

Grading Multiple Choice Exams at the DPECS

Test Committee

Grading procedure

To calculate the grades from the scores of a multiple choices test, the DPECS uses a single linear interpolation between the point of the pass-fail criterion, P_1 , and the highest possible grade, P_2 . The smallest passing score has to fulfil the criterion of at least 55% knowledge, that is, 55% correct questions after guessing correction.

For example, if we have $n = \mathbf{40 \text{ questions with 4 choices}}$, the guessing correction is $c_g = 40/4 = 10$. With a knowledge criterion $k_p = .55$ and a passing grade $g_p = 5.5$, the passing score s_p (“exact caesura”) is :

$$s_p = k_p(n - c_g) + c_g = .55(40 - 10) + 10 = 26.5$$

Thus, if the highest possible grade is $g_h = 10$, the interpolation uses the following two points:

$$P_1 = (s_p, g_p) = (26.5, 5.5)$$

$$P_2 = (n, g_h) = (40, 10)$$

Find below the grading procedure of multiple choice exam often used at the DPECS.

MC exam with 40 questions and 4 choices

Formular:

$$grade = \begin{cases} -3.333 + 0.333 \cdot score & \text{if } score > 13 \\ 1 & \text{if } score \leq 13 \end{cases}$$

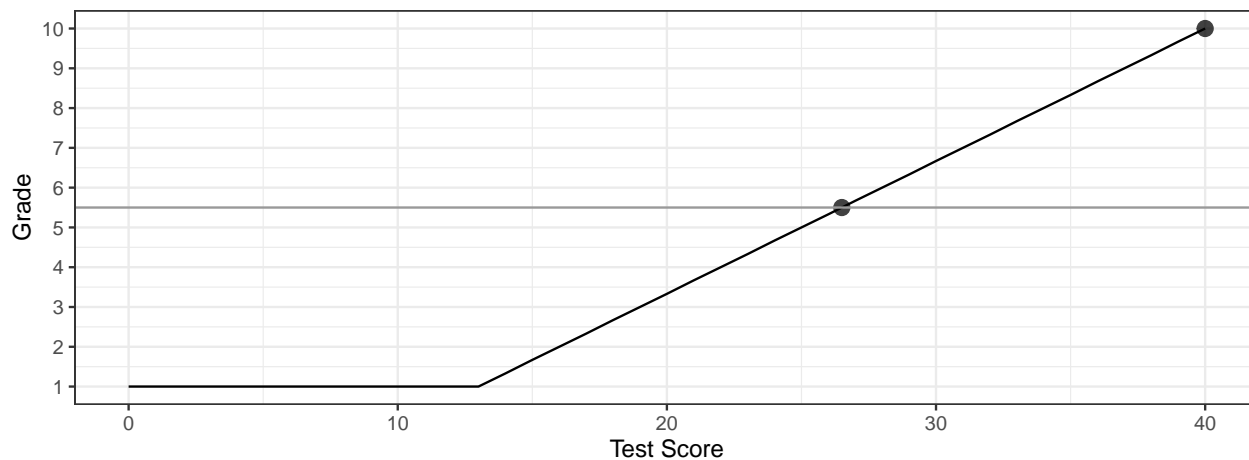


Table 1: Grading table

Score1	Grade1	Score2	Grade2
1	1.0	21	3.7
2	1.0	22	4.0
3	1.0	23	4.3
4	1.0	24	4.7
5	1.0	25	5.0
6	1.0	26	5.3
7	1.0	27	5.7
8	1.0	28	6.0
9	1.0	29	6.3
10	1.0	30	6.7
11	1.0	31	7.0
12	1.0	32	7.3
13	1.0	33	7.7
14	1.3	34	8.0
15	1.7	35	8.3
16	2.0	36	8.7
17	2.3	37	9.0
18	2.7	38	9.3
19	3.0	39	9.7
20	3.3	40	10.0

MC exam with 50 questions and 3 choices

Formular:

$$grade = \begin{cases} -5 + 0.3 \cdot score & \text{if } score > 20 \\ 1 & \text{if } score \leq 20 \end{cases}$$

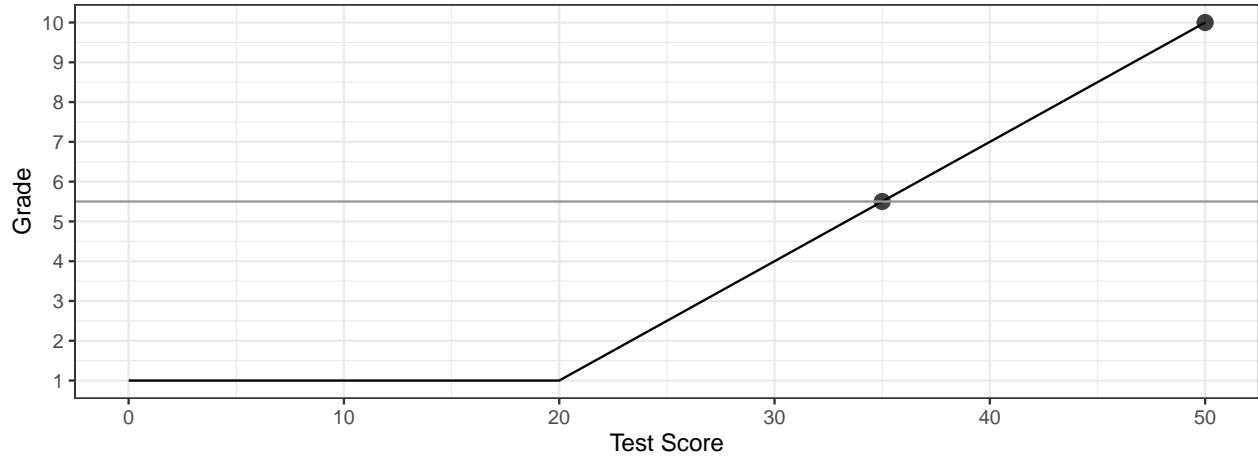


Table 2: Grading table

Score1	Grade1	Score2	Grade2	Score3	Grade3
1	1	21	1.3	41	7.3
2	1	22	1.6	42	7.6
3	1	23	1.9	43	7.9
4	1	24	2.2	44	8.2
5	1	25	2.5	45	8.5
6	1	26	2.8	46	8.8
7	1	27	3.1	47	9.1
8	1	28	3.4	48	9.4
9	1	29	3.7	49	9.7
10	1	30	4.0	50	10.0
11	1	31	4.3	NA	NA
12	1	32	4.6	NA	NA
13	1	33	4.9	NA	NA
14	1	34	5.2	NA	NA
15	1	35	5.5	NA	NA
16	1	36	5.8	NA	NA
17	1	37	6.1	NA	NA
18	1	38	6.4	NA	NA
19	1	39	6.7	NA	NA
20	1	40	7.0	NA	NA

MC exam with 50 questions and 4 choices

Formular:

$$grade = \begin{cases} -3.333 + 0.267 \cdot score & \text{if } score > 16.25 \\ 1 & \text{if } score \leq 16.25 \end{cases}$$

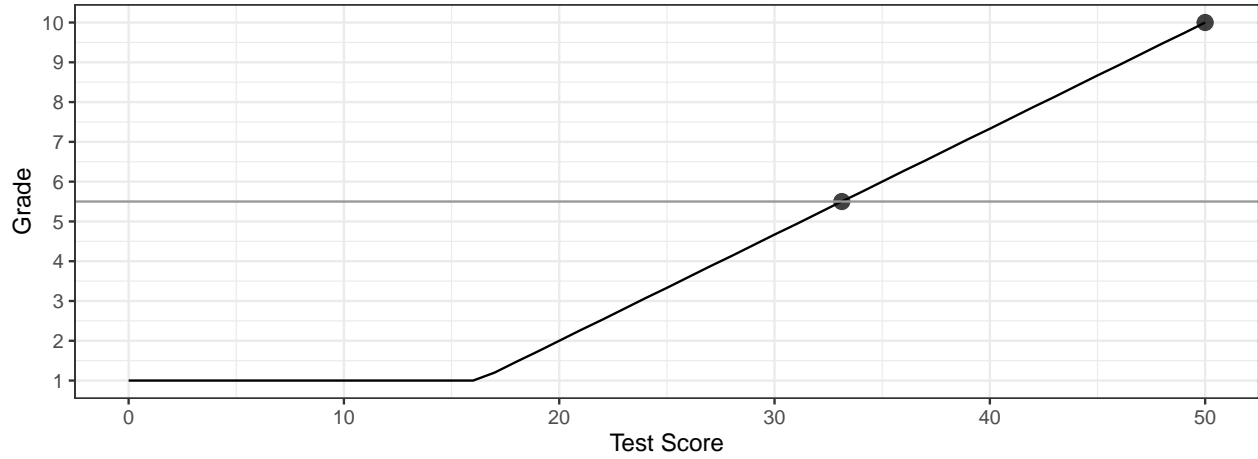


Table 3: Grading table

Score1	Grade1	Score2	Grade2	Score3	Grade3
1	1.0	21	2.3	41	7.6
2	1.0	22	2.5	42	7.9
3	1.0	23	2.8	43	8.1
4	1.0	24	3.1	44	8.4
5	1.0	25	3.3	45	8.7
6	1.0	26	3.6	46	8.9
7	1.0	27	3.9	47	9.2
8	1.0	28	4.1	48	9.5
9	1.0	29	4.4	49	9.7
10	1.0	30	4.7	50	10.0
11	1.0	31	4.9	NA	NA
12	1.0	32	5.2	NA	NA
13	1.0	33	5.5	NA	NA
14	1.0	34	5.7	NA	NA
15	1.0	35	6.0	NA	NA
16	1.0	36	6.3	NA	NA
17	1.2	37	6.5	NA	NA
18	1.5	38	6.8	NA	NA
19	1.7	39	7.1	NA	NA
20	2.0	40	7.3	NA	NA

MC exam with 60 questions and 3 choices

Formular:

$$grade = \begin{cases} -5 + 0.25 \cdot score & \text{if } score > 24 \\ 1 & \text{if } score \leq 24 \end{cases}$$

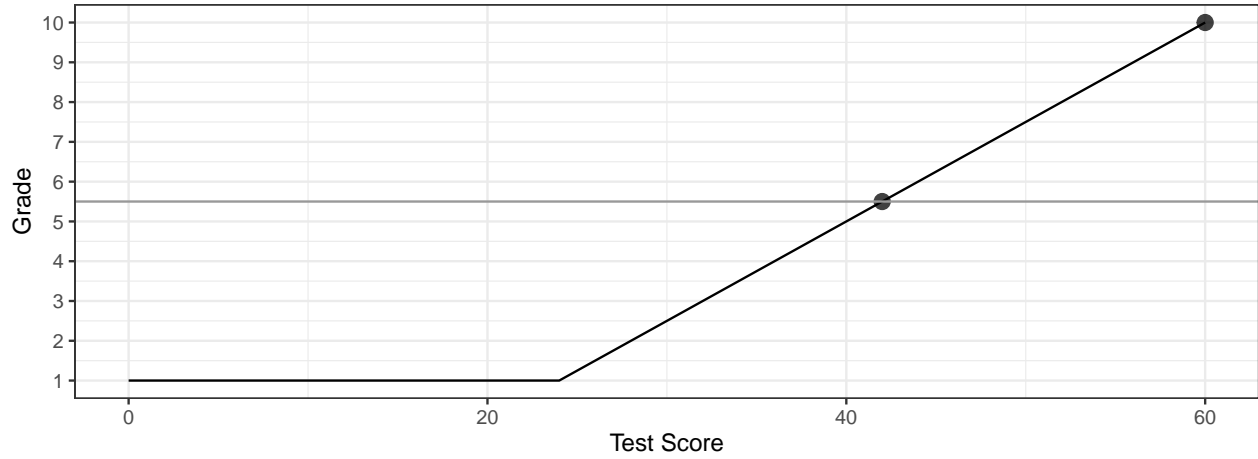


Table 4: Grading table

Score1	Grade1	Score2	Grade2	Score3	Grade3
1	1	21	1.0	41	5.2
2	1	22	1.0	42	5.5
3	1	23	1.0	43	5.8
4	1	24	1.0	44	6.0
5	1	25	1.2	45	6.2
6	1	26	1.5	46	6.5
7	1	27	1.8	47	6.8
8	1	28	2.0	48	7.0
9	1	29	2.2	49	7.2
10	1	30	2.5	50	7.5
11	1	31	2.8	51	7.8
12	1	32	3.0	52	8.0
13	1	33	3.2	53	8.2
14	1	34	3.5	54	8.5
15	1	35	3.8	55	8.8
16	1	36	4.0	56	9.0
17	1	37	4.2	57	9.2
18	1	38	4.5	58	9.5
19	1	39	4.8	59	9.8
20	1	40	5.0	60	10.0

MC exam with 80 questions and 2 choices

Formular:

$$grade = \begin{cases} -10 + 0.25 \cdot score & \text{if } score > 44 \\ 1 & \text{if } score \leq 44 \end{cases}$$

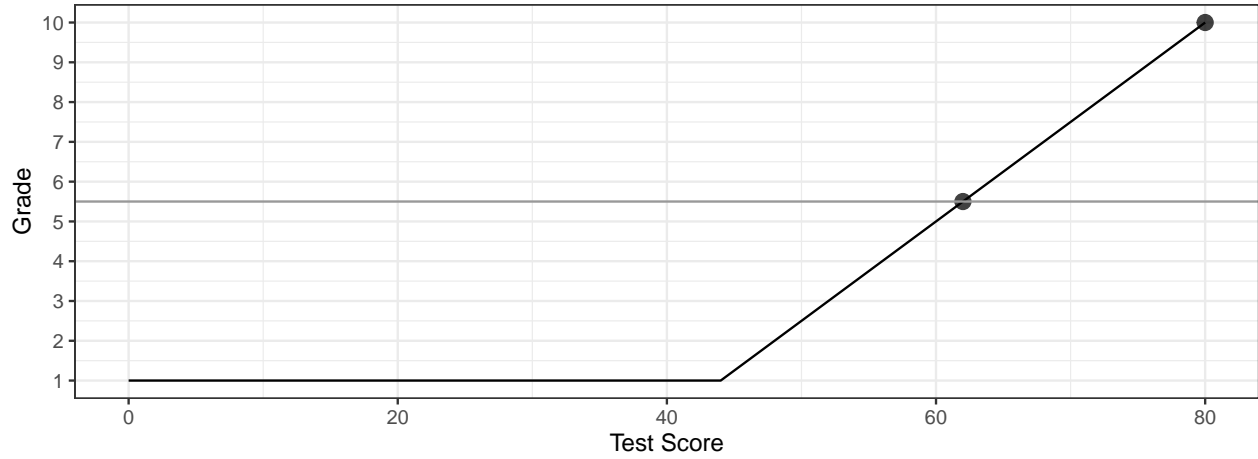


Table 5: Grading table

Score1	Grade1	Score2	Grade2	Score3	Grade3	Score4	Grade4
1	1	21	1	41	1.0	61	5.2
2	1	22	1	42	1.0	62	5.5
3	1	23	1	43	1.0	63	5.8
4	1	24	1	44	1.0	64	6.0
5	1	25	1	45	1.2	65	6.2
6	1	26	1	46	1.5	66	6.5
7	1	27	1	47	1.8	67	6.8
8	1	28	1	48	2.0	68	7.0
9	1	29	1	49	2.2	69	7.2
10	1	30	1	50	2.5	70	7.5
11	1	31	1	51	2.8	71	7.8
12	1	32	1	52	3.0	72	8.0
13	1	33	1	53	3.2	73	8.2
14	1	34	1	54	3.5	74	8.5
15	1	35	1	55	3.8	75	8.8
16	1	36	1	56	4.0	76	9.0
17	1	37	1	57	4.2	77	9.2
18	1	38	1	58	4.5	78	9.5
19	1	39	1	59	4.8	79	9.8
20	1	40	1	60	5.0	80	10.0

MC exam with 90 questions and 2 choices

Formular:

$$grade = \begin{cases} -10 + 0.222 \cdot score & \text{if } score > 49.5 \\ 1 & \text{if } score \leq 49.5 \end{cases}$$

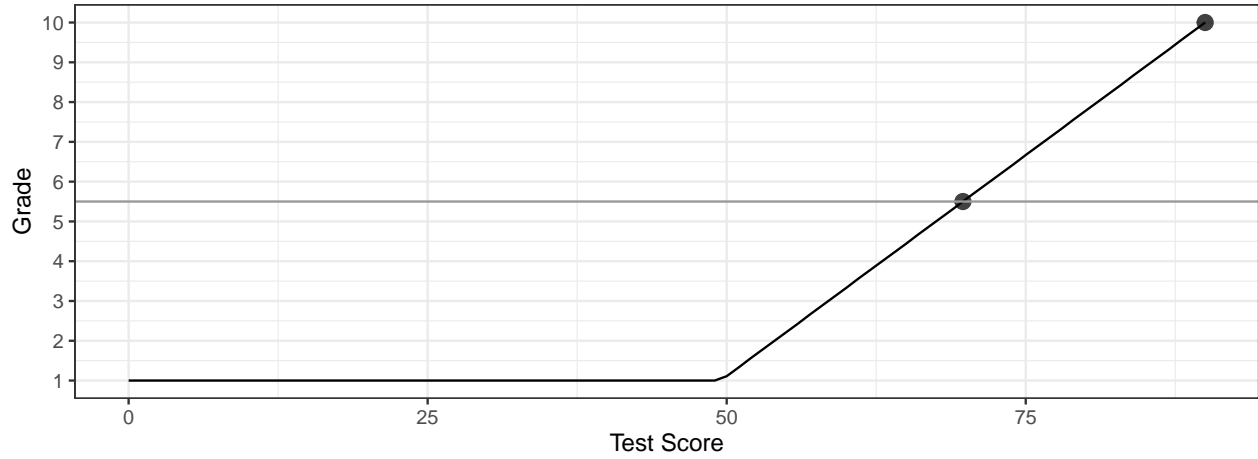


Table 6: Grading table

Score1	Grade1	Score2	Grade2	Score3	Grade3	Score4	Grade4	Score5	Grade5
1	1	21	1	41	1.0	61	3.6	81	8.0
2	1	22	1	42	1.0	62	3.8	82	8.2
3	1	23	1	43	1.0	63	4.0	83	8.4
4	1	24	1	44	1.0	64	4.2	84	8.7
5	1	25	1	45	1.0	65	4.4	85	8.9
6	1	26	1	46	1.0	66	4.7	86	9.1
7	1	27	1	47	1.0	67	4.9	87	9.3
8	1	28	1	48	1.0	68	5.1	88	9.6
9	1	29	1	49	1.0	69	5.3	89	9.8
10	1	30	1	50	1.1	70	5.6	90	10.0
11	1	31	1	51	1.3	71	5.8	NA	NA
12	1	32	1	52	1.6	72	6.0	NA	NA
13	1	33	1	53	1.8	73	6.2	NA	NA
14	1	34	1	54	2.0	74	6.4	NA	NA
15	1	35	1	55	2.2	75	6.7	NA	NA
16	1	36	1	56	2.4	76	6.9	NA	NA
17	1	37	1	57	2.7	77	7.1	NA	NA
18	1	38	1	58	2.9	78	7.3	NA	NA
19	1	39	1	59	3.1	79	7.6	NA	NA
20	1	40	1	60	3.3	80	7.8	NA	NA