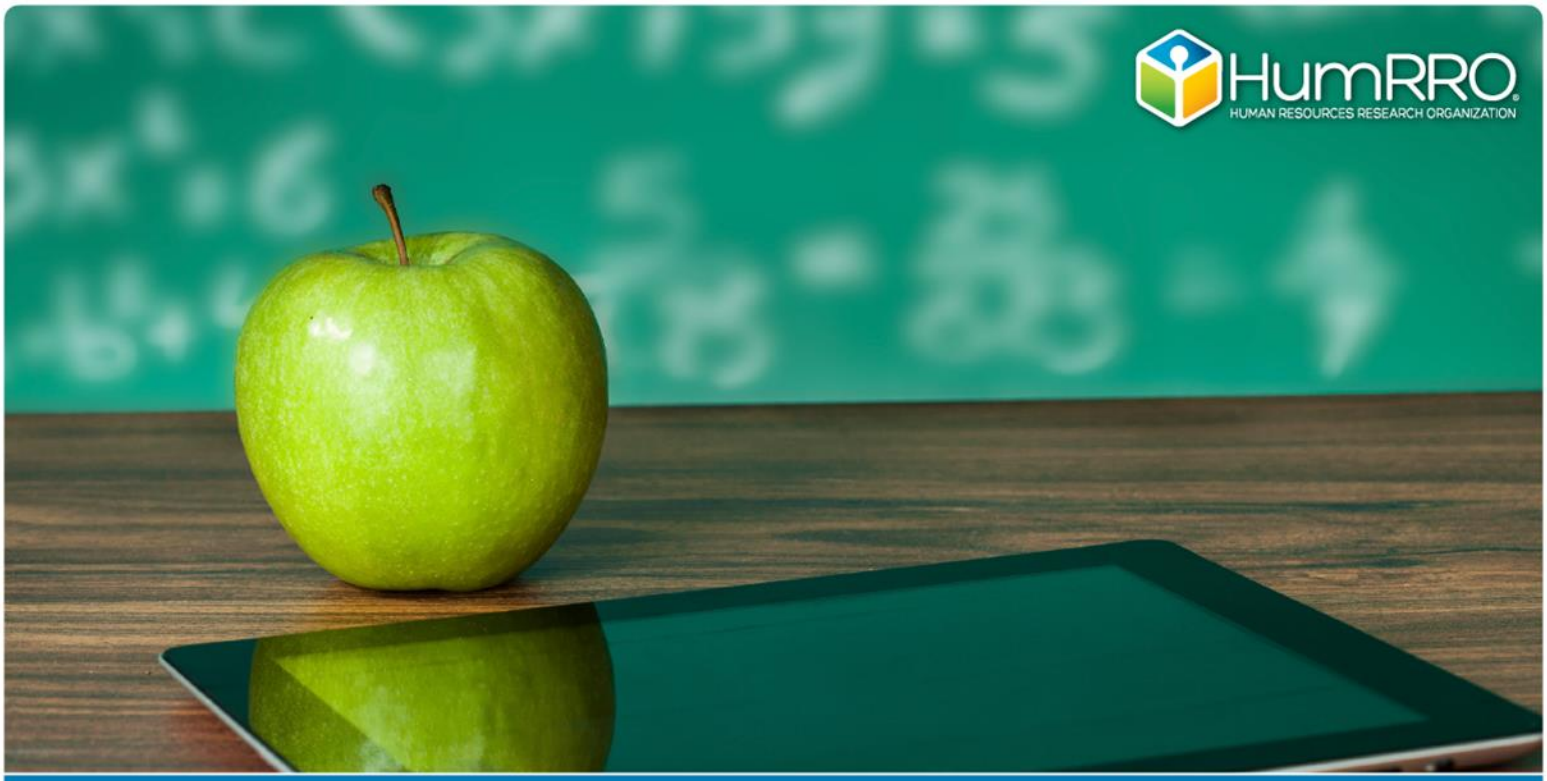

HumRRO
HUMAN RESOURCES RESEARCH ORGANIZATION

2022 No. 113

Third-Party Checking of 2022 Scaling and Equating for the Kentucky Summative Assessments (KSA)

Final Report

Prepared for:	Kentucky Department of Education Office of Assessment and Accountability 300 Sower Boulevard Frankfort, KY 40601	**Prepared under:**	Contract #1900004339
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Third-Party Checking of 2022 Scaling and Equating for the Kentucky Summative Assessments (KSA)

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Executive Summary

Pearson and the Human Resources Research Organization (HumRRO) independently calibrated, scaled, and equated the 2022 Kentucky Summative Assessments (KSA) and produced the raw-score-to-theta-score tables to be applied to students' test results. HumRRO further verified that scoring tables were applied accurately by independently scoring students and then comparing our scoring results to Pearson's. Results calculated by HumRRO were identical to those calculated by Pearson (M. Johnson, email communication, July 7, 2022 [math]; July 7, 2022 [reading] and July 7, 2022 [social studies]; July 11, 2022 [science]; July 12, 2022 [writing]). Given that HumRRO's results were identical to those of Pearson, we are assured that Pearson did not commit processing errors.

Third-Party Checking of 2022 Scaling and Equating for the Kentucky Summative Assessments (KSA) Tests

Introduction

Kentucky started administering the Kentucky Summative Assessments (KSA) in spring 2022. The KSA assess student performance on the Kentucky Academic Standards (KAS) using a combination of multiple choice, short answer, and extended response items. Student scores are estimated using a Rasch Item-Response Theory (IRT) model. As new test forms have been developed, an equating process has been implemented to allow for meaningful comparisons over the years with Kentucky's previous assessments.

In spring 2022, the KSA were administered in reading, mathematics, science, social studies, editing and mechanics, and on-demand writing. Reading and mathematics were assessed in grades 3 through 8 and grade 10; science in grades 4, 7, and 11; social studies, editing and mechanics, and on-demand writing in grades 5, 8, and 11.

This report describes how student test responses for the 2022 KSA were used to create scale scores and place students in Novice, Apprentice, Proficient or Distinguished (NAPD) performance categories. The complex analyses to accomplish these tasks were conducted independently, but cooperatively, by both HumRRO and Pearson staff members. Several interim checks were conducted during the analyses and any discrepancies between the two companies were investigated and ultimately resolved. This process was conducted transparently among Pearson, HumRRO, Kentucky Department of Education (KDE), and Kentucky's psychometric consultant (Dr. Bill Auty of Education Measurement Consulting) via frequent email communications and daily conference calls. The process was guided by a specifications document created by Pearson[1] and regularly updated based on decisions before and during calibration. This documentation is vital for ensuring consistency of processing across years and for guiding psychometric processing in future years.

Changes in 2022

In response to the COVID-19 pandemic's impact on schools during the 2020-2021 school year, the United States Department of Education (USED) waived accountability reporting requirements but maintained that states should continue to administer annual summative assessments. This led to a directive from KDE leadership to develop a simple, straightforward assessment focused on comparing current student performance to past student performance.

Beginning with the 2021-2022 academic year, the KSA cover new and revised content standards in reading, mathematics, science, social studies, and writing. For writing, there are two assessment components: 1) editing and mechanics and 2) writing. Except for writing, all tests are a blend of selected response and constructed response items. The writing component is a single essay prompt scored on multiple writing skills (or traits).

The 2022 administration consisted of multiple test forms for each subject, with each form including fewer items than was typical in previous administrations. Reading had 6 test forms for grade 3 and 4 forms for grades 4, 5, 6, 7, 8, and 10. Each reading test form included 30 items. For mathematics, each grade assessment included 6 forms. Mathematics test forms included 34

[1] Kentucky Spring 2022 Psychometric Analysis Specifications v1.3.

items for grade 3 and 29 items for grades 4, 5, 6, 7, 8, and 10. Science assessments in grades 4, 7, and 11 consisted of 4 forms, each with 24 items. Social studies assessments in grades 5, 8, and 11 consisted of 5 forms, with each grade-level form consisting of 27, 30, and 33 items, respectively. Editing and mechanics assessments in grades 5, 8, and 11 consisted of 3 forms, with each form consisting of 26 items. Writing assessments in grades 5, 8, and 11 consisted of 4 forms, each with a single essay prompt.

Analysis Procedures

Item parameters were generated (i.e., calibrated) across all grade-level forms for each subject in a single run. This equates test forms for a given grade so that test scores across forms are interchangeable in terms of difficulty. Anchored item calibration and equating analyses were conducted for Science assessments only. Raw-score-to-scale (RSS) score tables were generated for all assessments. For each of these analyses, we followed the analysis specifications provided by Pearson, independently conducted analyses, and verified that our results matched Pearson's results. Below we summarize HumRRO's processes and procedures for conducting these analyses.

Sample Identification and File Construction

We first applied exclusion rules to select the sample of student responses to include in the calibration analyses.[2] Kentucky selects most of its student population for use in the calibration sample for scaling and equating. However, some students are purposefully exempted, as specified in the 2022 psychometrics specifications document.[3] KDE established a set of invalidation codes for excluding students in the calibration file. Kentucky's exemption rules generally only apply to students who receive accommodations (e.g., Braille forms, audio, large print, etc.), students with duplicate records (the same identification number and name), and students with blank total test score values. However, three special exclusions were applied to the 2022 administration: 1) Students impacted by the missing online protractor tool in grade 4 mathematics; 2) one student exempted from several items in grade 3 reading; 3) students with inaccurate test attempt information in social studies across all grades. Pearson and HumRRO verified n-counts after this step.

The next step was to format all the grade/subject files to be read into the Winsteps IRT program and create Winsteps[4] control files to read the student responses and estimate item parameters. A sample control file is provided in Appendix A. HumRRO created specialized SAS and R statistical software programs to generate all input and control files automatically. The item documentation file was used to specify item types, location, keys, item use, and other important information. HumRRO and Pearson did not share programming or methodology for creating the input, control, or data files for Winsteps. However, both companies used the same raw student data files (containing all student responses). HumRRO followed the guidance provided by Pearson (with input from KDE) regarding the treatment of blank responses, condition codes, etc. in creating the input data files.

[2] Students who are excluded from calibration analyses are not excluded from scoring and reporting.

[3] Kentucky Spring 2022 Psychometric Analysis Specifications v1.3.

[4] HumRRO used Winsteps version 4.8.0.0 for this project.

Calibration and Scaling Procedures

Once input and control files were prepared, Winsteps software was used to calibrate test items across grade-level test forms. Multiple-choice items were fit to the Rasch measurement model and constructed-response items (short constructed response and extended response items) were fit to the Partial Credit Model (PCM). Both types of items were simultaneously calibrated in Winsteps and item difficulty parameters (logits) were produced. “Step parameters” were also produced for constructed response items. Step parameters tell us how the various points possible on the item relate to the item’s overall difficulty and are important for generating scoring tables. These parameters are produced on the theta scale (a commonly used scale with a mean of 0 and a standard deviation of 1). Appendix B contains an example of item parameters for one grade subject (logits and step parameters). Pearson and HumRRO verified item parameter estimates after this step.

Equating Procedures

Two types of equating occurred for the KSA: (a) forms equating within a given test administration year and (b) equating across test administration years using common anchor items. The first of these, forms equating, is accomplished by calibrating all the items for a given grade/subject together. By calibrating all the items together (i.e., across all forms), this effectively equates the various forms for a given grade/subject such that test scores on form 2 and form 3, for example, are interchangeable in terms of difficulty. Form equating was necessary for all grade/subject tests.

For science 4, 7, and 11, we also needed to equate the current year’s scores to be comparable to scores from prior years. To accomplish this, we first examined the stability of the linking items to ensure that item difficulty had not shifted excessively between administrations. We conducted the Robust Z statistical procedure to determine whether any linking items should be dropped from the equating process (Huynh & Meyer, 2010; Huyn & Rawls, 2009). Items with a substantial difference in item difficulty, as defined by the Pearson specifications, were not included as anchor items in equating. The resulting set of anchor items was then used to create the raw-score-to-scale-score tables.

Raw-score-to-Scale-Score Procedures

The item parameter estimates from the initial calibration for reading, mathematics, social studies, editing and mechanics and on-demand writing and the item parameter estimates from the equating analyses for Science grades 4, 7, and 11 were used in Winsteps to generate person ability estimates by form and by reporting categories. Ability estimates were reported in raw-score-to-theta-score tables.

Once theta scoring tables were obtained, they were linearly transformed to a reporting scale of 400-600 for all grade subjects. Performance levels (Novice, Apprentice, Proficient, and Distinguished; NAPD) were also assigned to each score. Cut scores for the performance levels were based on standard setting workshops conducted by Pearson. The results of those workshops included cut scores on the theta metric that can be used to assign NAPD categories to students. Scale score cuts were used, as opposed to theta cuts, to assign performance levels to students’ scale scores. Using these cuts allowed the scale scores associated with each performance level to be fixed across test administrations.

Verification of 2022 Scoring Tables

After verification of the raw-score-to-scale score tables, scoring tables were generated to assign student performance level classifications. HumRRO checked the 2022 scoring tables and verified that the correct scale score ranges were associated with each performance level. HumRRO matched Pearson on all grades and subjects.

Documentation

As HumRRO and Pearson completed each step of the process described above, Winsteps item parameter, anchor item, and score, and output files were shared to check for inconsistencies. Winsteps output files included the number of cases in the calibration sample, item-level information (e.g., p-values, parameters), and the theta scoring tables. A sample of the input and output files are appended to this document. They include:

1. Winsteps Control Files (Appendix A). These files contain the item parameter estimation specifications and important information for reading the student score files. It also specifies the output file names. The appendix includes an example control file for the initial item parameter estimation, equated item parameter estimation, and estimation of the cluster scores.

2. Winstep Item Parameter Files (Appendix B). These files contain the item parameters for the operational items. Each multiple-choice item has one parameter, a logit difficulty (named Measure in the Winstep files). Each constructed-response item has an overall difficulty parameter and a number of step parameters indicating how the points for the item are distributed along the theta scale. The file included in the appendix is an example of a final item parameter file. Initial item parameter files are in similar formats.

3. Winsteps Anchor File (Appendix C). The file includes the 2022 item parameter values for each anchor item with the equating shift estimate applied to the overall difficulty measure. The file is read by Winsteps and used to fix the item parameter values and estimate final score files.

4. Winsteps Score File (Appendix D). The file contains the raw score to theta estimation and includes the distribution of student scores.

5. Comparison of Files Output (Appendix E). This is a spreadsheet file from HumRRO's comparison program that checks scoring table results against Pearson's results. The files match if all comparison values are 0.

Conclusion

Pearson and HumRRO independently calculated the scaled/equated raw-score-to-scale-score tables for 2022 KSA reading and math (grades 3-8, 10), social studies and writing (grades 5, 8, 11), and science (grades 4, 7, 10). No differences were found between Pearson's and HumRRO's parameter estimations or raw-score-to-scale-score tables. Given that HumRRO's and Pearson's scaling and equating results were identical, HumRRO is confident that Pearson did not commit processing errors.

References

Huynh, H. & Meyer, P. (2010). Use of robust z in detecting unstable items in item response theory models. *Practical Assessment, Research & Evaluation,* 15(2). Available online: http://pareonline.net/getvn.asp?v=15&n=2

Huynh, H., & Rawls, A. (2009). A comparison between robust z and 0.3-logit difference procedures in assessing stability of linking items for the Rasch model. In E. V. Smith Jr. & G. E. Stone (Eds.), *Applications of Rasch measurement in criterion-referenced testing: Practice analysis to score reporting*. JAM Press.

Appendix A – Control File (Science Grade 4)

```
;Winstep Control file g04SC_v0

; HumRRO

&INST

Item1 = 18

NI = 64

TABLES = 00100000000001000001000000001

CODES = 01234

CSV = N

FITP = 3.0

FITI = 3.0

XWIDE =1

HLINES = Y

data=g04SCmopv0.dat

IFILE= g04SCv0.ITM

ISFILE = g04SCv0.ISF

SFILE =  g04SCv0.CSF

SCFILE = g04SCv0.RSS

PFILE = g04SCv0.PER

mprox=10

mucon=100

rconv=.50

lconv=.01

models=r

groups=0

stkeep=n

realse=n

stbias=n

target=n
```

extrsc=0.25

udecim=4

uimean=0

uscale=1

;upmean=0

;uanchor=y

ptbis=y

ILFILES = *

SC041601_01

SC041601_02

SC041601_03

SC041601_04b

SC041601_05

SC041601_06

SC041601_07

SC041601_08

SC041602_01

SC041602_02

SC041602_03b

SC041602_04

SC041602_05

SC041602_06

SC041602_07

SC041602_08

SC041603_01

SC041603_02

SC041603_03

SC041603_04

SC041603_06

SC041603_07

SC041603_08

SC041603_09

SC041607_01

SC041607_02

SC041607_03

SC041607_04b

SC041607_05

SC041607_06

SC041607_07

SC041607_08

SC041609_01

SC041609_02

SC041609_03

SC041609_04

SC041609_05

SC041609_06

SC041609_07b

SC041609_08

SC041614_01

SC041614_02

SC041614_04

SC041614_05

SC041614_06

SC041614_07

SC041614_08

SC041614_09

SC041623_01b

SC041623_02

SC041623_03

SC041623_04

SC041623_05

SC041623_06

SC041623_07

SC041623_08

SC041624_01

SC041624_02

SC041624_03

SC041624_04b

SC041624_05

SC041624_06b

SC041624_07

SC041624_08

*

&END

END NAMES

Appendix B – Winsteps Item Parameter Files (Science Grade 4)

Item parameters 2022 - Science 4 (g04SCv0.ITM)

```
; ITEM  C:\2022\KY Psychometrics\KSA2022\Winsteps\SC\g04SCv0.con  Jul  7 2022 20:59

;ENTRY MEASURE ST   COUNT    SCORE MODLSE IN.MSQ INZSTD OUTMSQ OUTZST  DISPL   PBSX WEIGHT OBSMA EXPMA PBX-E  RMSR    WMLE  INDF OUTDF G M R NAME

     1   .8770  1  9964.0   2624.0  .0241   1.18   9.90   1.36   9.90  .0009    .00   1.00  72.3  75.2   .25   .45   .8769 14716  6488 0 R . SC041601_01

     2  -.8599  1  9964.0   6186.0  .0221   1.00   -.31   1.04   3.43 -.0002    .24   1.00  69.3  67.5   .26   .45  -.8598 31126 15078 0 R . SC041601_02

     3  -.1294  1  9964.0   9369.0  .0167   1.11   8.98   1.12   9.11  .0004    .22   1.00  56.7  57.4   .33   .63  -.1294 13339 13251 0 R . SC041601_03

     4   .5281  1  9964.0   3262.0  .0228   1.13   9.90   1.21   9.90  .0006    .09   1.00  67.9  70.6   .26   .47   .5280 22548 10534 0 R . SC041601_04b

     5 -1.0652  1  9964.0   6599.0  .0226    .96  -4.79    .96  -3.04 -.0002    .29   1.00  71.6  69.7   .25   .43 -1.0651 24835 11440 0 R . SC041601_05

     6  -.5778  1  9964.0  11093.0  .0159    .91  -7.67    .90  -8.35 -.0003    .42   1.00  55.8  53.7   .34   .60  -.5778 14570 13731 0 R . SC041601_06

     7  -.2775  1  9964.0   4943.0  .0215    .93  -9.90    .91  -9.90  .0002    .36   1.00  69.5  64.9   .27   .45  -.2775 42170 23190 0 R . SC041601_07

     8  1.2485  1  9964.0   8325.0  .0134    .78  -9.90    .75  -9.90  .0037    .56   1.00  57.4  49.3   .39   .66  1.2485  9006  8146 0 R . SC041601_08

     9   .3886  1 21496.0   7628.0  .0153   1.03   4.63   1.08   8.61 -.0001    .24   1.00  69.0  69.4   .28   .45   .3886 54663 27094 0 R . SC041602_01

    10  -.4678  1 21496.0  11526.0  .0147    .99  -1.73   1.00    .17 -.0007    .29   1.00  66.2  65.4   .27   .46  -.4678 85505 46545 0 R . SC041602_02

    11 -1.2746  1 21496.0  28812.0  .0119    .96  -5.28    .95  -5.62 -.0020    .37   1.00  60.2  59.0   .32   .56 -1.2746 27702 26197 0 R . SC041602_03b

    12 -2.0096  1 21496.0  17598.0  .0186    .88  -9.90    .71  -9.90 -.0015    .37   1.00  82.5  82.2   .21   .34 -2.0095 16562  6883 0 R . SC041602_04

    13   .1038  1 21496.0   8885.0  .0149   1.07   9.90   1.08   9.90 -.0003    .19   1.00  63.1  66.9   .28   .47   .1037 71389 38505 0 R . SC041602_05

    14 -1.5921  1 21496.0  16255.0  .0168    .92  -9.48    .86  -9.90 -.0011    .33   1.00  77.9  76.6   .23   .39 -1.5920 28264 11764 0 R . SC041602_06

    15  -.2874  1 21496.0  10687.0  .0147   1.07   9.90   1.08   9.90 -.0006    .19   1.00  61.2  65.3   .28   .48  -.2874 86484 48764 0 R . SC041602_07

    16  1.7769  1 21496.0   9750.0  .0112    .93  -5.78    .87  -9.50  .0044    .42   1.00  67.5  64.7   .36   .59  1.7769 11319  9346 0 R . SC041602_08

    17   .1096  1 21344.0   8724.0  .0149   1.05   8.98   1.05   6.71  .0018    .20   1.00  63.8  66.6   .26   .47   .1096 73428 39892 0 R . SC041603_01

    18   .1988  1 21344.0   8324.0  .0150    .95  -9.63    .94  -7.95  .0019    .33   1.00  70.4  67.3   .26   .44   .1988 67561 35866 0 R . SC041603_02
```

19	-.5920	1	21344.0	11969.0	.0147	.95	-9.90	.92	-9.90	.0012	.33	1.00	67.6	65.3	.26	.45	-.5920	85667	45466	0	R	. SC041603_03
20	-1.2314	1	21344.0	14762.0	.0157	.92	-9.90	.87	-9.90	.0010	.34	1.00	74.1	71.4	.24	.42	-1.2313	45071	20132	0	R	. SC041603_04
21	-.1778	1	21344.0	10043.0	.0147	.96	-8.65	.95	-7.67	.0016	.32	1.00	67.4	65.0	.26	.46	-.1778	88634	50458	0	R	. SC041603_06
22	.4438	1	21344.0	7262.0	.0154	.96	-5.74	.98	-2.43	.0018	.30	1.00	72.2	69.9	.26	.44	.4438	51868	25805	0	R	. SC041603_07
23	1.4137	1	21344.0	12557.0	.0108	.91	-6.55	.89	-9.19	.0056	.43	1.00	64.0	58.9	.35	.60	1.4137	10870	13543	0	R	. SC041603_08
24	.8081	1	21344.0	5807.0	.0163	1.13	9.90	1.26	9.90	.0021	.06	1.00	72.7	74.4	.25	.45	.8081	33424	15446	0	R	. SC041603_09
25	-.6827	1	9964.0	5816.0	.0217	.92	-9.90	.90	-9.66	-.0001	.36	1.00	69.0	66.1	.26	.44	-.6826	36449	18578	0	R	. SC041607_01
26	-.7759	1	9964.0	6012.0	.0219	.98	-2.71	.98	-1.49	-.0003	.28	1.00	67.4	66.8	.26	.45	-.7759	33720	16728	0	R	. SC041607_02
27	1.0967	1	9964.0	2263.0	.0253	1.08	5.56	1.21	9.60	.0010	.13	1.00	77.2	78.1	.24	.41	1.0966	11194	4834	0	R	. SC041607_03
28	.0605	1	9964.0	4215.0	.0217	1.12	9.90	1.20	9.90	.0003	.12	1.00	60.3	66.1	.27	.49	.0605	36268	19076	0	R	. SC041607_04b
29	-1.0153	1	9964.0	11940.0	.0191	1.01	.97	1.01	1.05	-.0008	.27	1.00	65.1	65.9	.30	.53	-1.0153	10927	10794	0	R	. SC041607_05
30	-.1034	1	9964.0	4566.0	.0215	.99	-1.91	.98	-1.84	.0002	.29	1.00	66.5	65.2	.27	.46	-.1035	40148	21823	0	R	. SC041607_06
31	-.3084	1	9964.0	5010.0	.0215	1.10	9.90	1.12	9.90	.0001	.14	1.00	58.6	64.8	.27	.49	-.3084	42240	23203	0	R	. SC041607_07
32	1.5023	1	9964.0	7290.0	.0141	.95	-3.66	.92	-5.03	.0043	.43	1.00	56.6	52.1	.38	.69	1.5023	8575	7496	0	R	. SC041607_08
33	.5699	1	21453.0	15887.0	.0126	1.22	9.90	1.22	9.90	.0006	.03	1.00	57.9	61.9	.28	.60	.5699	26923	26863	0	R	. SC041609_01
34	1.1587	1	21453.0	10883.0	.0126	1.22	9.90	1.31	9.90	.0014	.03	1.00	49.3	61.4	.29	.60	1.1587	26739	23480	0	R	. SC041609_02
35	.6098	1	21453.0	15245.0	.0123	1.16	9.90	1.17	9.90	.0006	.11	1.00	54.3	59.9	.29	.60	.6098	28070	28085	0	R	. SC041609_03
36	-.5703	1	21453.0	23554.0	.0113	.98	-1.94	.99	-1.39	-.0009	.31	1.00	56.1	57.3	.30	.60	-.5703	28902	28823	0	R	. SC041609_04
37	1.3812	1	21453.0	14287.0	.0090	.82	-9.90	.74	-9.90	.0031	.51	1.00	59.4	52.8	.37	.68	1.3811	17619	11440	0	R	. SC041609_05
38	.3836	1	21453.0	7549.0	.0152	.93	-9.90	.92	-9.90	-.0003	.33	1.00	72.6	68.8	.24	.43	.3835	57710	30869	0	R	. SC041609_06
39	.1350	1	21453.0	8659.0	.0148	1.08	9.90	1.10	9.90	-.0004	.14	1.00	62.0	66.3	.25	.48	.1350	76456	43348	0	R	. SC041609_07b
40	-.6353	1	21453.0	12277.0	.0147	.92	-9.90	.89	-9.90	-.0009	.35	1.00	68.5	64.8	.24	.45	-.6353	90808	48545	0	R	. SC041609_08
41	-.6661	1	20189.0	11804.0	.0152	.94	-9.90	.93	-9.90	-.0046	.33	1.00	69.1	65.8	.26	.45	-.6661	76499	39166	0	R	. SC041614_01
42	-1.2486	1	20189.0	27544.0	.0120	.89	-9.90	.88	-9.90	-.0059	.42	1.00	62.1	57.7	.31	.55	-1.2486	26183	23349	0	R	. SC041614_02

```
    43  -.1036  1 20189.0  19173.0  .0129   1.09   8.71   1.09   8.63 -.0038    .21   1.00  64.8  65.3   .30   .57  -.1036 21605 21546 0 R . SC041614_04
    44  1.0703  1 20189.0  19514.0  .0097    .93  -6.58    .92  -8.50 -.0001    .44   1.00  53.1  50.0   .38   .70  1.0703 17972 19060 0 R . SC041614_05
    45   .7556  1 20189.0   5809.0  .0165   1.14   9.90   1.25   9.90 -.0035    .06   1.00  70.2  73.3   .26   .46   .7555 35080 16283 0 R . SC041614_06
    46   .1860  1 20189.0   8081.0  .0154   1.06   9.90   1.06   8.03 -.0041    .20   1.00  63.6  66.9   .27   .47   .1860 67350 35582 0 R . SC041614_07
    47   .0511  1 20189.0   8660.0  .0152   1.03   6.61   1.05   6.63 -.0041    .23   1.00  64.6  65.8   .27   .47   .0511 75704 41284 0 R . SC041614_08
    48   .0754  1 20189.0   8555.0  .0152    .96  -7.10    .95  -6.60 -.0041    .32   1.00  67.8  66.0   .27   .45   .0754 74279 40286 0 R . SC041614_09
    49  -.8230  1 10073.0   6233.0  .0216    .91  -9.90    .88  -9.90 -.0046    .36   1.00  70.7  66.0   .23   .44  -.8230 36977 19116 0 R . SC041623_01b
;ENTRY MEASURE ST   COUNT    SCORE MODLSE IN.MSQ INZSTD OUTMSQ OUTZST  DISPL   PBSX WEIGHT OBSMA EXPMA PBX-E  RMSR    WMLE   INDF OUTDF G M R NAME
    50   .2329  1 10073.0   3895.0  .0216   1.00   -.52   1.00    .21 -.0040    .24   1.00  67.0  66.5   .24   .46   .2329 34942 19774 0 R . SC041623_02
    51  -.0534  1 10073.0   4522.0  .0212    .94  -9.77    .95  -5.96 -.0041    .33   1.00  68.0  64.1   .24   .46  -.0534 46813 27698 0 R . SC041623_03
    52  -.8342  1 10073.0  12311.0  .0159   1.00   -.07   1.02   1.35 -.0051    .29   1.00  54.9  54.4   .29   .62  -.8342 14482 13651 0 R . SC041623_04
    53  -.3828  1 10073.0   5262.0  .0211    .95  -7.87    .94  -7.43 -.0044    .30   1.00  66.6  63.3   .24   .46  -.3828 51934 30060 0 R . SC041623_05
    54   .7620  1 10073.0   2835.0  .0233   1.15   9.90   1.24   9.90 -.0036    .01   1.00  70.1  73.4   .23   .46   .7619 17297  8971 0 R . SC041623_06
    55  1.2540  1 10073.0   6668.0  .0131    .97  -1.60    .91  -4.61 -.0006    .40   1.00  53.3  51.7   .37   .75  1.2539  7189  5384 0 R . SC041623_07
    56  -.6270  1 10073.0  11697.0  .0147    .96  -3.69    .96  -3.58 -.0046    .35   1.00  50.2  48.3   .31   .67  -.6270 16757 13919 0 R . SC041623_08
    57  -.4943  1 10116.0   5545.0  .0216    .86  -9.90    .82  -9.90 -.0046    .46   1.00  74.2  66.2   .29   .43  -.4943 36536 19252 0 R . SC041624_01
    58   .4841  1 10116.0   3478.0  .0225   1.10   9.90   1.16   9.90 -.0036    .17   1.00  66.8  70.3   .29   .46   .4840 23561 10654 0 R . SC041624_02
    59   .0353  1 10116.0   4403.0  .0217   1.01   1.25   1.01   1.24 -.0041    .29   1.00  66.0  66.7   .30   .46   .0353 34057 17855 0 R . SC041624_03
    60  -.7738  1 10116.0   6137.0  .0219    .90  -9.90    .86  -9.90 -.0048    .41   1.00  72.1  67.6   .29   .43  -.7737 31174 14958 0 R . SC041624_04b
    61  -.2122  1 10116.0   9915.0  .0166    .96  -2.98    .96  -3.29 -.0041    .40   1.00  57.4  57.4   .36   .59  -.2122 13564 13479 0 R . SC041624_05
    62  -.1236  1 10116.0   4744.0  .0215   1.03   4.58   1.04   3.57 -.0042    .26   1.00  64.3  66.1   .30   .47  -.1236 36602 19843 0 R . SC041624_06b
    63  -.3478  1 10116.0   5229.0  .0215    .92  -9.90    .90  -9.90 -.0044    .39   1.00  69.9  65.9   .30   .44  -.3478 37675 20448 0 R . SC041624_07
    64  1.6230  1 10116.0   6860.0  .0130    .85  -9.90    .76  -9.90  .0006    .53   1.00  58.0  53.6   .43   .71  1.6229  8356  3831 0 R . SC041624_08
```

Step parameters 2022 - Science Grade 4 (g04SCv0.CSF)

```
; STRUCTURE-THRESHOLD MEASURE ANCHOR FILE FOR C:\2022\KY Psychometrics\KSA2022\Winsteps\SC\g04SCv0.con Jul  7
2022 20:59
; ITEM CATEGORY  Rasch-Andrich threshold MEASURE
     1  0   .0000
     1  1   .0000
     2  0   .0000
     2  1   .0000
     3  0   .0000
     3  1 -1.1649
     3  2  1.1649
     4  0   .0000
     4  1   .0000
     5  0   .0000
     5  1   .0000
     6  0   .0000
     6  1  -.9134
     6  2   .9134
     7  0   .0000
     7  1   .0000
     8  0   .0000
     8  1 -1.5343
     8  2  -.4551
     8  3   .8217
     8  4  1.1676
     9  0   .0000
     9  1   .0000
    10  0   .0000
    10  1   .0000
    11  0   .0000
    11  1 -1.1734
    11  2  1.1734
    12  0   .0000
    12  1   .0000
    13  0   .0000
    13  1   .0000
    14  0   .0000
    14  1   .0000
    15  0   .0000
    15  1   .0000
    16  0   .0000
    16  1 -1.1916
    16  2  -.0347
    16  3   .7574
    16  4   .4689
    17  0   .0000
    17  1   .0000
    18  0   .0000
    18  1   .0000
    19  0   .0000
    19  1   .0000
    20  0   .0000
    20  1   .0000
    21  0   .0000
    21  1   .0000
    22  0   .0000
    22  1   .0000
    23  0   .0000
    23  1 -1.5559
    23  2   .9066
    23  3   .5265
    23  4   .1228
    24  0   .0000
    24  1   .0000
    25  0   .0000
    25  1   .0000
    26  0   .0000
    26  1   .0000
    27  0   .0000
    27  1   .0000
    28  0   .0000
    28  1   .0000
    29  0   .0000
    29  1 -1.7029
    29  2  1.7029
    30  0   .0000
    30  1   .0000
    31  0   .0000
```

```
    31  1   .0000
; ITEM CATEGORY  Rasch-Andrich threshold MEASURE
    32  0   .0000
    32  1 -1.6295
    32  2  -.4449
    32  3   .6351
    32  4  1.4393
    33  0   .0000
    33  1 -1.5580
    33  2  1.5580
    34  0   .0000
    34  1 -1.1966
    34  2  1.1966
    35  0   .0000
    35  1 -1.4242
    35  2  1.4242
    36  0   .0000
    36  1 -1.1372
    36  2  1.1372
    37  0   .0000
    37  1  -.8611
    37  2  -.9426
    37  3   .8409
    37  4   .9628
    38  0   .0000
    38  1   .0000
    39  0   .0000
    39  1   .0000
    40  0   .0000
    40  1   .0000
    41  0   .0000
    41  1   .0000
    42  0   .0000
    42  1 -1.0036
    42  2  1.0036
    43  0   .0000
    43  1 -1.5689
    43  2  1.5689
    44  0   .0000
    44  1 -1.9143
    44  2  -.2693
    44  3  1.3726
    44  4   .8109
    45  0   .0000
    45  1   .0000
    46  0   .0000
    46  1   .0000
    47  0   .0000
    47  1   .0000
    48  0   .0000
    48  1   .0000
    49  0   .0000
    49  1   .0000
    50  0   .0000
    50  1   .0000
    51  0   .0000
    51  1   .0000
    52  0   .0000
    52  1  -.9270
    52  2   .9270
    53  0   .0000
    53  1   .0000
    54  0   .0000
    54  1   .0000
    55  0   .0000
    55  1  -.8757
    55  2  -.4324
    55  3   .5729
    55  4   .7353
    56  0   .0000
    56  1  -.5387
    56  2   .5387
    57  0   .0000
    57  1   .0000
    58  0   .0000
    58  1   .0000
    59  0   .0000
    59  1   .0000
    60  0   .0000
    60  1   .0000
    61  0   .0000
```

```
; ITEM CATEGORY  Rasch-Andrich threshold MEASURE
    61  1 -1.1673
    61  2  1.1673
    62  0   .0000
    62  1   .0000
    63  0   .0000
    63  1   .0000
    64  0   .0000
    64  1  -.8145
    64  2 -1.2679
    64  3   .1077
    64  4  1.9747
```

Appendix C – Winsteps Anchor File (Science Grade 4)

Item Anchor File (g04SCv0anchors.IAF)

```
 9 0.6113  1 21496.0  7628.0 .0153  1.03  4.63  1.08  8.61 -.0001  .24  1.00 69.0 69.4  .28  .45  .3886 54663 27094 0 R . SC041
 9 0.6113  1 21496.0  7628.0 .0153  1.03  4.63  1.08  8.61 -.0001  .24  1.00 69.0 69.4  .28  .45  .3886 54663 27094 0 R . SC041
10 -0.2181 1 21496.0 11526.0 .0147  .99 -1.73  1.00  .17 -.0007  .29  1.00 66.2 65.4  .27  .46 -.4678 85505 46545 0 R . SC041
10 -0.2181 1 21496.0 11526.0 .0147  .99 -1.73  1.00  .17 -.0007  .29  1.00 66.2 65.4  .27  .46 -.4678 85505 46545 0 R . SC041
11 -0.9761 1 21496.0 28812.0 .0119  .96 -5.28  .95 -5.62 -.0020  .37  1.00 60.2 59.0  .32  .56 -1.2746 27702 26197 0 R . SC041
11 -0.9761 1 21496.0 28812.0 .0119  .96 -5.28  .95 -5.62 -.0020  .37  1.00 60.2 59.0  .32  .56 -1.2746 27702 26197 0 R . SC041
12 -1.7202 1 21496.0 17598.0 .0186  .88 -9.90  .71 -9.90 -.0015  .37  1.00 82.5 82.2  .21  .34 -2.0095 16562  6883 0 R . SC041
12 -1.7202 1 21496.0 17598.0 .0186  .88 -9.90  .71 -9.90 -.0015  .37  1.00 82.5 82.2  .21  .34 -2.0095 16562  6883 0 R . SC041
13 0.3352  1 21496.0  8885.0 .0149 1.07  9.90 1.08  9.90 -.0003  .19  1.00 63.1 66.9  .28  .47  .1037 71389 38505 0 R . SC041
13 0.3352  1 21496.0  8885.0 .0149 1.07  9.90 1.08  9.90 -.0003  .19  1.00 63.1 66.9  .28  .47  .1037 71389 38505 0 R . SC041
14 -1.3771 1 21496.0 16255.0 .0168  .92 -9.48  .86 -9.90 -.0011  .33  1.00 77.9 76.6  .23  .39 -1.5920 28264 11764 0 R . SC041
14 -1.3771 1 21496.0 16255.0 .0168  .92 -9.48  .86 -9.90 -.0011  .33  1.00 77.9 76.6  .23  .39 -1.5920 28264 11764 0 R . SC041
15 -0.0967 1 21496.0 10687.0 .0147 1.07  9.90 1.08  9.90 -.0006  .19  1.00 61.2 65.3  .28  .48 -.2874 86484 48764 0 R . SC041
15 -0.0967 1 21496.0 10687.0 .0147 1.07  9.90 1.08  9.90 -.0006  .19  1.00 61.2 65.3  .28  .48 -.2874 86484 48764 0 R . SC041
17 0.1198  1 21344.0  8724.0 .0149 1.05  8.98 1.05  6.71  .0018  .20  1.00 63.8 66.6  .26  .47  .1096 73428 39892 0 R . SC041
17 0.1198  1 21344.0  8724.0 .0149 1.05  8.98 1.05  6.71  .0018  .20  1.00 63.8 66.6  .26  .47  .1096 73428 39892 0 R . SC041
18 0.1728  1 21344.0  8324.0 .0150  .95 -9.63  .94 -7.95  .0019  .33  1.00 70.4 67.3  .26  .44  .1988 67561 35866 0 R . SC041
18 0.1728  1 21344.0  8324.0 .0150  .95 -9.63  .94 -7.95  .0019  .33  1.00 70.4 67.3  .26  .44  .1988 67561 35866 0 R . SC041
19 -0.6202 1 21344.0 11969.0 .0147  .95 -9.90  .92 -9.90  .0012  .33  1.00 67.6 65.3  .26  .45 -.5920 85667 45466 0 R . SC041
19 -0.6202 1 21344.0 11969.0 .0147  .95 -9.90  .92 -9.90  .0012  .33  1.00 67.6 65.3  .26  .45 -.5920 85667 45466 0 R . SC041
```

20 -1.1244 1 21344.0 14762.0 .0157 .92 -9.90 .87 -9.90 .0010 .34 1.00 74.1 71.4 .24 .42 -1.2313 45071 20132 0 R . SC041

20 -1.1244 1 21344.0 14762.0 .0157 .92 -9.90 .87 -9.90 .0010 .34 1.00 74.1 71.4 .24 .42 -1.2313 45071 20132 0 R . SC041

21 -0.1009 1 21344.0 10043.0 .0147 .96 -8.65 .95 -7.67 .0016 .32 1.00 67.4 65.0 .26 .46 -.1778 88634 50458 0 R . SC041

21 -0.1009 1 21344.0 10043.0 .0147 .96 -8.65 .95 -7.67 .0016 .32 1.00 67.4 65.0 .26 .46 -.1778 88634 50458 0 R . SC041

22 0.512 1 21344.0 7262.0 .0154 .96 -5.74 .98 -2.43 .0018 .30 1.00 72.2 69.9 .26 .44 .4438 51868 25805 0 R . SC041

22 0.512 1 21344.0 7262.0 .0154 .96 -5.74 .98 -2.43 .0018 .30 1.00 72.2 69.9 .26 .44 .4438 51868 25805 0 R . SC041

24 0.9252 1 21344.0 5807.0 .0163 1.13 9.90 1.26 9.90 .0021 .06 1.00 72.7 74.4 .25 .45 .8081 33424 15446 0 R . SC041

24 0.9252 1 21344.0 5807.0 .0163 1.13 9.90 1.26 9.90 .0021 .06 1.00 72.7 74.4 .25 .45 .8081 33424 15446 0 R . SC041

25 -0.271 1 9964.0 5816.0 .0217 .92 -9.90 .90 -9.66 -.0001 .36 1.00 69.0 66.1 .26 .44 -.6826 36449 18578 0 R . SC041

26 -0.4553 1 9964.0 6012.0 .0219 .98 -2.71 .98 -1.49 -.0003 .28 1.00 67.4 66.8 .26 .45 -.7759 33720 16728 0 R . SC041

27 1.3517 1 9964.0 2263.0 .0253 1.08 5.56 1.21 9.60 .0010 .13 1.00 77.2 78.1 .24 .41 1.0966 11194 4834 0 R . SC041

28 0.2738 1 9964.0 4215.0 .0217 1.12 9.90 1.20 9.90 .0003 .12 1.00 60.3 66.1 .27 .49 .0605 36268 19076 0 R . SC041

29 -0.7445 1 9964.0 11940.0 .0191 1.01 .97 1.01 1.05 -.0008 .27 1.00 65.1 65.9 .30 .53 -1.0153 10927 10794 0 R . SC041

30 0.0967 1 9964.0 4566.0 .0215 .99 -1.91 .98 -1.84 .0002 .29 1.00 66.5 65.2 .27 .46 -.1035 40148 21823 0 R . SC041

31 -0.0964 1 9964.0 5010.0 .0215 1.10 9.90 1.12 9.90 .0001 .14 1.00 58.6 64.8 .27 .49 -.3084 42240 23203 0 R . SC041

33 0.6569 1 21453.0 15887.0 .0126 1.22 9.90 1.22 9.90 .0006 .03 1.00 57.9 61.9 .28 .60 .5699 26923 26863 0 R . SC041

33 0.6569 1 21453.0 15887.0 .0126 1.22 9.90 1.22 9.90 .0006 .03 1.00 57.9 61.9 .28 .60 .5699 26923 26863 0 R . SC041

34 1.4521 1 21453.0 10883.0 .0126 1.22 9.90 1.31 9.90 .0014 .03 1.00 49.3 61.4 .29 .60 1.1587 26739 23480 0 R . SC041

34 1.4521 1 21453.0 10883.0 .0126 1.22 9.90 1.31 9.90 .0014 .03 1.00 49.3 61.4 .29 .60 1.1587 26739 23480 0 R . SC041

35 0.8829 1 21453.0 15245.0 .0123 1.16 9.90 1.17 9.90 .0006 .11 1.00 54.3 59.9 .29 .60 .6098 28070 28085 0 R . SC041

35 0.8829 1 21453.0 15245.0 .0123 1.16 9.90 1.17 9.90 .0006 .11 1.00 54.3 59.9 .29 .60 .6098 28070 28085 0 R . SC041

36 -0.457 1 21453.0 23554.0 .0113 .98 -1.94 .99 -1.39 -.0009 .31 1.00 56.1 57.3 .30 .60 -.5703 28902 28823 0 R . SC041

36 -0.457 1 21453.0 23554.0 .0113 .98 -1.94 .99 -1.39 -.0009 .31 1.00 56.1 57.3 .30 .60 -.5703 28902 28823 0 R . SC041

38 0.5371 1 21453.0 7549.0 .0152 .93 -9.90 .92 -9.90 -.0003 .33 1.00 72.6 68.8 .24 .43 .3835 57710 30869 0 R . SC041

38 0.5371 1 21453.0 7549.0 .0152 .93 -9.90 .92 -9.90 -.0003 .33 1.00 72.6 68.8 .24 .43 .3835 57710 30869 0 R . SC041

39 0.2089 1 21453.0 8659.0 .0148 1.08 9.90 1.10 9.90 -.0004 .14 1.00 62.0 66.3 .25 .48 .1350 76456 43348 0 R . SC041

39 0.2089 1 21453.0 8659.0 .0148 1.08 9.90 1.10 9.90 -.0004 .14 1.00 62.0 66.3 .25 .48 .1350 76456 43348 0 R . SC041

40 -0.5778 1 21453.0 12277.0 .0147 .92 -9.90 .89 -9.90 -.0009 .35 1.00 68.5 64.8 .24 .45 -.6353 90808 48545 0 R . SC041

40 -0.5778 1 21453.0 12277.0 .0147 .92 -9.90 .89 -9.90 -.0009 .35 1.00 68.5 64.8 .24 .45 -.6353 90808 48545 0 R . SC041

41 -0.5651 1 20189.0 11804.0 .0152 .94 -9.90 .93 -9.90 -.0046 .33 1.00 69.1 65.8 .26 .45 -.6661 76499 39166 0 R . SC041

41 -0.5651 1 20189.0 11804.0 .0152 .94 -9.90 .93 -9.90 -.0046 .33 1.00 69.1 65.8 .26 .45 -.6661 76499 39166 0 R . SC041

42 -1.0393 1 20189.0 27544.0 .0120 .89 -9.90 .88 -9.90 -.0059 .42 1.00 62.1 57.7 .31 .55 -1.2486 26183 23349 0 R . SC041

42 -1.0393 1 20189.0 27544.0 .0120 .89 -9.90 .88 -9.90 -.0059 .42 1.00 62.1 57.7 .31 .55 -1.2486 26183 23349 0 R . SC041

43 0.0331 1 20189.0 19173.0 .0129 1.09 8.71 1.09 8.63 -.0038 .21 1.00 64.8 65.3 .30 .57 -.1036 21605 21546 0 R . SC041

43 0.0331 1 20189.0 19173.0 .0129 1.09 8.71 1.09 8.63 -.0038 .21 1.00 64.8 65.3 .30 .57 -.1036 21605 21546 0 R . SC041

45 1.391 1 20189.0 5809.0 .0165 1.14 9.90 1.25 9.90 -.0035 .06 1.00 70.2 73.3 .26 .46 .7555 35080 16283 0 R . SC041

45 1.391 1 20189.0 5809.0 .0165 1.14 9.90 1.25 9.90 -.0035 .06 1.00 70.2 73.3 .26 .46 .7555 35080 16283 0 R . SC041

46 0.4568 1 20189.0 8081.0 .0154 1.06 9.90 1.06 8.03 -.0041 .20 1.00 63.6 66.9 .27 .47 .1860 67350 35582 0 R . SC041

Step Parameter Anchor File (g04SCv0anchors.SAF)

```
 9  0  0.0000
 9  1  0.0000
10  0  0.0000
10  1  0.0000
11  0  0.0000
11  1 -1.1958
11  2  1.1959
12  0  0.0000
12  1  0.0000
13  0  0.0000
13  1  0.0000
14  0  0.0000
14  1  0.0000
15  0  0.0000
15  1  0.0000
17  0  0.0000
17  1  0.0000
18  0  0.0000
18  1  0.0000
19  0  0.0000
19  1  0.0000
20  0  0.0000
20  1  0.0000
21  0  0.0000
21  1  0.0000
22  0  0.0000
22  1  0.0000
24  0  0.0000
```

24 1 0.0000

25 0 0.0000

25 1 0.0000

26 0 0.0000

26 1 0.0000

27 0 0.0000

27 1 0.0000

28 0 0.0000

28 1 0.0000

29 0 0.0000

29 1 -1.7187

29 2 1.7186

30 0 0.0000

30 1 0.0000

31 0 0.0000

31 1 0.0000

33 0 0.0000

33 1 -1.5476

33 2 1.5476

34 0 0.0000

34 1 -1.1876

34 2 1.1876

35 0 0.0000

35 1 -1.4246

35 2 1.4247

36 0 0.0000

36 1 -1.1665

36 2 1.1665

38 0 0.0000

38 1 0.0000

39 0 0.0000

39 1 0.0000

40 0 0.0000

40 1 0.0000

41 0 0.0000

41 1 0.0000

42 0 0.0000

42 1 -0.8536

42 2 0.8536

43 0 0.0000

43 1 -1.4763

43 2 1.4763

45 0 0.0000

45 1 0.0000

46 0 0.0000

Appendix D – Winsteps Score File (Science Grade 4)

PERSON SCORE FILE FOR C:\Users\mfan\Documents\2022\KY Psychometrics\KSA2022\Winsteps\SC\g04SCv0_eq. Jul 11 2022 11:43 USCALE=1.00

SCORE	MEASURE	S.E.	INFO	NORMED	S.E.	FREQUENCY	%	CUM.FREQ.	%	PERCENTILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59	60	61	62	63	64																
0	-6.1660	2.0073	.25	-232	243	0	.0	0	.0	.0	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00																			
1	-4.7579	1.0144	.97	-62	123	22	.1	22	.1	.1	.00	.02	.03	.00	.02	.03	.01	.01	.00	.01	.07	.05	.01	.03	.01	.00	.01	.01	.02	.03	.01
.01	.01	.00	.01	.01	.00	.01	.09	.01	.01	.01	.02	.01	.01	.04	.00	.00	.01	.02	.01	.05	.04	.02	.00	.01	.01	.01	.02	.01	.01	.04
.01	.00	.00	.02	.01	.00	.01	.02	.03	.01	.01	.00																			
2	-4.0360	.7270	1.89	26	88	13	.0	35	.1	.1	.01	.03	.05	.01	.04	.07	.02	.02	.01	.02	.14	.09	.01	.07	.02	.01	.02	.01	.03	.05	.02
.01	.02	.01	.02	.03	.00	.01	.17	.02	.02	.02	.04	.01	.03	.08	.01	.01	.01	.03	.03	.11	.07	.03	.00	.01	.01	.02	.03	.01	.02	.08
.02	.01	.01	.05	.02	.01	.01	.03	.06	.02	.02	.01																			
3	-3.6023	.6012	2.77	79	73	35	.1	70	.2	.1	.01	.05	.08	.01	.06	.10	.03	.03	.01	.03	.20	.13	.02	.10	.03	.01	.02	.02	.05	.08	.03
.02	.03	.01	.03	.04	.01	.02	.25	.02	.03	.03	.06	.02	.05	.12	.01	.02	.02	.05	.05	.16	.10	.05	.01	.02	.02	.03	.05	.02	.02	.12
.03	.01	.02	.07	.04	.01	.02	.05	.08	.02	.03	.01																			
4	-3.2867	.5270	3.60	117	64	0	.0	70	.2	.2	.01	.07	.11	.02	.09	.13	.04	.04	.02	.04	.26	.17	.03	.13	.04	.02	.03	.03	.06	.10	.04
.02	.04	.01	.05	.06	.01	.03	.31	.03	.04	.04	.08	.03	.06	.16	.02	.02	.03	.06	.06	.21	.14	.07	.01	.02	.02	.04	.07	.02	.03	.16
.04	.01	.02	.10	.05	.02	.03	.06	.11	.03	.04	.01																			
5	-3.0361	.4768	4.40	147	58	41	.1	111	.3	.2	.02	.09	.14	.02	.11	.16	.05	.05	.03	.06	.32	.21	.03	.16	.05	.02	.04	.04	.08	.13	.05
.03	.05	.02	.06	.07	.01	.04	.37	.04	.05	.05	.11	.04	.08	.20	.02	.03	.04	.08	.08	.27	.17	.09	.01	.03	.03	.05	.08	.03	.04	.20
.06	.02	.03	.13	.06	.02	.04	.08	.14	.04	.05	.02																			
6	-2.8265	.4402	5.16	173	53	19	.0	130	.3	.3	.02	.11	.16	.03	.13	.20	.06	.07	.03	.07	.37	.25	.04	.19	.06	.03	.05	.05	.10	.15	.06
.03	.06	.02	.07	.09	.02	.04	.42	.05	.06	.06	.13	.04	.09	.24	.03	.03	.05	.10	.09	.32	.21	.11	.01	.04	.04	.06	.10	.04	.05	.24
.07	.02	.03	.15	.07	.03	.05	.10	.17	.05	.06	.02																			
7	-2.6454	.4119	5.89	195	50	23	.1	153	.4	.3	.02	.13	.19	.04	.15	.23	.08	.08	.04	.08	.42	.28	.05	.22	.07	.03	.06	.06	.12	.18	.07
.04	.07	.03	.09	.10	.02	.05	.47	.06	.07	.07	.15	.05	.11	.28	.04	.04	.05	.11	.11	.37	.24	.13	.02	.04	.04	.07	.12	.05	.06	.28
.08	.03	.04	.18	.09	.03	.05	.11	.20	.06	.08	.03																			
8	-2.4852	.3894	6.60	214	47	43	.1	196	.5	.4	.03	.15	.22	.04	.17	.26	.09	.09	.04	.09	.47	.32	.06	.25	.08	.04	.07	.07	.13	.20	.08
.05	.08	.03	.10	.12	.02	.06	.52	.07	.08	.08	.17	.06	.13	.32	.04	.05	.06	.13	.13	.41	.27	.15	.02	.05	.05	.08	.14	.05	.07	.32
.09	.03	.05	.21	.10	.04	.06	.13	.23	.07	.09	.03																			
9	-2.3408	.3709	7.27	232	45	30	.1	226	.5	.5	.03	.16	.25	.05	.19	.30	.10	.11	.05	.11	.51	.35	.06	.28	.10	.04	.08	.07	.15	.23	.10
.05	.09	.04	.11	.13	.02	.07	.56	.08	.10	.09	.19	.07	.14	.35	.05	.05	.07	.15	.14	.46	.30	.17	.02	.06	.06	.09	.16	.06	.08	.36
.11	.04	.06	.24	.12	.05	.07	.15	.25	.08	.10	.04																			
10	-2.2091	.3554	7.92	247	43	69	.2	295	.7	.6	.04	.18	.27	.05	.22	.33	.11	.12	.06	.12	.55	.38	.07	.30	.11	.05	.09	.08	.17	.25	.11
.06	.10	.04	.13	.15	.03	.08	.60	.09	.11	.10	.22	.08	.16	.39	.06	.06	.08	.16	.16	.50	.33	.19	.03	.07	.07	.10	.17	.07	.09	.40
.12	.04	.06	.27	.13	.05	.08	.16	.28	.09	.11	.04																			
11	-2.0876	.3422	8.54	262	41	129	.3	424	1.0	.9	.04	.20	.30	.06	.24	.36	.12	.14	.06	.13	.59	.41	.08	.33	.12	.06	.10	.09	.19	.28
.12	.07	.11	.05	.14	.16	.03	.09	.63	.10	.12	.12	.24	.09	.18	.42	.07	.07	.09	.18	.18	.55	.36	.21	.03	.07	.07	.11	.19	.08	.10
.44	.13	.05	.07	.30	.14	.06	.09	.18	.31	.10	.13	.05																		
12	-1.9745	.3307	9.14	276	40	93	.2	517	1.2	1.1	.05	.22	.33	.07	.26	.40	.14	.15	.07	.15	.63	.44	.09	.35	.13	.06	.11	.10	.21	.30
.13	.08	.12	.05	.15	.18	.03	.10	.66	.11	.13	.13	.26	.10	.20	.46	.08	.08	.10	.20	.20	.59	.39	.23	.03	.08	.08	.12	.21	.09	.11
.47	.15	.05	.08	.33	.16	.07	.10	.20	.34	.12	.14	.06																		

13 -1.8684 .3208 9.72 289 39 167 .4 684 1.6 1.4 .05 .24 .35 .07 .28 .43 .15 .17 .08 .16 .67 .46 .10 .38 .15 .07 .12 .11 .22 .32
.15 .08 .14 .06 .17 .20 .04 .11 .69 .12 .15 .14 .28 .11 .22 .49 .08 .08 .11 .22 .21 .63 .42 .25 .04 .09 .09 .13 .23 .09 .12
.51 .16 .06 .09 .37 .17 .07 .11 .22 .36 .13 .15 .06
14 -1.7684 .3120 10.27 301 38 163 .4 847 2.0 1.8 .06 .26 .38 .08 .30 .46 .16 .18 .08 .18 .71 .49 .11 .40 .16 .08 .13 .13 .24 .34
.16 .09 .15 .06 .18 .21 .04 .11 .72 .13 .16 .16 .30 .12 .23 .52 .09 .09 .12 .23 .23 .68 .44 .28 .04 .10 .10 .15 .25 .10 .13
.55 .17 .06 .10 .40 .19 .08 .12 .23 .39 .14 .17 .07
15 -1.6735 .3042 10.81 312 37 275 .7 1122 2.7 2.4 .06 .28 .41 .09 .32 .49 .18 .20 .09 .19 .74 .51 .12 .43 .17 .09 .14 .14 .26 .37
.17 .10 .16 .07 .20 .23 .05 .12 .75 .15 .17 .17 .32 .13 .25 .55 .10 .10 .13 .25 .25 .72 .47 .30 .04 .11 .11 .16 .27 .11 .14
.58 .19 .07 .11 .43 .20 .09 .13 .25 .42 .15 .18 .08
16 -1.5832 .2972 11.32 323 36 243 .6 1365 3.3 3.0 .07 .30 .43 .10 .34 .52 .19 .22 .10 .20 .77 .53 .13 .45 .18 .09 .15 .15 .28 .39
.19 .11 .17 .08 .21 .24 .05 .14 .77 .16 .18 .19 .35 .14 .27 .58 .11 .11 .14 .27 .27 .75 .50 .32 .05 .12 .12 .17 .28 .12 .15
.61 .20 .07 .12 .46 .22 .09 .14 .27 .44 .16 .19 .09
17 -1.4967 .2909 11.82 334 35 277 .7 1642 4.0 3.6 .07 .31 .46 .10 .36 .56 .20 .24 .11 .22 .80 .56 .14 .47 .20 .10 .17 .16 .29 .41
.20 .12 .19 .08 .23 .26 .05 .15 .80 .17 .20 .20 .37 .15 .29 .61 .13 .12 .15 .29 .28 .79 .52 .35 .05 .12 .13 .18 .30 .13 .17
.65 .22 .08 .13 .50 .23 .10 .15 .29 .47 .17 .21 .10
18 -1.4138 .2852 12.29 344 35 444 1.1 2086 5.0 4.5 .08 .33 .48 .11 .38 .59 .22 .26 .12 .23 .84 .58 .15 .49 .21 .11 .18 .17 .31 .43
.21 .13 .20 .09 .24 .28 .06 .16 .82 .18 .21 .22 .39 .16 .31 .64 .14 .12 .16 .30 .30 .83 .55 .37 .06 .13 .14 .20 .32 .14 .18
.68 .23 .09 .15 .53 .25 .11 .16 .30 .50 .19 .22 .11
19 -1.3339 .2801 12.75 354 34 421 1.0 2507 6.0 5.5 .09 .35 .51 .12 .40 .62 .23 .28 .13 .25 .87 .60 .16 .51 .22 .12 .19 .18 .33 .45
.23 .14 .22 .09 .26 .29 .06 .17 .84 .19 .22 .24 .41 .17 .33 .67 .15 .13 .18 .32 .32 .87 .57 .39 .06 .14 .15 .21 .34 .15 .19
.71 .25 .09 .16 .56 .26 .12 .17 .32 .52 .20 .24 .12
20 -1.2568 .2754 13.19 363 33 1094 2.6 3601 8.7 7.4 .09 .37 .53 .13 .42 .65 .25 .30 .13 .26 .89 .61 .17 .53 .24 .13 .20 .19 .35 .47
.24 .15 .23 .10 .27 .31 .07 .18 .86 .21 .24 .25 .43 .19 .34 .70 .16 .14 .19 .34 .33 .90 .59 .42 .07 .15 .16 .22 .35 .16 .20
.75 .26 .10 .17 .60 .28 .13 .19 .34 .55 .21 .25 .13
21 -1.1822 .2711 13.61 372 33 0 .0 3601 8.7 8.7 .10 .39 .56 .14 .44 .68 .26 .32 .14 .28 .92 .63 .18 .55 .25 .14 .21 .21 .36 .49
.25 .16 .24 .11 .29 .33 .07 .19 .88 .22 .25 .27 .45 .20 .36 .73 .18 .15 .20 .35 .35 .93 .62 .44 .07 .16 .17 .23 .37 .17 .21
.78 .28 .11 .18 .63 .29 .14 .20 .36 .57 .22 .26 .14
22 -1.1097 .2671 14.01 381 32 598 1.4 4199 10.1 9.4 .11 .40 .58 .14 .45 .71 .27 .34 .15 .29 .95 .65 .19 .57 .27 .15 .23 .22 .38 .50
.27 .16 .26 .12 .30 .34 .08 .20 .90 .23 .27 .29 .47 .21 .38 .75 .19 .16 .21 .37 .37 .97 .64 .47 .08 .17 .18 .25 .39 .18 .23
.81 .29 .12 .20 .67 .31 .14 .21 .37 .60 .24 .28 .15
23 -1.0393 .2635 14.40 389 32 1476 3.6 5675 13.7 11.9 .11 .42 .61 .15 .47 .74 .29 .36 .16 .31 .98 .66 .20 .58 .28 .16 .24 .23 .40 .52
.28 .17 .27 .12 .32 .36 .08 .21 .92 .24 .28 .31 .49 .22 .40 .78 .21 .17 .22 .39 .38 1.00 .66 .49 .08 .18 .19 .26 .41 .19 .24
.84 .31 .12 .21 .70 .32 .15 .22 .39 .62 .25 .29 .16
24 -.9708 .2602 14.77 398 32 0 .0 5675 13.7 13.7 .12 .44 .63 .16 .49 .77 .30 .38 .17 .32 1.00 .68 .21 .60 .29 .17 .25 .24 .41 .54
.30 .19 .29 .13 .33 .37 .09 .22 .94 .26 .29 .33 .51 .24 .42 .80 .22 .18 .24 .40 .40 1.03 .68 .52 .09 .19 .20 .27 .42 .20 .25
.87 .32 .13 .23 .73 .34 .16 .23 .40 .65 .26 .31 .18
25 -.9039 .2571 15.12 406 31 1890 4.6 7565 18.2 15.9 .13 .45 .66 .17 .50 .79 .32 .40 .18 .33 1.03 .69 .22 .62 .31 .18 .26 .25 .43 .55
.31 .20 .30 .14 .35 .39 .09 .24 .96 .27 .31 .35 .53 .25 .44 .83 .24 .19 .25 .42 .42 1.06 .70 .54 .09 .20 .21 .29 .44 .21 .27
.90 .33 .14 .24 .77 .35 .17 .24 .42 .67 .28 .32 .19
26 -.8385 .2543 15.46 414 31 586 1.4 8151 19.6 18.9 .13 .47 .68 .18 .52 .82 .33 .43 .19 .35 1.05 .71 .24 .63 .32 .19 .28 .27 .45 .57
.32 .21 .32 .15 .36 .41 .10 .25 .98 .28 .32 .37 .55 .26 .45 .85 .26 .20 .26 .44 .43 1.09 .73 .57 .10 .21 .22 .30 .45 .22 .28
.93 .35 .15 .26 .80 .37 .18 .26 .44 .69 .29 .34 .21
27 -.7745 .2517 15.78 421 31 865 2.1 9016 21.7 20.7 .14 .49 .70 .19 .54 .85 .35 .45 .20 .36 1.08 .72 .25 .65 .34 .20 .29 .28 .46 .59
.34 .22 .34 .15 .38 .42 .11 .26 .99 .30 .34 .39 .57 .28 .47 .88 .28 .21 .27 .45 .45 1.12 .75 .59 .10 .23 .23 .32 .47 .24 .29
.95 .36 .15 .28 .83 .39 .19 .27 .45 .72 .30 .35 .22

28 -.7117 .2493 16.09 429 30 1980 4.8 10996 26.5 24.1 .15 .50 .73 .20 .55 .88 .36 .48 .21 .38 1.10 .73 .26 .66 .35 .21 .30 .29 .48
.60 .35 .23 .35 .16 .39 .44 .11 .27 1.01 .31 .35 .41 .59 .29 .49 .90 .30 .22 .28 .47 .46 1.15 .77 .62 .11 .24 .24 .33 .49 .25
.30 .98 .38 .16 .30 .87 .40 .20 .28 .47 .74 .32 .37 .24
29 -.6502 .2470 16.39 436 30 0 .0 10996 26.5 26.5 .16 .52 .75 .21 .57 .90 .37 .50 .22 .39 1.12 .74 .27 .67 .37 .23 .32 .31 .49 .62
.37 .24 .37 .17 .41 .45 .12 .28 1.02 .32 .36 .43 .60 .30 .51 .93 .32 .23 .30 .48 .48 1.18 .78 .65 .11 .25 .25 .34 .50 .26 .32
1.01 .39 .17 .32 .90 .41 .21 .29 .48 .76 .33 .38 .26
30 -.5896 .2450 16.66 444 30 1724 4.2 12720 30.6 28.6 .17 .53 .77 .22 .58 .93 .39 .53 .23 .41 1.15 .76 .28 .69 .38 .24 .33 .32 .51
.63 .38 .25 .39 .18 .42 .47 .13 .30 1.04 .33 .38 .45 .62 .32 .53 .95 .34 .24 .31 .50 .49 1.20 .80 .67 .12 .26 .27 .36 .52 .27
.33 1.04 .41 .18 .34 .93 .43 .22 .31 .50 .78 .34 .39 .28
31 -.5301 .2430 16.93 451 29 1425 3.4 14145 34.1 32.3 .18 .55 .79 .23 .60 .96 .40 .55 .24 .42 1.17 .77 .30 .70 .39 .25 .34 .33 .52
.64 .39 .26 .40 .19 .44 .48 .13 .31 1.06 .35 .39 .48 .64 .33 .55 .97 .36 .26 .32 .51 .51 1.23 .82 .70 .13 .27 .28 .37 .53 .28
.34 1.06 .42 .19 .36 .96 .44 .23 .32 .51 .81 .36 .41 .30
32 -.4715 .2413 17.18 458 29 778 1.9 14923 35.9 35.0 .18 .56 .82 .24 .61 .98 .42 .58 .25 .44 1.19 .78 .31 .71 .41 .27 .36 .34 .54 .66
.41 .27 .42 .20 .45 .50 .14 .32 1.07 .36 .41 .50 .66 .35 .56 .99 .39 .27 .34 .53 .52 1.26 .84 .73 .13 .28 .29 .38 .55 .29 .36
1.09 .44 .20 .38 .99 .46 .24 .33 .53 .83 .37 .42 .32
33 -.4137 .2396 17.42 465 29 1006 2.4 15929 38.4 37.1 .19 .58 .84 .25 .62 1.01 .43 .61 .26 .45 1.21 .79 .32 .72 .42 .28 .37 .36 .55
.67 .42 .28 .44 .21 .46 .51 .15 .33 1.09 .38 .42 .52 .68 .36 .58 1.02 .41 .28 .35 .54 .54 1.28 .86 .75 .14 .30 .30 .40 .56 .31
.37 1.11 .45 .21 .40 1.03 .47 .25 .35 .54 .85 .38 .44 .34
34 -.3566 .2381 17.64 472 29 1374 3.3 17303 41.7 40.0 .20 .59 .86 .26 .64 1.04 .44 .64 .28 .47 1.23 .80 .33 .74 .44 .29 .38 .37 .57
.68 .44 .30 .45 .22 .48 .52 .15 .35 1.10 .39 .44 .55 .69 .38 .60 1.04 .44 .29 .36 .56 .55 1.31 .88 .78 .15 .31 .31 .41 .57 .32
.38 1.14 .47 .22 .43 1.06 .49 .26 .36 .56 .87 .40 .45 .36
35 -.3003 .2367 17.85 479 29 815 2.0 18118 43.6 42.6 .21 .60 .88 .27 .65 1.06 .46 .67 .29 .48 1.25 .81 .35 .75 .45 .31 .40 .38 .58
.70 .45 .31 .47 .23 .49 .54 .16 .36 1.12 .40 .45 .57 .71 .39 .62 1.06 .46 .30 .38 .57 .57 1.33 .90 .81 .16 .32 .33 .43 .59 .33
.40 1.16 .48 .23 .45 1.09 .50 .27 .37 .57 .89 .41 .47 .39
36 -.2445 .2354 18.04 486 29 901 2.2 19019 45.8 44.7 .22 .62 .90 .29 .66 1.09 .47 .70 .30 .49 1.27 .81 .36 .76 .46 .33 .41 .40 .59
.71 .46 .32 .49 .24 .51 .55 .17 .37 1.13 .42 .46 .60 .73 .41 .63 1.08 .49 .31 .39 .58 .58 1.35 .91 .84 .16 .33 .34 .44 .60 .34
.41 1.19 .49 .24 .48 1.12 .52 .29 .39 .58 .92 .42 .48 .42
37 -.1894 .2342 18.23 492 28 2207 5.3 21226 51.1 48.4 .23 .63 .92 .30 .68 1.11 .49 .73 .31 .51 1.29 .82 .37 .77 .48 .34 .42 .41 .61
.72 .48 .33 .51 .25 .52 .57 .18 .39 1.15 .43 .48 .63 .75 .42 .65 1.10 .52 .33 .40 .60 .59 1.37 .93 .86 .17 .34 .35 .45 .61 .36
.42 1.21 .51 .25 .50 1.15 .53 .30 .40 .60 .94 .44 .49 .44
38 -.1348 .2331 18.40 499 28 0 .0 21226 51.1 51.1 .24 .64 .94 .31 .69 1.13 .50 .76 .32 .52 1.31 .83 .38 .78 .49 .36 .44 .42 .62 .73
.49 .34 .53 .26 .53 .58 .18 .40 1.16 .44 .49 .65 .76 .44 .67 1.12 .55 .34 .41 .61 .61 1.40 .95 .89 .18 .36 .36 .47 .63 .37 .44
1.23 .52 .26 .53 1.17 .54 .31 .41 .61 .96 .45 .51 .47
39 -.0807 .2321 18.56 506 28 2215 5.3 23441 56.4 53.8 .25 .65 .96 .32 .70 1.16 .51 .79 .33 .53 1.33 .84 .40 .79 .50 .38 .45 .44 .63
.74 .51 .36 .54 .27 .55 .59 .19 .41 1.18 .46 .50 .68 .78 .46 .69 1.14 .58 .35 .43 .62 .62 1.42 .96 .92 .19 .37 .38 .48 .64 .38
.45 1.25 .53 .27 .56 1.20 .56 .32 .42 .62 .98 .46 .52 .50
40 -.0270 .2312 18.70 512 28 713 1.7 24154 58.2 57.3 .26 .67 .98 .33 .71 1.18 .53 .82 .35 .55 1.35 .84 .41 .79 .52 .39 .46 .45 .64
.75 .52 .37 .56 .28 .56 .61 .20 .43 1.19 .47 .52 .71 .79 .47 .70 1.16 .61 .36 .44 .63 .63 1.44 .98 .95 .19 .38 .39 .49 .65 .39
.47 1.28 .55 .28 .59 1.23 .57 .33 .44 .64 1.00 .48 .53 .54
41 .0263 .2304 18.84 518 28 0 .0 24154 58.2 58.2 .27 .68 1.01 .34 .72 1.20 .54 .85 .36 .56 1.37 .85 .42 .80 .53 .41 .48 .46 .66 .76
.53 .38 .58 .29 .57 .62 .21 .44 1.21 .48 .53 .74 .81 .49 .72 1.18 .65 .37 .45 .65 .64 1.46 1.00 .98 .20 .39 .40 .51 .66 .41
.48 1.30 .56 .29 .62 1.26 .58 .34 .45 .65 1.02 .49 .55 .57
42 .0792 .2297 18.96 525 28 2626 6.3 26780 64.5 61.3 .28 .69 1.03 .36 .73 1.23 .55 .88 .37 .57 1.39 .86 .44 .81 .54 .43 .49 .48 .67
.77 .54 .39 .60 .30 .59 .63 .22 .45 1.22 .50 .54 .77 .83 .51 .74 1.20 .68 .39 .47 .66 .66 1.48 1.01 1.00 .21 .41 .41 .52 .68
.42 .49 1.32 .57 .30 .66 1.28 .60 .36 .46 .66 1.04 .50 .56 .61

43 .1318 .2290 19.06 531 28 0 .0 26780 64.5 64.5 .29 .70 1.05 .37 .74 1.25 .57 .92 .38 .59 1.40 .86 .45 .82 .56 .45 .50 .49 .68 .78
.56 .41 .62 .31 .60 .64 .23 .46 1.24 .51 .56 .80 .84 .52 .76 1.22 .72 .40 .48 .67 .67 1.50 1.03 1.03 .22 .42 .43 .53 .69 .43
.50 1.34 .59 .31 .69 1.31 .61 .37 .48 .67 1.06 .52 .57 .64
44 .1841 .2285 19.16 538 28 649 1.6 27429 66.0 65.3 .30 .71 1.07 .38 .75 1.27 .58 .95 .39 .60 1.42 .87 .46 .83 .57 .47 .52 .50 .69
.79 .57 .42 .64 .32 .61 .65 .24 .48 1.25 .52 .57 .83 .86 .54 .77 1.24 .76 .41 .49 .68 .68 1.51 1.05 1.06 .23 .43 .44 .55 .70
.45 .52 1.36 .60 .32 .72 1.33 .62 .38 .49 .68 1.08 .53 .59 .68
45 .2362 .2280 19.24 544 28 1816 4.4 29245 70.4 68.2 .31 .72 1.09 .39 .76 1.29 .59 .99 .41 .61 1.44 .88 .48 .83 .58 .49 .53 .52 .70
.80 .58 .43 .67 .33 .62 .67 .25 .49 1.27 .53 .58 .86 .87 .56 .79 1.26 .80 .43 .51 .69 .69 1.53 1.06 1.09 .24 .45 .45 .56 .71
.46 .53 1.38 .61 .33 .76 1.36 .63 .39 .50 .69 1.10 .54 .60 .72
46 .2880 .2275 19.31 550 28 0 .0 29245 70.4 70.4 .32 .73 1.11 .41 .77 1.31 .60 1.02 .42 .62 1.46 .88 .49 .84 .60 .52 .54 .53 .71 .80
.60 .44 .69 .35 .64 .68 .26 .50 1.28 .55 .59 .89 .89 .57 .81 1.28 .83 .44 .52 .70 .70 1.55 1.08 1.12 .25 .46 .46 .57 .72 .47
.54 1.40 .62 .34 .80 1.38 .64 .41 .52 .71 1.12 .56 .61 .76
47 .3397 .2272 19.37 556 28 1140 2.7 30385 73.2 71.8 .34 .74 1.13 .42 .78 1.33 .62 1.06 .43 .64 1.47 .89 .50 .85 .61 .54 .55 .54 .72
.81 .61 .46 .71 .36 .65 .69 .27 .52 1.30 .56 .61 .92 .91 .59 .82 1.30 .88 .45 .53 .71 .71 1.57 1.10 1.15 .26 .47 .48 .58 .73
.48 .56 1.42 .64 .36 .84 1.41 .66 .42 .53 .72 1.14 .57 .62 .81
48 .3913 .2269 19.42 563 28 1101 2.7 31486 75.8 74.5 .35 .75 1.14 .43 .79 1.35 .63 1.09 .45 .65 1.49 .89 .51 .85 .62 .56 .57 .55 .73
.82 .62 .47 .73 .37 .66 .70 .28 .53 1.31 .57 .62 .96 .92 .61 .84 1.32 .92 .46 .55 .72 .72 1.58 1.11 1.18 .27 .48 .49 .60 .74
.50 .57 1.44 .65 .37 .88 1.43 .67 .43 .54 .73 1.16 .58 .63 .85
49 .4427 .2267 19.46 569 27 0 .0 31486 75.8 75.8 .36 .76 1.16 .44 .80 1.37 .64 1.13 .46 .66 1.51 .90 .53 .86 .63 .59 .58 .57 .74 .83
.63 .48 .75 .38 .67 .71 .29 .54 1.32 .59 .63 .99 .94 .63 .86 1.34 .96 .48 .56 .74 .73 1.60 1.13 1.21 .28 .50 .50 .61 .75 .51
.58 1.46 .66 .38 .92 1.45 .68 .44 .55 .74 1.18 .59 .65 .90
50 .4941 .2266 19.48 575 27 965 2.3 32451 78.1 77.0 .37 .77 1.18 .46 .80 1.39 .65 1.17 .47 .67 1.52 .90 .54 .87 .64 .61 .59 .58 .75
.83 .64 .50 .78 .39 .68 .72 .30 .55 1.34 .60 .64 1.03 .95 .65 .87 1.36 1.00 .49 .57 .74 .74 1.61 1.14 1.24 .29 .51 .52 .62 .76
.52 .59 1.48 .67 .39 .96 1.47 .69 .46 .57 .75 1.20 .61 .66 .94
51 .5454 .2265 19.49 581 27 1004 2.4 33455 80.6 79.3 .38 .78 1.20 .47 .81 1.41 .66 1.21 .48 .68 1.54 .91 .55 .87 .66 .64 .60 .59 .76
.84 .66 .51 .80 .41 .69 .73 .31 .57 1.35 .61 .66 1.06 .97 .66 .89 1.37 1.05 .50 .58 .75 .75 1.63 1.16 1.28 .30 .52 .53 .63 .77
.54 .61 1.50 .68 .41 1.01 1.49 .70 .47 .58 .76 1.22 .62 .67 .99
52 .5967 .2265 19.49 588 27 404 1.0 33859 81.5 81.0 .40 .79 1.22 .48 .82 1.43 .68 1.25 .50 .69 1.55 .91 .57 .88 .67 .67 .62 .60 .77
.85 .67 .52 .83 .42 .70 .74 .32 .58 1.37 .62 .67 1.10 .98 .68 .91 1.39 1.09 .51 .60 .76 .76 1.64 1.18 1.31 .31 .53 .54 .64 .78
.55 .62 1.51 .69 .42 1.05 1.51 .71 .48 .59 .77 1.24 .63 .68 1.04
53 .6481 .2266 19.47 594 27 1275 3.1 35134 84.6 83.1 .41 .80 1.24 .49 .83 1.45 .69 1.28 .51 .70 1.57 .91 .58 .88 .68 .69 .63 .62 .78
.85 .68 .53 .86 .43 .71 .75 .33 .59 1.38 .63 .68 1.13 1.00 .70 .92 1.41 1.14 .53 .61 .77 .77 1.66 1.19 1.34 .32 .55 .55 .66 .79
.56 .63 1.53 .70 .43 1.10 1.53 .72 .49 .60 .77 1.26 .64 .69 1.09
54 .6994 .2267 19.45 600 27 351 .8 35485 85.4 85.0 .42 .80 1.26 .51 .84 1.47 .70 1.32 .52 .71 1.58 .92 .59 .89 .69 .72 .64 .63 .79
.86 .69 .55 .88 .44 .73 .76 .34 .60 1.40 .65 .69 1.17 1.01 .72 .94 1.43 1.19 .54 .62 .78 .78 1.67 1.21 1.37 .33 .56 .57 .67 .80
.57 .64 1.55 .71 .44 1.15 1.55 .73 .51 .62 .78 1.27 .65 .70 1.14
55 .7509 .2269 19.42 606 28 0 .0 35485 85.4 85.4 .43 .81 1.28 .52 .84 1.49 .71 1.37 .53 .72 1.60 .92 .60 .89 .70 .75 .65 .64 .80 .87
.70 .56 .91 .46 .74 .77 .35 .62 1.41 .66 .70 1.21 1.03 .74 .96 1.44 1.24 .55 .63 .79 .79 1.68 1.23 1.41 .35 .57 .58 .68 .80 .59
.65 1.56 .72 .46 1.20 1.57 .74 .52 .63 .79 1.29 .67 .71 1.20
56 .8025 .2272 19.37 613 28 1172 2.8 36657 88.3 86.8 .45 .82 1.30 .53 .85 1.51 .72 1.41 .55 .74 1.61 .93 .61 .90 .71 .79 .66 .65 .81
.87 .71 .57 .94 .47 .75 .78 .37 .63 1.43 .67 .71 1.25 1.04 .76 .97 1.46 1.28 .57 .64 .80 .80 1.70 1.24 1.44 .36 .59 .59 .69 .81
.60 .67 1.58 .73 .47 1.25 1.59 .75 .53 .64 .80 1.31 .68 .72 1.25
57 .8542 .2275 19.31 619 28 278 .7 36935 88.9 88.6 .46 .83 1.32 .55 .86 1.52 .73 1.45 .56 .75 1.63 .93 .63 .90 .72 .82 .68 .66 .81
.88 .72 .58 .98 .48 .75 .79 .38 .64 1.44 .68 .72 1.29 1.06 .78 .99 1.48 1.33 .58 .66 .81 .81 1.71 1.26 1.48 .37 .60 .60 .70 .82
.61 .68 1.60 .74 .48 1.31 1.61 .76 .55 .65 .81 1.33 .69 .73 1.31

58 .9060 .2279 19.25 625 28 0 .0 36935 88.9 88.9 .47 .84 1.34 .56 .86 1.54 .74 1.49 .57 .75 1.64 .93 .64 .91 .73 .85 .69 .68 .82 .88
.73 .60 1.01 .50 .76 .80 .39 .65 1.46 .69 .73 1.33 1.07 .79 1.01 1.50 1.38 .59 .67 .82 .81 1.72 1.27 1.51 .38 .61 .62 .71 .83 .62
.69 1.61 .75 .49 1.36 1.62 .77 .56 .66 .82 1.35 .70 .74 1.36
59 .9581 .2284 19.17 631 28 1160 2.8 38095 91.7 90.3 .48 .84 1.35 .57 .87 1.56 .75 1.54 .59 .76 1.65 .94 .65 .91 .74 .89 .70 .69 .83
.89 .74 .61 1.04 .51 .77 .80 .40 .66 1.47 .70 .74 1.37 1.09 .81 1.02 1.51 1.43 .60 .68 .82 .82 1.73 1.29 1.55 .39 .62 .63 .72 .83
.64 .70 1.63 .76 .51 1.42 1.64 .78 .57 .68 .82 1.37 .71 .75 1.42
60 1.0103 .2289 19.09 638 28 0 .0 38095 91.7 91.7 .50 .85 1.37 .58 .87 1.58 .76 1.58 .60 .77 1.67 .94 .66 .92 .75 .92 .71 .70 .84
.89 .75 .62 1.08 .52 .78 .81 .42 .68 1.49 .71 .75 1.41 1.11 .83 1.04 1.53 1.49 .62 .69 .83 .83 1.75 1.31 1.59 .41 .63 .64 .73 .84
.65 .71 1.64 .77 .52 1.48 1.65 .79 .58 .69 .83 1.39 .72 .76 1.47
61 1.0628 .2294 19.00 644 28 272 .7 38367 92.4 92.0 .51 .86 1.39 .60 .88 1.59 .77 1.62 .61 .78 1.68 .94 .67 .92 .76 .96 .72 .71 .84
.90 .76 .63 1.12 .53 .79 .82 .43 .69 1.50 .72 .76 1.45 1.12 .85 1.06 1.54 1.54 .63 .70 .84 .84 1.76 1.32 1.63 .42 .65 .65 .74 .85
.66 .72 1.65 .78 .53 1.54 1.67 .80 .60 .70 .84 1.40 .73 .77 1.53
62 1.1156 .2300 18.90 651 28 676 1.6 39043 94.0 93.2 .52 .86 1.41 .61 .88 1.61 .78 1.67 .62 .79 1.69 .94 .69 .92 .77 1.00 .73 .72 .85
.90 .77 .65 1.16 .55 .80 .83 .44 .70 1.52 .73 .77 1.50 1.14 .87 1.08 1.56 1.59 .64 .71 .84 .84 1.77 1.34 1.67 .43 .66 .66 .75 .85
.67 .73 1.67 .79 .55 1.60 1.69 .81 .61 .71 .85 1.42 .74 .78 1.58
63 1.1687 .2307 18.79 657 28 0 .0 39043 94.0 94.0 .54 .87 1.43 .62 .89 1.62 .79 1.72 .64 .80 1.70 .95 .70 .93 .78 1.04 .74 .73 .86
.91 .78 .66 1.21 .56 .81 .84 .45 .71 1.53 .74 .78 1.54 1.15 .89 1.09 1.58 1.64 .65 .72 .85 .85 1.78 1.36 1.71 .44 .67 .68 .76 .86
.68 .74 1.68 .80 .56 1.66 1.70 .81 .62 .72 .85 1.44 .75 .79 1.64
64 1.2221 .2314 18.68 663 28 309 .7 39352 94.7 94.4 .55 .87 1.45 .63 .90 1.64 .80 1.76 .65 .81 1.72 .95 .71 .93 .79 1.09 .75 .74 .86
.91 .79 .67 1.26 .57 .82 .84 .47 .72 1.54 .75 .79 1.58 1.17 .91 1.11 1.59 1.69 .66 .73 .86 .86 1.79 1.37 1.75 .46 .68 .69 .77 .87
.69 .75 1.70 .81 .57 1.72 1.71 .82 .63 .73 .86 1.46 .76 .80 1.70
65 1.2758 .2322 18.55 670 28 399 1.0 39751 95.7 95.2 .56 .88 1.46 .65 .90 1.65 .80 1.81 .66 .82 1.73 .95 .72 .93 .80 1.13 .76 .75 .87
.92 .80 .68 1.31 .59 .82 .85 .48 .73 1.56 .76 .80 1.63 1.19 .93 1.13 1.61 1.75 .68 .74 .86 .86 1.80 1.39 1.79 .47 .69 .70 .78 .87
.71 .76 1.71 .82 .59 1.78 1.73 .83 .65 .74 .87 1.48 .77 .81 1.75
66 1.3299 .2330 18.43 677 28 0 .0 39751 95.7 95.7 .58 .89 1.48 .66 .90 1.67 .81 1.86 .67 .82 1.74 .95 .73 .94 .81 1.18 .77 .76 .88
.92 .81 .69 1.36 .60 .83 .86 .49 .74 1.57 .77 .81 1.68 1.20 .95 1.15 1.62 1.80 .69 .75 .87 .87 1.81 1.41 1.84 .48 .71 .71 .79 .88
.72 .77 1.72 .82 .60 1.85 1.74 .84 .66 .75 .87 1.49 .78 .82 1.81
67 1.3843 .2338 18.29 683 28 442 1.1 40193 96.8 96.2 .59 .89 1.50 .67 .91 1.68 .82 1.91 .68 .83 1.75 .96 .74 .94 .81 1.23 .78 .77 .88
.92 .82 .71 1.42 .61 .84 .86 .51 .75 1.59 .78 .81 1.72 1.22 .97 1.16 1.64 1.86 .70 .76 .88 .88 1.82 1.42 1.88 .50 .72 .72 .80 .89
.73 .78 1.73 .83 .61 1.91 1.75 .84 .67 .76 .88 1.51 .79 .82 1.86
68 1.4392 .2347 18.15 690 28 116 .3 40309 97.1 96.9 .60 .90 1.52 .68 .91 1.69 .83 1.96 .70 .84 1.76 .96 .75 .94 .82 1.28 .79 .78 .89
.93 .82 .72 1.48 .63 .85 .87 .52 .76 1.60 .79 .82 1.77 1.24 1.00 1.18 1.65 1.91 .71 .77 .88 .88 1.82 1.44 1.93 .51 .73 .73 .81 .89
.74 .79 1.75 .84 .62 1.98 1.76 .85 .68 .77 .88 1.53 .80 .83 1.92
69 1.4945 .2357 18.01 696 29 188 .5 40497 97.5 97.3 .62 .90 1.53 .70 .92 1.71 .84 2.01 .71 .85 1.77 .96 .76 .95 .83 1.33 .80 .79 .89
.93 .83 .73 1.54 .64 .85 .88 .54 .77 1.62 .80 .83 1.82 1.25 1.02 1.20 1.66 1.97 .72 .78 .89 .89 1.83 1.46 1.98 .53 .74 .74 .82 .90
.75 .80 1.76 .85 .64 2.05 1.78 .86 .69 .78 .89 1.54 .81 .84 1.97
70 1.5503 .2367 17.85 703 29 217 .5 40714 98.0 97.8 .63 .91 1.55 .71 .92 1.72 .84 2.06 .72 .85 1.78 .96 .77 .95 .84 1.39 .81 .80 .90
.94 .84 .74 1.61 .65 .86 .88 .55 .78 1.63 .81 .84 1.87 1.27 1.04 1.22 1.68 2.02 .73 .79 .89 .89 1.84 1.47 2.03 .54 .75 .75 .82 .90
.76 .81 1.77 .85 .65 2.12 1.79 .86 .71 .79 .89 1.56 .82 .85 2.02
71 1.6065 .2378 17.69 710 29 56 .1 40770 98.2 98.1 .64 .91 1.57 .72 .93 1.73 .85 2.12 .73 .86 1.79 .97 .78 .95 .85 1.44 .82 .81 .90
.94 .85 .75 1.68 .66 .87 .89 .56 .79 1.64 .82 .85 1.92 1.29 1.06 1.24 1.69 2.08 .74 .80 .90 .90 1.85 1.49 2.08 .55 .76 .76 .83 .91
.77 .82 1.78 .86 .66 2.19 1.80 .87 .72 .80 .90 1.58 .82 .85 2.08
72 1.6634 .2389 17.51 717 29 73 .2 40843 98.3 98.3 .66 .92 1.58 .73 .93 1.75 .86 2.17 .74 .87 1.80 .97 .79 .95 .85 1.50 .82 .82 .91
.94 .85 .76 1.76 .68 .87 .89 .58 .80 1.66 .83 .85 1.97 1.30 1.08 1.25 1.70 2.13 .76 .81 .90 .90 1.86 1.51 2.13 .57 .77 .77 .84 .91
.78 .82 1.79 .87 .68 2.26 1.81 .88 .73 .81 .90 1.59 .83 .86 2.13

73 1.7208 .2402 17.33 724 29 185 .4 41028 98.8 98.6 .67 .92 1.60 .74 .93 1.76 .86 2.23 .75 .87 1.81 .97 .80 .96 .86 1.57 .83 .82 .91
.95 .86 .77 1.84 .69 .88 .90 .59 .81 1.67 .84 .86 2.02 1.32 1.10 1.27 1.72 2.19 .77 .82 .91 .91 1.86 1.52 2.19 .58 .78 .78 .85 .92
.79 .83 1.80 .87 .69 2.32 1.82 .88 .74 .82 .91 1.61 .84 .87 2.18
74 1.7788 .2416 17.13 731 29 40 .1 41068 98.9 98.8 .68 .92 1.62 .75 .94 1.77 .87 2.28 .76 .88 1.82 .97 .81 .96 .87 1.63 .84 .83 .92
.95 .87 .78 1.93 .70 .89 .90 .61 .82 1.68 .84 .87 2.07 1.34 1.12 1.29 1.73 2.25 .78 .83 .91 .91 1.87 1.54 2.24 .60 .79 .79 .86 .92
.80 .84 1.81 .88 .70 2.39 1.83 .89 .75 .83 .91 1.63 .85 .87 2.23
75 1.8376 .2432 16.91 738 29 47 .1 41115 99.0 98.9 .69 .93 1.63 .76 .94 1.78 .88 2.34 .77 .89 1.83 .97 .82 .96 .87 1.70 .85 .84 .92
.95 .87 .79 2.02 .71 .89 .91 .62 .83 1.70 .85 .87 2.13 1.36 1.15 1.31 1.74 2.30 .79 .84 .92 .92 1.88 1.56 2.30 .61 .80 .80 .86 .92
.81 .85 1.82 .89 .71 2.46 1.84 .90 .76 .83 .92 1.64 .85 .88 2.28
76 1.8971 .2449 16.67 745 30 139 .3 41254 99.3 99.0 .71 .93 1.65 .77 .94 1.79 .88 2.39 .78 .89 1.84 .97 .83 .96 .88 1.77 .86 .85 .93
.95 .88 .80 2.11 .73 .90 .91 .63 .84 1.71 .86 .88 2.18 1.37 1.17 1.33 1.75 2.36 .80 .84 .92 .92 1.88 1.57 2.36 .62 .81 .81 .87 .93
.82 .86 1.83 .89 .72 2.53 1.85 .90 .77 .84 .92 1.66 .86 .89 2.32
77 1.9576 .2469 16.41 753 30 34 .1 41288 99.4 99.0 .72 .94 1.66 .78 .95 1.80 .89 2.45 .79 .90 1.85 .98 .84 .97 .89 1.84 .86 .86 .93
.96 .89 .81 2.20 .74 .90 .92 .65 .84 1.72 .87 .89 2.24 1.39 1.19 1.35 1.77 2.42 .81 .85 .93 .93 1.89 1.59 2.42 .64 .82 .82 .88 .93
.83 .86 1.84 .90 .74 2.60 1.85 .91 .78 .85 .93 1.67 .87 .89 2.37
78 2.0190 .2490 16.12 760 30 30 .1 41318 99.5 99.0 .73 .94 1.68 .79 .95 1.81 .90 2.51 .80 .90 1.85 .98 .84 .97 .89 1.92 .87 .86 .93
.96 .89 .82 2.30 .75 .91 .92 .66 .85 1.73 .87 .89 2.29 1.41 1.21 1.37 1.78 2.48 .81 .86 .93 .93 1.90 1.61 2.48 .65 .83 .83 .88 .94
.83 .87 1.85 .90 .75 2.67 1.86 .91 .79 .86 .93 1.69 .88 .90 2.42
79 2.0817 .2515 15.81 768 30 74 .2 41392 99.7 99.0 .74 .94 1.69 .80 .95 1.82 .90 2.57 .81 .91 1.86 .98 .85 .97 .90 2.00 .88 .87 .94
.96 .90 .83 2.40 .76 .91 .93 .67 .86 1.75 .88 .90 2.35 1.43 1.24 1.39 1.79 2.54 .82 .87 .93 .93 1.90 1.62 2.55 .67 .84 .84 .89 .94
.84 .88 1.85 .91 .76 2.74 1.87 .92 .80 .87 .94 1.70 .88 .90 2.47
80 2.1456 .2543 15.46 775 31 0 .0 41392 99.7 99.0 .76 .95 1.71 .81 .96 1.83 .91 2.63 .82 .91 1.87 .98 .86 .97 .90 2.08 .88 .88 .94
.96 .90 .84 2.51 .77 .92 .93 .69 .87 1.76 .89 .90 2.41 1.45 1.26 1.41 1.80 2.60 .83 .87 .94 .94 1.91 1.64 2.61 .68 .84 .85 .90 .94
.85 .88 1.86 .91 .77 2.81 1.88 .92 .81 .87 .94 1.72 .89 .91 2.51
81 2.2111 .2575 15.08 783 31 27 .1 41419 99.7 99.0 .77 .95 1.72 .82 .96 1.84 .91 2.69 .83 .92 1.88 .98 .87 .97 .91 2.16 .89 .88 .94
.97 .91 .85 2.61 .78 .92 .94 .70 .87 1.77 .89 .91 2.46 1.47 1.28 1.43 1.81 2.66 .84 .88 .94 .94 1.91 1.65 2.68 .69 .85 .86 .90 .95
.86 .89 1.87 .92 .78 2.88 1.89 .93 .82 .88 .94 1.73 .90 .91 2.56
82 2.2783 .2612 14.66 792 32 35 .1 41454 99.8 99.0 .78 .95 1.74 .83 .96 1.85 .92 2.75 .84 .92 1.88 .98 .87 .97 .91 2.25 .90 .89 .95
.97 .92 .85 2.71 .79 .93 .94 .72 .88 1.78 .90 .91 2.52 1.49 1.31 1.45 1.82 2.72 .85 .89 .95 .94 1.92 1.67 2.75 .71 .86 .86 .91 .95
.87 .90 1.88 .92 .79 2.94 1.89 .93 .83 .89 .95 1.74 .90 .92 2.60
83 2.3476 .2653 14.21 800 32 0 .0 41454 99.8 99.0 .79 .96 1.75 .84 .96 1.86 .92 2.81 .85 .93 1.89 .98 .88 .98 .92 2.34 .90 .90 .95
.97 .92 .86 2.82 .81 .93 .94 .73 .89 1.79 .90 .92 2.58 1.51 1.33 1.47 1.83 2.78 .86 .89 .95 .95 1.92 1.69 2.82 .72 .87 .87 .91 .95
.88 .90 1.89 .93 .80 3.01 1.90 .93 .84 .89 .95 1.76 .91 .92 2.65
84 2.4192 .2701 13.71 809 33 26 .1 41480 99.9 99.0 .80 .96 1.76 .85 .97 1.87 .93 2.88 .86 .93 1.90 .98 .89 .98 .93 2.44 .91 .90 .95
.97 .93 .87 2.92 .82 .94 .95 .74 .90 1.81 .91 .93 2.65 1.53 1.36 1.49 1.84 2.85 .87 .90 .95 .95 1.93 1.70 2.89 .74 .88 .88 .92 .96
.88 .91 1.89 .93 .82 3.07 1.91 .94 .85 .90 .95 1.77 .91 .93 2.69
85 2.4936 .2755 13.17 818 33 10 .0 41490 99.9 99.0 .81 .96 1.78 .86 .97 1.88 .93 2.94 .87 .94 1.91 .99 .90 .98 .93 2.53 .91 .91 .96
.97 .93 .88 3.02 .83 .94 .95 .76 .90 1.82 .92 .93 2.71 1.55 1.38 1.51 1.85 2.91 .88 .91 .96 .96 1.93 1.72 2.96 .75 .88 .89 .92 .96
.89 .92 1.90 .94 .83 3.14 1.91 .94 .86 .91 .96 1.79 .92 .93 2.74
86 2.5712 .2818 12.60 827 34 16 .0 41506 99.9 99.0 .83 .96 1.79 .87 .97 1.89 .94 3.00 .88 .94 1.91 .99 .90 .98 .94 2.63 .92 .92 .96
.98 .94 .89 3.12 .84 .94 .95 .77 .91 1.83 .92 .94 2.77 1.57 1.41 1.54 1.86 2.98 .88 .91 .96 .96 1.94 1.73 3.04 .76 .89 .89 .93 .96
.90 .92 1.91 .94 .84 3.20 1.92 .95 .87 .91 .96 1.80 .92 .94 2.79
87 2.6526 .2890 11.98 837 35 7 .0 41513 100.0 99.0 .84 .97 1.81 .88 .97 1.89 .94 3.07 .89 .95 1.92 .99 .91 .98 .94 2.73 .93 .92 .96
.98 .94 .89 3.21 .85 .95 .96 .79 .92 1.84 .93 .94 2.84 1.59 1.44 1.56 1.87 3.04 .89 .92 .96 .96 1.94 1.75 3.11 .78 .90 .90 .93 .96
.90 .93 1.91 .95 .85 3.26 1.93 .95 .88 .92 .96 1.81 .93 .94 2.84

88 2.7385 .2973 11.31 847 36 0 .0 41513 100.0 99.0 .85 .97 1.82 .89 .97 1.90 .95 3.14 .89 .95 1.92 .99 .92 .98 .94 2.83 .93 .93 .97
.98 .94 .90 3.30 .86 .95 .96 .80 .92 1.85 .93 .94 2.91 1.61 1.47 1.58 1.88 3.11 .90 .93 .96 .96 1.95 1.77 3.18 .79 .91 .91 .94 .97
.91 .93 1.92 .95 .86 3.33 1.93 .95 .89 .93 .97 1.83 .94 .95 2.88
89 2.8297 .3070 10.61 858 37 14 .0 41527 100.0 99.0 .86 .97 1.83 .90 .98 1.91 .95 3.20 .90 .95 1.93 .99 .92 .99 .95 2.94 .94 .93 .97
.98 .95 .91 3.39 .87 .96 .96 .81 .93 1.86 .94 .95 2.98 1.64 1.50 1.61 1.89 3.18 .91 .93 .97 .97 1.95 1.78 3.26 .81 .91 .92 .94 .97
.92 .94 1.93 .95 .87 3.39 1.94 .96 .90 .93 .97 1.84 .94 .95 2.94
90 2.9273 .3182 9.87 870 39 2 .0 41529 100.0 99.0 .87 .97 1.85 .91 .98 1.92 .96 3.27 .91 .96 1.94 .99 .93 .99 .95 3.04 .94 .94 .97
.98 .95 .92 3.47 .88 .96 .97 .83 .93 1.87 .94 .95 3.05 1.66 1.53 1.63 1.90 3.25 .92 .94 .97 .97 1.96 1.80 3.33 .82 .92 .92 .95 .97
.93 .94 1.93 .96 .88 3.45 1.94 .96 .91 .94 .97 1.85 .95 .96 2.99
91 3.0328 .3315 9.10 883 40 0 .0 41529 100.0 99.0 .88 .98 1.86 .91 .98 1.93 .96 3.34 .92 .96 1.94 .99 .94 .99 .96 3.15 .95 .95 .97
.98 .96 .93 3.54 .89 .96 .97 .84 .94 1.89 .95 .96 3.13 1.69 1.56 1.66 1.91 3.32 .92 .94 .97 .97 1.96 1.82 3.41 .84 .93 .93 .95 .98
.93 .95 1.94 .96 .89 3.50 1.95 .97 .91 .94 .97 1.87 .95 .96 3.04
92 3.1479 .3474 8.29 897 42 1 .0 41530 100.0 99.0 .89 .98 1.87 .92 .98 1.93 .96 3.41 .93 .97 1.95 .99 .94 .99 .96 3.25 .95 .95 .98
.99 .96 .93 3.61 .90 .97 .97 .86 .95 1.90 .95 .96 3.20 1.71 1.59 1.69 1.92 3.39 .93 .95 .98 .98 1.97 1.83 3.48 .85 .94 .94 .96 .98
.94 .95 1.95 .97 .90 3.56 1.95 .97 .92 .95 .98 1.88 .96 .96 3.10
93 3.2751 .3665 7.44 912 44 2 .0 41532 100.0 99.0 .91 .98 1.89 .93 .99 1.94 .97 3.48 .93 .97 1.95 .99 .95 .99 .97 3.36 .96 .96 .98
.99 .97 .94 3.68 .91 .97 .98 .87 .95 1.91 .96 .97 3.28 1.74 1.63 1.71 1.93 3.46 .94 .96 .98 .98 1.97 1.85 3.55 .87 .94 .95 .96 .98
.95 .96 1.95 .97 .91 3.62 1.96 .97 .93 .95 .98 1.89 .96 .97 3.16
94 3.4179 .3900 6.57 930 47 0 .0 41532 100.0 99.0 .92 .98 1.90 .94 .99 1.95 .97 3.54 .94 .97 1.96 .99 .96 .99 .97 3.46 .96 .96 .98
.99 .97 .95 3.73 .92 .98 .98 .89 .96 1.92 .97 .97 3.36 1.77 1.66 1.74 1.94 3.54 .95 .96 .98 .98 1.97 1.87 3.62 .88 .95 .95 .97 .98
.95 .96 1.96 .97 .92 3.67 1.96 .98 .94 .96 .98 1.91 .97 .97 3.23
95 3.5813 .4196 5.68 949 51 0 .0 41532 100.0 99.0 .93 .99 1.92 .95 .99 1.96 .98 3.61 .95 .98 1.97 1.00 .96 .99 .98 3.55 .97 .97 .99
.99 .98 .96 3.79 .93 .98 .98 .90 .96 1.93 .97 .98 3.45 1.79 1.70 1.78 1.95 3.61 .95 .97 .98 .98 1.98 1.89 3.69 .90 .96 .96 .97 .99
.96 .97 1.96 .98 .93 3.72 1.97 .98 .95 .97 .98 1.92 .97 .98 3.30
96 3.7732 .4580 4.77 973 56 0 .0 41532 100.0 99.0 .94 .99 1.93 .96 .99 1.96 .98 3.68 .96 .98 1.97 1.00 .97 .99 .98 3.65 .97 .97 .99
.99 .98 .96 3.83 .95 .98 .99 .92 .97 1.94 .98 .98 3.53 1.82 1.74 1.81 1.95 3.68 .96 .97 .99 .99 1.98 1.90 3.75 .92 .96 .97 .98 .99
.97 .97 1.97 .98 .94 3.78 1.98 .98 .96 .97 .99 1.93 .98 .98 3.38
97 4.0065 .5105 3.84 1001 62 0 .0 41532 100.0 99.0 .95 .99 1.94 .97 .99 1.97 .98 3.75 .97 .99 1.98 1.00 .98 1.00 .98 3.73 .98 .98 .99
.99 .98 .97 3.88 .96 .99 .99 .93 .98 1.95 .98 .98 3.62 1.86 1.79 1.84 1.96 3.75 .97 .98 .99 .99 1.99 1.92 3.81 .93 .97 .97 .98 .99
.97 .98 1.98 .99 .96 3.83 1.98 .99 .97 .98 .99 1.95 .98 .98 3.47
98 4.3054 .5876 2.90 1037 71 1 .0 41533 100.0 99.0 .96 .99 1.96 .97 .99 1.98 .99 3.82 .98 .99 1.98 1.00 .98 1.00 .99 3.81 .99 .98 .99
1.00 .99 .98 3.91 .97 .99 .99 .95 .98 1.97 .99 .99 3.72 1.89 1.84 1.88 1.97 3.82 .98 .98 .99 .99 1.99 1.94 3.87 .95 .98 .98 .99 .99
.98 .99 1.98 .99 .97 3.87 1.99 .99 .97 .98 .99 1.96 .99 .99 3.57
99 4.7239 .7170 1.95 1088 87 0 .0 41533 100.0 100.0 .98 1.00 1.97 .98 1.00 1.99 .99 3.88 .98 .99 1.99 1.00 .99 1.00 .99 3.88 .99 .99 1.00
1.00 .99 .99 3.95 .98 .99 .99 .97 .99 1.98 .99 .99 3.81 1.92 1.89 1.92 1.98 3.88 .99 .99 1.00 .99 1.99 1.96 3.92 .97 .99 .99 .99
1.00 .99 .99 1.99 .99 .98 3.92 1.99 .99 .98 .99 1.00 1.97 .99 .99 3.69
100 5.4326 1.0086 .98 1174 122 0 .0 41533 100.0 100.0 .99 1.00 1.99 .99 1.00 1.99 1.00 3.94 .99 1.00 1.99 1.00 .99 1.00 1.00 3.95 1.00 .99
1.00 1.00 1.00 .99 3.98 .99 1.00 1.00 .98 .99 1.99 1.00 1.00 3.91 1.96 1.94 1.96 1.99 3.94 .99 .99 1.00 1.00 2.00 1.98 3.96 .98 .99 .99
1.00 1.00 .99 1.00 1.99 1.00 .99 3.96 2.00 1.00 .99 .99 1.00 1.99 1.00 1.00 3.83
101 6.8331 2.0051 .25 1344 243 0 .0 41533 100.0 100.0 1.00 1.00 2.00 1.00 1.00 2.00 1.00 4.00 1.00 1.00 2.00 1.00 1.00 1.00 1.00 4.00 1.00 1.00
1.00 1.00 1.00 1.00 4.00 1.00 1.00 1.00 1.00 1.00 2.00 1.00 1.00 4.00 2.00 2.00 2.00 2.00 4.00 1.00 1.00 1.00 1.00 2.00 2.00 4.00 1.00 1.00
1.00 1.00 1.00 1.00 1.00 2.00 1.00 1.00 4.00 2.00 1.00 1.00 1.00 1.00 2.00 1.00 1.00 4.00

Appendix E – Comparison of Files Output (Science Grade 4)

All RSSS Differences – Science Grade 4

grade	form	rs	pearson_theta	pearson_se	pearson_ss	pearson_pl	humrro_theta	humrro_se	humrro_ss	humrro_pl	ss_diff	pl_match
04	1	0	-5.1918	2.0194	400	N	-5.1918	2.0194	400	N	0	1
04	1	1	-3.7473	1.0381	448	N	-3.7473	1.0381	448	N	0	1
04	1	2	-2.9766	0.7598	460	N	-2.9766	0.7598	460	N	0	1
04	1	3	-2.4939	0.6407	468	N	-2.4939	0.6407	468	N	0	1
04	1	4	-2.1292	0.5718	475	N	-2.1292	0.5718	475	N	0	1
04	1	5	-1.8292	0.5262	480	N	-1.8292	0.5262	480	N	0	1
04	1	6	-1.57	0.4935	484	N	-1.57	0.4935	484	N	0	1
04	1	7	-1.339	0.4689	488	N	-1.339	0.4689	488	N	0	1
04	1	8	-1.1283	0.4497	491	N	-1.1283	0.4497	491	N	0	1
04	1	9	-0.9331	0.4345	494	N	-0.9331	0.4345	494	N	0	1
04	1	10	-0.7498	0.4222	498	A	-0.7498	0.4222	498	A	0	1
04	1	11	-0.5759	0.4122	500	A	-0.5759	0.4122	500	A	0	1
04	1	12	-0.4094	0.4041	503	A	-0.4094	0.4041	503	A	0	1
04	1	13	-0.2488	0.3976	506	A	-0.2488	0.3976	506	A	0	1
04	1	14	-0.0928	0.3924	508	A	-0.0928	0.3924	508	A	0	1
04	1	15	0.0595	0.3884	511	A	0.0595	0.3884	511	A	0	1
04	1	16	0.2092	0.3855	513	A	0.2092	0.3855	513	A	0	1
04	1	17	0.3569	0.3834	516	P	0.3569	0.3834	516	P	0	1
04	1	18	0.5034	0.3822	518	P	0.5034	0.3822	518	P	0	1
04	1	19	0.6493	0.3817	521	P	0.6493	0.3817	521	P	0	1
04	1	20	0.7949	0.3816	523	P	0.7949	0.3816	523	P	0	1
04	1	21	0.9406	0.3818	526	P	0.9406	0.3818	526	P	0	1
04	1	22	1.0864	0.382	528	P	1.0864	0.382	528	P	0	1
04	1	23	1.2323	0.3819	531	D	1.2323	0.3819	531	D	0	1
04	1	24	1.3781	0.3816	533	D	1.3781	0.3816	533	D	0	1
04	1	25	1.5235	0.381	535	D	1.5235	0.381	535	D	0	1
04	1	26	1.6685	0.3807	538	D	1.6685	0.3807	538	D	0	1
04	1	27	1.8135	0.3812	540	D	1.8135	0.3812	540	D	0	1
04	1	28	1.9596	0.3835	543	D	1.9596	0.3835	543	D	0	1
04	1	29	2.1084	0.3885	545	D	2.1084	0.3885	545	D	0	1
04	1	30	2.2624	0.3972	548	D	2.2624	0.3972	548	D	0	1
04	1	31	2.4253	0.411	550	D	2.4253	0.411	550	D	0	1
04	1	32	2.6024	0.4317	553	D	2.6024	0.4317	553	D	0	1
04	1	33	2.8013	0.4622	557	D	2.8013	0.4622	557	D	0	1
04	1	34	3.0351	0.5077	561	D	3.0351	0.5077	561	D	0	1
04	1	35	3.3277	0.5792	565	D	3.3277	0.5792	565	D	0	1
04	1	36	3.7327	0.7051	572	D	3.7327	0.7051	572	D	0	1
04	1	37	4.4211	0.9969	584	D	4.4211	0.9969	584	D	0	1
04	1	38	5.8026	1.9985	600	D	5.8026	1.9985	600	D	0	1
04	2	0	-5.2748	2.0183	400	N	-5.2748	2.0183	400	N	0	1
04	2	1	-3.8333	1.0362	446	N	-3.8333	1.0362	446	N	0	1
04	2	2	-3.0664	0.7576	459	N	-3.0664	0.7576	459	N	0	1
04	2	3	-2.5869	0.6383	467	N	-2.5869	0.6383	467	N	0	1
04	2	4	-2.2249	0.5695	473	N	-2.2249	0.5695	473	N	0	1

04	2	5	-1.9273	0.5241	478	N	-1.9273	0.5241	478	N	0	1
04	2	6	-1.6702	0.4915	482	N	-1.6702	0.4915	482	N	0	1
04	2	7	-1.4409	0.4671	486	N	-1.4409	0.4671	486	N	0	1
04	2	8	-1.2318	0.4481	489	N	-1.2318	0.4481	489	N	0	1
04	2	9	-1.038	0.433	493	N	-1.038	0.433	493	N	0	1
04	2	10	-0.856	0.4207	496	A	-0.856	0.4207	496	A	0	1
04	2	11	-0.6833	0.4107	499	A	-0.6833	0.4107	499	A	0	1
04	2	12	-0.518	0.4025	501	A	-0.518	0.4025	501	A	0	1
04	2	13	-0.3588	0.3958	504	A	-0.3588	0.3958	504	A	0	1
04	2	14	-0.2043	0.3904	507	A	-0.2043	0.3904	507	A	0	1
04	2	15	-0.0537	0.386	509	A	-0.0537	0.386	509	A	0	1
04	2	16	0.0939	0.3826	512	A	0.0939	0.3826	512	A	0	1
04	2	17	0.2393	0.3802	514	A	0.2393	0.3802	514	A	0	1
04	2	18	0.3832	0.3787	516	P	0.3832	0.3787	516	P	0	1
04	2	19	0.5264	0.3782	519	P	0.5264	0.3782	519	P	0	1
04	2	20	0.6695	0.3787	521	P	0.6695	0.3787	521	P	0	1
04	2	21	0.8135	0.3802	524	P	0.8135	0.3802	524	P	0	1
04	2	22	0.9589	0.3827	526	P	0.9589	0.3827	526	P	0	1
04	2	23	1.1067	0.3863	528	P	1.1067	0.3863	528	P	0	1
04	2	24	1.2576	0.3907	531	D	1.2576	0.3907	531	D	0	1
04	2	25	1.4123	0.396	534	D	1.4123	0.396	534	D	0	1
04	2	26	1.5715	0.402	536	D	1.5715	0.402	536	D	0	1
04	2	27	1.7358	0.4089	539	D	1.7358	0.4089	539	D	0	1
04	2	28	1.9062	0.4169	542	D	1.9062	0.4169	542	D	0	1
04	2	29	2.0839	0.4268	545	D	2.0839	0.4268	545	D	0	1
04	2	30	2.2714	0.44	548	D	2.2714	0.44	548	D	0	1
04	2	31	2.473	0.4589	551	D	2.473	0.4589	551	D	0	1
04	2	32	2.6959	0.4871	555	D	2.6959	0.4871	555	D	0	1
04	2	33	2.9535	0.531	559	D	2.9535	0.531	559	D	0	1
04	2	34	3.2717	0.6028	565	D	3.2717	0.6028	565	D	0	1
04	2	35	3.7095	0.7326	572	D	3.7095	0.7326	572	D	0	1
04	2	36	4.4499	1.0307	584	D	4.4499	1.0307	584	D	0	1
04	2	37	5.8966	2.0253	600	D	5.8966	2.0253	600	D	0	1
04	3	0	-5.1267	2.0239	400	N	-5.1267	2.0239	400	N	0	1
04	3	1	-3.6708	1.0438	449	N	-3.6708	1.0438	449	N	0	1
04	3	2	-2.8917	0.7633	462	N	-2.8917	0.7633	462	N	0	1
04	3	3	-2.4061	0.6412	470	N	-2.4061	0.6412	470	N	0	1
04	3	4	-2.0423	0.5698	476	N	-2.0423	0.5698	476	N	0	1
04	3	5	-1.7456	0.5221	481	N	-1.7456	0.5221	481	N	0	1
04	3	6	-1.4913	0.488	485	N	-1.4913	0.488	485	N	0	1
04	3	7	-1.266	0.4625	489	N	-1.266	0.4625	489	N	0	1
04	3	8	-1.0614	0.4429	492	N	-1.0614	0.4429	492	N	0	1
04	3	9	-0.8722	0.4275	495	A	-0.8722	0.4275	495	A	0	1
04	3	10	-0.6948	0.4154	498	A	-0.6948	0.4154	498	A	0	1
04	3	11	-0.5264	0.4058	501	A	-0.5264	0.4058	501	A	0	1
04	3	12	-0.365	0.3982	504	A	-0.365	0.3982	504	A	0	1
04	3	13	-0.2088	0.3924	507	A	-0.2088	0.3924	507	A	0	1
04	3	14	-0.0566	0.3881	509	A	-0.0566	0.3881	509	A	0	1
04	3	15	0.0928	0.385	512	A	0.0928	0.385	512	A	0	1
04	3	16	0.2402	0.3831	514	A	0.2402	0.3831	514	A	0	1

04	3	17	0.3865	0.3821	516	P	0.3865	0.3821	516	P	0	1
04	3	18	0.5324	0.3819	519	P	0.5324	0.3819	519	P	0	1
04	3	19	0.6784	0.3825	521	P	0.6784	0.3825	521	P	0	1
04	3	20	0.825	0.3835	524	P	0.825	0.3835	524	P	0	1
04	3	21	0.9726	0.3848	526	P	0.9726	0.3848	526	P	0	1
04	3	22	1.1213	0.3863	529	P	1.1213	0.3863	529	P	0	1
04	3	23	1.2711	0.3878	531	D	1.2711	0.3878	531	D	0	1
04	3	24	1.422	0.3893	534	D	1.422	0.3893	534	D	0	1
04	3	25	1.5743	0.3911	536	D	1.5743	0.3911	536	D	0	1
04	3	26	1.7282	0.3938	539	D	1.7282	0.3938	539	D	0	1
04	3	27	1.885	0.3985	541	D	1.885	0.3985	541	D	0	1
04	3	28	2.0466	0.4063	544	D	2.0466	0.4063	544	D	0	1
04	3	29	2.2166	0.4191	547	D	2.2166	0.4191	547	D	0	1
04	3	30	2.4001	0.4391	550	D	2.4001	0.4391	550	D	0	1
04	3	31	2.6056	0.4694	553	D	2.6056	0.4694	553	D	0	1
04	3	32	2.8465	0.5153	557	D	2.8465	0.5153	557	D	0	1
04	3	33	3.1478	0.5874	562	D	3.1478	0.5874	562	D	0	1
04	3	34	3.5633	0.713	569	D	3.5633	0.713	569	D	0	1
04	3	35	4.2629	1.0021	581	D	4.2629	1.0021	581	D	0	1
04	3	36	5.6507	1.9998	600	D	5.6507	1.9998	600	D	0	1
04	4	0	-5.1601	2.0141	400	N	-5.1601	2.0141	400	N	0	1
04	4	1	-3.7312	1.0281	448	N	-3.7312	1.0281	448	N	0	1
04	4	2	-2.981	0.7465	460	N	-2.981	0.7465	460	N	0	1
04	4	3	-2.518	0.6253	468	N	-2.518	0.6253	468	N	0	1
04	4	4	-2.1725	0.5551	474	N	-2.1725	0.5551	474	N	0	1
04	4	5	-1.891	0.5085	478	N	-1.891	0.5085	478	N	0	1
04	4	6	-1.6499	0.4751	482	N	-1.6499	0.4751	482	N	0	1
04	4	7	-1.4363	0.4501	486	N	-1.4363	0.4501	486	N	0	1
04	4	8	-1.2428	0.4305	489	N	-1.2428	0.4305	489	N	0	1
04	4	9	-1.0642	0.415	492	N	-1.0642	0.415	492	N	0	1
04	4	10	-0.8974	0.4024	495	A	-0.8974	0.4024	495	A	0	1
04	4	11	-0.7396	0.3921	498	A	-0.7396	0.3921	498	A	0	1
04	4	12	-0.5893	0.3836	500	A	-0.5893	0.3836	500	A	0	1
04	4	13	-0.4449	0.3766	503	A	-0.4449	0.3766	503	A	0	1
04	4	14	-0.3053	0.3708	505	A	-0.3053	0.3708	505	A	0	1
04	4	15	-0.1697	0.366	507	A	-0.1697	0.366	507	A	0	1
04	4	16	-0.0372	0.3621	509	A	-0.0372	0.3621	509	A	0	1
04	4	17	0.0927	0.359	512	A	0.0927	0.359	512	A	0	1
04	4	18	0.2207	0.3566	514	A	0.2207	0.3566	514	A	0	1
04	4	19	0.3472	0.3549	516	P	0.3472	0.3549	516	P	0	1
04	4	20	0.4728	0.3539	518	P	0.4728	0.3539	518	P	0	1
04	4	21	0.5979	0.3536	520	P	0.5979	0.3536	520	P	0	1
04	4	22	0.723	0.3538	522	P	0.723	0.3538	522	P	0	1
04	4	23	0.8484	0.3547	524	P	0.8484	0.3547	524	P	0	1
04	4	24	0.9747	0.3561	526	P	0.9747	0.3561	526	P	0	1
04	4	25	1.1023	0.3582	528	P	1.1023	0.3582	528	P	0	1
04	4	26	1.2315	0.3609	531	D	1.2315	0.3609	531	D	0	1
04	4	27	1.3629	0.3642	533	D	1.3629	0.3642	533	D	0	1
04	4	28	1.497	0.3683	535	D	1.497	0.3683	535	D	0	1
04	4	29	1.6345	0.3732	537	D	1.6345	0.3732	537	D	0	1

04	4	30	1.776	0.3793	540	D	1.776	0.3793	540	D	0	1
04	4	31	1.9226	0.3868	542	D	1.9226	0.3868	542	D	0	1
04	4	32	2.0758	0.3963	545	D	2.0758	0.3963	545	D	0	1
04	4	33	2.2375	0.4086	547	D	2.2375	0.4086	547	D	0	1
04	4	34	2.4109	0.4249	550	D	2.4109	0.4249	550	D	0	1
04	4	35	2.6005	0.4471	553	D	2.6005	0.4471	553	D	0	1
04	4	36	2.8137	0.478	557	D	2.8137	0.478	557	D	0	1
04	4	37	3.0629	0.5231	561	D	3.0629	0.5231	561	D	0	1
04	4	38	3.3718	0.5933	566	D	3.3718	0.5933	566	D	0	1
04	4	39	3.7936	0.7169	573	D	3.7936	0.7169	573	D	0	1
04	4	40	4.4986	1.0049	585	D	4.4986	1.0049	585	D	0	1
04	4	41	5.8913	2.0019	600	D	5.8913	2.0019	600	D	0	1