.09874) | 5.801 (.04905) | 6.889 (.02493) | 8.222 (.00994) |
| 7 | 7 | 7 | 4.594 (.09933) | 5.819 (.04911) | 6.954 (.02446) | 8.378 (.00992) |
| 8 | 8 | 8 | 4.595 (.09933) | 5.805 (.04973) | 6.995 (.02485) | 8.465 (.00991) |

| Group Sizes | | | | Nominal size $\alpha$ | | | |
|---|---|---|---|---|---|---|---|
| | | | | 0.10 | 0.05 | 0.025 | 0.01 |
| 2 | 2 | 1 | 1 | - - | - - | - - | - - |
| 2 | 2 | 2 | 1 | 5.357 (.06667) | 5.679 (.03810) | - - | - - |
| 2 | 2 | 2 | 2 | 5.667 (.07619) | 6.167 (.03810) | 6.667 (.00952) | 6.667 (.00952) |
| 3 | 1 | 1 | 1 | - - | - - | - - | - - |
| 3 | 2 | 1 | 1 | 5.143 (.08571) | - - | - - | - - |
| 3 | 2 | 2 | 1 | 5.556 (.07143) | 5.833 (.04286) | 6.250 (.02143) | - - |
| 3 | 2 | 2 | 2 | 5.644 (.10000) | 6.333 (.04762) | 6.978 (.01746) | 7.133 (.00794) |
| 3 | 3 | 1 | 1 | 5.333 (.09643) | 6.333 (.02143) | 6.333 (.02143) | - |
| 3 | 3 | 2 | 1 | 5.689 (.08571) | 6.244 (.04246) | 6.689 (.01786) | 7.200 (.00595) |
| 3 | 3 | 2 | 2 | 5.745 (.09921) | 6.527 (.04921) | 7.055 (.02317) | 7.636 (.01000) |
| 3 | 3 | 3 | 1 | 5.655 (.09786) | 6.600 (.04929) | 7.036 (.02429) | 7.400 (.00857) |
| 3 | 3 | 3 | 2 | 5.879 (.09974) | 6.727 (.04948) | 7.515 (.02390) | 8.015 (.00961) |
| 3 | 3 | 3 | 3 | 6.026 (.09779) | 7.000 (.04351) | 7.667 (.02338) | 8.538 (.00838) |
| 4 | 1 | 1 | 1 | - - | - - | - - | - - |
| 4 | 2 | 1 | 1 | 5.250 (.09048) | 5.833 (.04286) | - - | - - |
| 4 | 2 | 2 | 1 | 5.533 (.09788) | 6.133 (.04180) | 6.533 (.02063) | 7.000 (.00952) |
| 4 | 2 | 2 | 2 | 5.755 (.09302) | 6.545 (.04921) | 7.064 (.02222) | 7.391 (.00889) |
| 4 | 3 | 1 | 1 | 5.067 (.09524) | 6.178 (.04921) | 6.711 (.01905) | 7.067 (.00952) |
| 4 | 3 | 2 | 1 | 5.591 (.09857) | 6.309 (.04937) | 6.955 (.02317) | 7.455 (.00984) |
| 4 | 3 | 2 | 2 | 5.750 (.09980) | 6.621 (.04949) | 7.326 (.02496) | 7.871 (.00999) |
| 4 | 3 | 3 | 1 | 5.689 (.09602) | 6.545 (.04952) | 7.326 (.02329) | 7.758 (.00974) |
| 4 | 3 | 3 | 2 | 5.872 (.09929) | 6.795 (.04925) | 7.564 (.02494) | 8.333 (.00985) |
| 4 | 3 | 3 | 3 | 6.016 (.09779) | 6.984 (.04897) | 7.775 (.02437) | 8.659 (.00990) |
| 4 | 4 | 1 | 1 | 5.182 (.09968) | 5.945 (.04952) | 6.955 (.02349) | 7.909 (.00381) |
| 4 | 4 | 2 | 1 | 5.568 (.09980) | 6.386 (.04981) | 7.159 (.02459) | 7.909 (.00906) |
| 4 | 4 | 2 | 2 | 5.808 (.09882) | 6.731 (.04872) | 7.538 (.02453) | 8.346 (.00941) |
| 4 | 4 | 3 | 1 | 5.692 (.09853) | 6.635 (.04978) | 7.500 (.02462) | 8.231 (.00955) |
| 4 | 4 | 3 | 2 | 5.901 (.09950) | 6.874 (.04983) | 7.747 (.02500) | 8.621 (.00999) |
| 4 | 4 | 3 | 3 | 6.019 (.09948) | 7.038 (.04990) | 7.929 (.02487) | 8.876 (.00974) |
| 4 | 4 | 4 | 1 | 5.654 (.09801) | 6.725 (.04979) | 7.648 (.02470) | 8.588 (.00986) |
| 4 | 4 | 4 | 2 | 5.914 (.09940) | 6.957 (.04960) | 7.914 (.02499) | 8.871 (.00987) |
| 4 | 4 | 4 | 3 | 6.042 (.09980) | 7.142 (.04954) | 8.079 (.02494) | 9.075 (.01000) |
| 4 | 4 | 4 | 4 | 6.088 (.09900) | 7.235 (.04922) | 8.228 (.02476) | 9.287 (.00999) |

| Group Sizes | | | | | Nominal size $\alpha$ | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0.10 | 0.05 | 0.025 | 0.01 |
| 2 | 2 | 1 | 1 | 1 | 5.786 (.09524) | - - | - - | - - |
| 2 | 2 | 2 | 1 | 1 | 6.250 (.08810) | 6.750 (.02381) | 6.750 (.02381) | - - |
| 2 | 2 | 2 | 2 | 1 | 6.600 (.08889) | 7.133 (.04127) | 7.333 (.02222) | 7.533 (.00952) |
| 2 | 2 | 2 | 2 | 2 | 6.982 (.09101) | 7.418 (.04868) | 7.964 (.02222) | 8.291 (.00952) |
| 3 | 1 | 1 | 1 | 1 | - - | - - | - - | - - |
| 3 | 2 | 1 | 1 | 1 | 6.139 (.10000) | 6.583 (.03571) | - - | - - |
| 3 | 2 | 2 | 1 | 1 | 6.511 (.10000) | 6.800 (.04921) | 7.200 (.02460) | 7.600 (.00794) |
| 3 | 2 | 2 | 2 | 1 | 6.709 (.09873) | 7.309 (.04889) | 7.745 (.02317) | 8.127 (.00937) |
| 3 | 2 | 2 | 2 | 2 | 6.955 (.09922) | 7.682 (.04745) | 8.182 (.02384) | 8.682 (.00958) |
| 3 | 3 | 1 | 1 | 1 | 6.311 (.09286) | 7.111 (.04048) | 7.467 (.01190) | - - |
| 3 | 3 | 2 | 1 | 1 | 6.600 (.09929) | 7.200 (.05000) | 7.618 (.02452) | 8.073 (.00738) |
| 3 | 3 | 2 | 2 | 1 | 6.788 (.09892) | 7.591 (.04919) | 8.121 (.02437) | 8.576 (.00984) |
| 3 | 3 | 2 | 2 | 2 | 7.026 (.09897) | 7.910 (.04934) | 8.538 (.02408) | 9.115 (.00996) |
| 3 | 3 | 3 | 1 | 1 | 6.788 (.09779) | 7.576 (.04545) | 8.061 (.02325) | 8.424 (.00909) |
| 3 | 3 | 3 | 2 | 1 | 6.910 (.09916) | 7.769 (.04885) | 8.449 (.02471) | 9.051 (.00976) |
| 3 | 3 | 3 | 2 | 2 | 7.121 (.09979) | 8.044 (.04915) | 8.813 (.02472) | 9.505 (.00999) |
| 3 | 3 | 3 | 3 | 1 | 7.077 (.09836) | 8.000 (.04792) | 8.703 (.02396) | 9.451 (.00997) |
| 3 | 3 | 3 | 3 | 2 | 7.210 (.09965) | 8.200 (.04940) | 9.038 (.02452) | 9.876 (.00966) |
| 3 | 3 | 3 | 3 | 3 | 7.333 (.09922) | 8.333 (.04955) | 9.200 (.02500) | 10.200 (.00986) |