The Student Survey – Quartiles and Box Plots



If you took part in the student survey you will have completed the reaction time game <http://www.mathsisfun.com/games/reaction-time.html>

*You have to click when the circle changes colour.*

In this activity we will consider whether “**Reaction time** is dependent upon **age**”.

1. Circle which you think is likely to be true:
2. Older people will have faster reaction times.
3. Younger people will have faster reaction times.
4. Age has no influence on reaction time.

Below you will find the reaction times of the students grouped by age (they have been ordered to make this easier for you). Obviously erroneous data has been removed.

1. Find the minimum value, lower quartile (Q1), median (Q2), upper quartile (Q3) and maximum value for the individual groups and complete the table below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Age group | min | Q1 | Q2 | Q3 | max |
| 11-14 |  |  |  |  |  |
| 15-18 |  |  |  |  |  |
| >18 |  |  |  |  |  |

1. Plot 3 separate boxplots on the grid on page 3 like this



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **11-14 y olds** |  | **15-18 y olds** |  |  |  | **>18 y olds** |
| 1 | 0.126 | 51 | 0.282 | 101 | 0.352 |   | 1 | 0.132 | 51 | 0.274 | 101 | 0.319 |   | 1 | 0.216 |
| 2 | 0.199 | 52 | 0.283 | 102 | 0.354 |   | 2 | 0.132 | 52 | 0.275 | 102 | 0.32 |   | 2 | 0.228 |
| 3 | 0.204 | 53 | 0.284 | 103 | 0.355 |   | 3 | 0.195 | 53 | 0.276 | 103 | 0.322 |   | 3 | 0.234 |
| 4 | 0.208 | 54 | 0.285 | 104 | 0.356 |   | 4 | 0.21 | 54 | 0.276 | 104 | 0.335 |   | 4 | 0.242 |
| 5 | 0.211 | 55 | 0.285 | 105 | 0.357 |   | 5 | 0.211 | 55 | 0.277 | 105 | 0.336 |   | 5 | 0.26 |
| 6 | 0.22 | 56 | 0.285 | 106 | 0.358 |   | 6 | 0.211 | 56 | 0.278 | 106 | 0.344 |   | 6 | 0.261 |
| 7 | 0.234 | 57 | 0.287 | 107 | 0.359 |   | 7 | 0.222 | 57 | 0.279 | 107 | 0.344 |   | 7 | 0.263 |
| 8 | 0.239 | 58 | 0.288 | 108 | 0.359 |   | 8 | 0.224 | 58 | 0.28 | 108 | 0.345 |   | 8 | 0.266 |
| 9 | 0.243 | 59 | 0.288 | 109 | 0.359 |   | 9 | 0.234 | 59 | 0.281 | 109 | 0.345 |   | 9 | 0.266 |
| 10 | 0.244 | 60 | 0.288 | 110 | 0.361 |   | 10 | 0.237 | 60 | 0.281 | 110 | 0.345 |   | 10 | 0.278 |
| 11 | 0.244 | 61 | 0.290 | 111 | 0.361 |   | 11 | 0.237 | 61 | 0.282 | 111 | 0.351 |   | 11 | 0.28 |
| 12 | 0.245 | 62 | 0.292 | 112 | 0.361 |   | 12 | 0.238 | 62 | 0.282 | 112 | 0.364 |   | 12 | 0.287 |
| 13 | 0.25 | 63 | 0.294 | 113 | 0.362 |   | 13 | 0.239 | 63 | 0.284 | 113 | 0.365 |   | 13 | 0.294 |
| 14 | 0.251 | 64 | 0.295 | 114 | 0.362 |   | 14 | 0.239 | 64 | 0.284 | 114 | 0.373 |   | 14 | 0.317 |
| 15 | 0.254 | 65 | 0.296 | 115 | 0.364 |   | 15 | 0.24 | 65 | 0.284 | 115 | 0.383 |   | 15 | 0.343 |
| 16 | 0.254 | 66 | 0.296 | 116 | 0.365 |   | 16 | 0.241 | 66 | 0.284 | 116 | 0.409 |   | 16 | 0.352 |
| 17 | 0.254 | 67 | 0.298 | 117 | 0.368 |   | 17 | 0.243 | 67 | 0.284 | 117 | 0.424 |   | 17 | 0.362 |
| 18 | 0.255 | 68 | 0.299 | 118 | 0.368 |   | 18 | 0.249 | 68 | 0.285 | 118 | 0.442 |   | 18 | 0.385 |
| 19 | 0.258 | 69 | 0.302 | 119 | 0.368 |   | 19 | 0.249 | 69 | 0.287 | 119 | 0.461 |   | 19 | 0.443 |
| 20 | 0.259 | 70 | 0.302 | 120 | 0.370 |   | 20 | 0.25 | 70 | 0.287 | 120 | 0.567 |  |  |  |
| 21 | 0.260 | 71 | 0.307 | 121 | 0.374 |   | 21 | 0.25 | 71 | 0.288 | 121 | 0.657 |  |  |  |
| 22 | 0.260 | 72 | 0.307 | 122 | 0.378 |   | 22 | 0.253 | 72 | 0.289 | 122 | 0.825 |  |  |  |
| 23 | 0.26 | 73 | 0.309 | 123 | 0.378 |   | 23 | 0.253 | 73 | 0.293 |  |  |  |  |  |
| 24 | 0.26 | 74 | 0.309 | 124 | 0.378 |   | 24 | 0.253 | 74 | 0.293 |  |  |  |  |  |
| 25 | 0.262 | 75 | 0.310 | 125 | 0.38 |   | 25 | 0.255 | 75 | 0.295 |  |  |  |  |  |
| 26 | 0.262 | 76 | 0.310 | 126 | 0.382 |   | 26 | 0.256 | 76 | 0.295 |  |  |  |  |  |
| 27 | 0.263 | 77 | 0.313 | 127 | 0.383 |   | 27 | 0.257 | 77 | 0.296 |  |  |  |  |  |
| 28 | 0.264 | 78 | 0.313 | 128 | 0.387 |   | 28 | 0.258 | 78 | 0.297 |  |  |  |  |  |
| 29 | 0.265 | 79 | 0.314 | 129 | 0.388 |   | 29 | 0.258 | 79 | 0.298 |  |  |  |  |  |
| 30 | 0.268 | 80 | 0.317 | 130 | 0.396 |   | 30 | 0.259 | 80 | 0.299 |  |  |  |  |  |
| 31 | 0.268 | 81 | 0.32 | 131 | 0.397 |   | 31 | 0.259 | 81 | 0.299 |  |  |  |  |  |
| 32 | 0.269 | 82 | 0.32 | 132 | 0.414 |   | 32 | 0.259 | 82 | 0.301 |  |  |  |  |  |
| 33 | 0.269 | 83 | 0.321 | 133 | 0.418 |   | 33 | 0.26 | 83 | 0.301 |  |  |  |  |  |
| 34 | 0.271 | 84 | 0.324 | 134 | 0.424 |   | 34 | 0.26 | 84 | 0.301 |  |  |  |  |  |
| 35 | 0.273 | 85 | 0.326 | 135 | 0.444 |   | 35 | 0.26 | 85 | 0.302 |  |  |  |  |  |
| 36 | 0.274 | 86 | 0.327 | 136 | 0.452 |   | 36 | 0.262 | 86 | 0.302 |  |  |  |  |  |
| 37 | 0.274 | 87 | 0.327 | 137 | 0.453 |   | 37 | 0.264 | 87 | 0.303 |  |  |  |  |  |
| 38 | 0.274 | 88 | 0.327 | 138 | 0.463 |   | 38 | 0.265 | 88 | 0.304 |  |  |  |  |  |
| 39 | 0.275 | 89 | 0.33 | 139 | 0.464 |   | 39 | 0.266 | 89 | 0.304 |  |  |  |  |  |
| 40 | 0.276 | 90 | 0.334 | 140 | 0.464 |   | 40 | 0.266 | 90 | 0.304 |  |  |  |  |  |
| 41 | 0.276 | 91 | 0.335 | 141 | 0.502 |   | 41 | 0.268 | 91 | 0.308 |  |  |  |  |  |
| 42 | 0.277 | 92 | 0.337 | 142 | 0.571 |   | 42 | 0.268 | 92 | 0.308 |  |  |  |  |  |
| 43 | 0.277 | 93 | 0.340 |  |  |   | 43 | 0.269 | 93 | 0.31 |  |  |  |  |  |
| 44 | 0.277 | 94 | 0.342 |  |  |   | 44 | 0.27 | 94 | 0.31 |  |  |  |  |  |
| 45 | 0.278 | 95 | 0.344 |  |  |   | 45 | 0.271 | 95 | 0.31 |  |  |  |  |  |
| 46 | 0.278 | 96 | 0.344 |  |  |   | 46 | 0.272 | 96 | 0.313 |  |  |  |  |  |
| 47 | 0.278 | 97 | 0.344 |  |  |   | 47 | 0.273 | 97 | 0.314 |  |  |  |  |  |
| 48 | 0.28 | 98 | 0.349 |  |  |   | 48 | 0.273 | 98 | 0.314 |  |  |  |  |  |
| 49 | 0.28 | 99 | 0.35 |  |  |   | 49 | 0.273 | 99 | 0.315 |  |  |  |  |  |
| 50 | 0.281 | 100 | 0.351 |  |  |   | 50 | 0.273 | 100 | 0.317 |  |  |  |  |  |



1. Describe what you notice about the boxplots. Does this support your hypothesis in Q1?

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