

Appendix

Mathematics Proficiency Levels – Descriptions of Principal Process Skills for Full Item Set

Level 5 - Advanced Level of Mathematics Achievement				
Strand	Skill	Ref	Principal Process Skill	Logit
NUM	A&PS	B22	Solve non-routine problem involving use of fraction concepts and operations	1.98
MEAS	I&C	A21	Connect decimal and fraction notation in comparing capacities of containers	1.94
DATA	IMP	C16	Read values on a line graph	1.77
DATA	REA	C15	Interpret and analyse data in a line graph	1.57
ALG	REA	F16	Identify and extend patterns and relationships in number	1.50
NUM	REA	F15	Make hypotheses and test them for correctness (mixed operations sentence)	1.48
MEAS	A&PS	C23	Solve non-routine problem involving measure concepts and fraction operations	1.28
MEAS	A&PS	E20	Solve routine problem involving measure concepts and fraction operations	1.28
S&S	U&R	E17	Recall definition of property of lines and angles	1.24
MEAS	A&PS	C21	Solve routine problem involving subtraction of times	1.23
NUM	IMP	E13	Implement procedure for estimating quotients	1.21
MEAS	A&PS	F21	Select appropriate operation for solving routine problem on time	1.16
MEAS	A&PS	F23	Apply concepts of ratio and proportion in shopping problem	1.16
NUM	IMP	D18	Implement procedure for estimating sums	1.07

Level 4 – High Level of Mathematics Achievement				
Strand	Skill	Ref	Principal Process Skill	Logit
NUM	A&PS	C06	Solve routine problem involving fraction concepts and operations	1.02
S&S	REA	A25	Make informal deductions about 2-D shapes	1.01
MEAS	A&PS	F17	Solve non-routine problem involving measure concepts and operations	1.01
MEAS	A&PS	F20	Solve non-routine problem involving measure concepts and operations	0.99
MEAS	A&PS	B25	Solve routine problem involving fraction and length concepts	0.94
S&S	U&R	D14	Recall and use definition of perpendicular lines	0.94
NUM	A&PS	F04	Solve routine problem involving multiplication of times	0.94
MEAS	A&PS	F19	Solve non-routine problem involving operations with weight measures	0.90
DATA	REA	D20	Systematically list options in a roadmap context	0.87
S&S	REA	E25	Make informal deductions about properties of 2-D shapes	0.86
NUM	REA	F05	Make hypotheses and test them for correctness (multiplication sentence)	0.84
MEAS	A&PS	C10	Analyse a timetable to solve a problem	0.82
DATA	A&PS	E11	Solve a routine problem using data from a line graph	0.82
MEAS	A&PS	E18	Solve routine problem involving subtraction of weights	0.79

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NUM	A&PS	C19	Solve routine problem involving division of whole numbers	0.77
MEAS	A&PS	A22	Solve non-routine word problem involving measures of time	0.76
S&S	REA	C24	Visualise properties of 3-D shapes from 2-D diagrams	0.76
NUM	U&R	E22	Identify fraction of area of regular shape	0.75
ALG	U&R	C22	Recall meaning of < symbol	0.73
MEAS	A&PS	B19	Apply concept of scale to map-reading	0.67
S&S	REA	D16	Recall and use definition of a right angle	0.65
ALG	REA	E19	Complete number sentence involving distributive property	0.65
NUM	REA	E21	Identify a fraction between two fractions	0.65
MEAS	A&PS	E24	Solve routine problem involving calculation of perimeter	0.65
NUM	IMP	A09	Implement procedure for long multiplication	0.62
S&S	U&R	D21	Recall and use definition of a right angle	0.61
S&S	REA	C25	Partition 2-D shape using area concept of fraction	0.60
MEAS	IMP	D15	Add measures of length	0.60
NUM	U&R	A20	Identify example of a fraction	0.57
S&S	U&R	A24	Identify angle types in a 2-D shape	0.57
NUM	IMP	E23	Round whole numbers to nearest hundred	0.56
NUM	IMP	A19	Round four-digit whole numbers	0.55
NUM	REA	D17	Identify missing information in a problem	0.55
MEAS	A&PS	D22	Solve routine problem involving multiplication of whole numbers	0.55
S&S	REA	B11	Visualise properties of 3-D shapes from 2-D nets	0.53
S&S	U&R	B24	Recall and use definition of parallel lines	0.53
NUM	IMP	C20	Calculate a fraction of a number	0.51
NUM	IMP	F08	Make hypotheses and test them for correctness (division sentence)	0.51
ALG	I&C	A23	Connect verbal and symbolic representations of a word problem on operations	0.50
NUM	U&R	C08	Identify place value in decimals	0.50
ALG	REA	D24	Complete number sentence involving associative property	0.46
NUM	REA	F10	Test answers for correctness in mixed operations sentences	0.46
MEAS	A&PS	F25*	Solve routine problem involving division of whole numbers	0.45
DATA	A&PS	F12	Analyse a table of data to solve a routine problem	0.44
NUM	U&R	B18	Convert a fraction to decimal	0.43
NUM	A&PS	B07	Solve routine word problem on fractions	0.42
NUM	I&C	B17	Connect verbal and symbolic representations of estimation procedure	0.41
MEAS	A&PS	C11	Read a timetable to solve a routine problem	0.41
MEAS	A&PS	F18	Calculate perimeter of rectangular area in problem context	0.41
MEAS	IMP	A14	Convert measures of time	0.39
MEAS	A&PS	C13	Solve routine problem involving subtraction of weights	0.35

Strand	Skill	Ref	Principal Process Skill Level 3 – Moderate Level of Mathematics Achievement	Logit
MEAS	IMP	B23	Calculate difference in lengths of two objects	0.33
NUM	A&PS	C17	Solve routine problem involving multiplication of capacities	0.32
NUM	REA	F09	Make hypotheses and test them for correctness (mixed operations sentence)	0.30
MEAS	U&R	B16	Select appropriate unit of weight	0.28
MEAS	A&PS	E16	Solve routine problem involving subtraction of lengths	0.27
NUM	REA	F07	Test answers for correctness in division situation	0.27
NUM	U&R	D12	Identify fractional area of regular 2-D shape	0.24
S&S	U&R	A10	Identify example of angle type	0.22
MEAS	A&PS	F22	Solve routine problem involving operations with money	0.20
NUM	A&PS	A15	Apply Unitary Method in everyday context	0.18
NUM	I&C	B13	Connect verbal and symbolic representations of a word problem on ratio	0.18
S&S	U&R	C18	Recall and use definition of line symmetry	0.18
S&S	U&R	D25	Recall and use definition of line symmetry	0.18
MEAS	I&C	B20	Connect verbal, diagrammatic and symbolic representations of perimeter	0.16
NUM	IMP	C04	Divide a decimal by a whole number	0.16
NUM	REAS	D03	Complete number sentence involving distributive property	0.16
NUM	IMP	C07	Estimate products of whole numbers	0.15
MEAS	A&PS	D08	Solve non-routine problem involving money operations	0.11
NUM	REA	E07	Order fractions in terms of magnitude	0.05
MEAS	A&PS	A12	Solve routine word problem involving subtraction of lengths	0.04
MEAS	IMP	D23	Convert measures time	0.04
ALG	I&C	B14	Connect verbal and symbolic representations of a word problem on operations	0.03
NUM	A&PS	B10	Solve non-routine problem involving whole number operations	0.02
NUM	IMP	E02	Implement procedure for division of whole numbers	-0.01
MEAS	A&PS	E15	Solve routine problem involving subtraction of times	-0.02
MEAS	A&PS	E14	Solve routine problem involving subtraction of times	-0.04
NUM	REA	F06	Make hypotheses and test them for correctness (multiplication sentence)	-0.04
MEAS	A&PS	C14	Solve non-routine problem involving systematic listing of possible routes(map)	-0.08
NUM	IMP	D02	Round four-digit numbers	-0.10
DATA	U&R	D10	Order simple events in terms of likelihood of occurrence	-0.11
NUM	A&PS	D07	Solve routine problem involving fractions	-0.13
NUM	REA	F02	Reason systematically about multi-digit numbers in column addition	-0.17
NUM	A&PS	D11	Solve non-routine problem involving division of whole numbers	-0.18
DATA	A&PS	F14	Analyse a table of data to solve a routine problem	-0.19
MEAS	A&PS	D19	Solve routine problem involving subtraction of capacities	-0.20
NUM	REA	E05	Identify and extend decimal number pattern	-0.21
NUM	A&PS	A08	Solve word routine problem involving fraction concept	-0.22

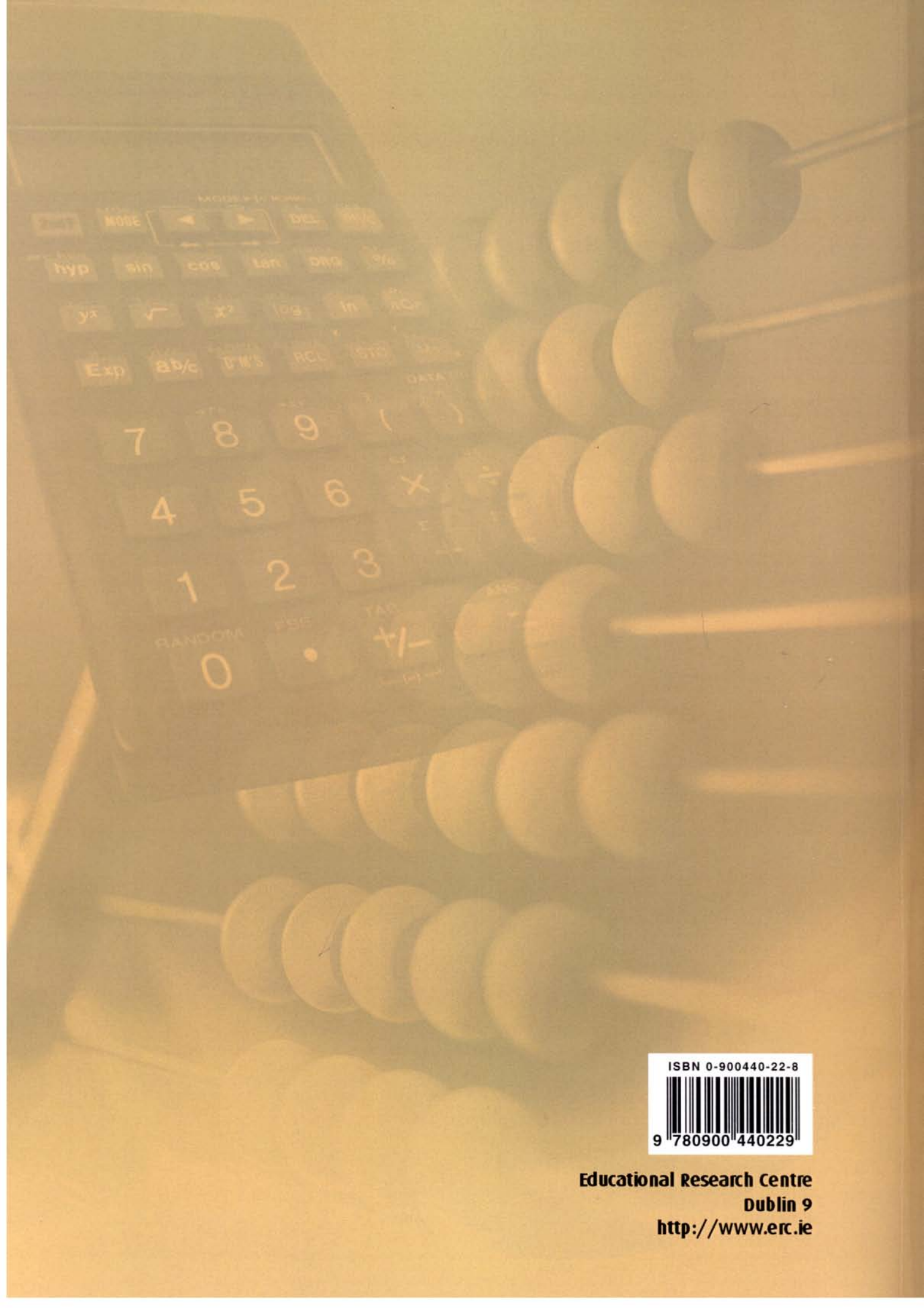
Strand	Skill	Ref	Principal Process Skill	Logit
Level 2 - Basic Level of Mathematics Achievement				
MEAS	IMP	A17	Calculate area of regular shape using a grid	-0.27
MEAS	A&PS	A16	Apply Unitary Method in everyday context	-0.29
MEAS	I&C	C09	Connect diagrammatic and verbal representations of weight problem	-0.29
DATA	A&PS	F11	Analyse a table of data to solve a non-routine problem	-0.29
S&S	U&R	A18	Visualise properties of 3-D shape	-0.32
MEAS	A&PS	D13	Solve routine problem involving addition of whole numbers	-0.34
S&S	U&R	B12	Identify properties of 2-D shapes	-0.36
DATA	A&PS	F13	Analyse a table of data to solve a non-routine problem	-0.37
MEAS	A&PS	A11	Solve non-routine word problem involving money operations	-0.38
NUM	IMP	A13	Count even numbers in a specified range	-0.38
NUM	IMP	D04	Identify place value in decimals	-0.40
NUM	REA	D05	Reason with notation of decimals	-0.40
S&S	REA	D09	Visualise properties of 3-D shapes from 2-D diagrams	-0.54
MEAS	A&PS	A06	Solve routine word problem involving measures of time	-0.55
NUM	IMP	B03	Implement short multiplication procedure	-0.56
NUM	REA	C12	Reason with notation of four-digit numbers	-0.58
NUM	IMP	E01	Implement procedure for column addition	-0.58
MEAS	U&R	A07	Select appropriate unit of length	-0.59
S&S	REA	E09	Visualise properties of 3-D shapes from 2-D diagrams	-0.62
NUM	IMP	D01	Implement procedure for multi-digit subtraction	-0.67
DATA	IMP	E10	Read values from a line graph	-0.75
MEAS	A&PS	A02	Solve routine word problem on addition and subtraction of money	-0.77
MEAS	IMP	C05	Solve routine problem involving addition of lengths	-0.78
MEAS	U&R	E03	Read time from a clock	-0.81
S&S	REA	E04	Analyse a table classifying shapes by four properties	-0.84
DATA	REA	B06	Make informal deductions about graphical data	-0.89
NUM	REA	B21	Identify decimal between two decimals	-0.93

Strand	Skill	Ref	Principal Process Skill	Logit
Level 1 - Minimum Level of Mathematics Achievement				
NUM	A&PS	A05	Solve routine word problem involving use of a division fact	-1.00
MEAS	A&PS	E08	Solve routine problem involving calculation with a calendar	-1.01
S&S	U&R	E12	Recall and use definition of line symmetry	-1.08
NUM	U&R	B08	Identify place value in four-digit numbers	-1.09
NUM	IMP	C01	Implement short multiplication procedure	-1.13
NUM	U&R	C02	Read points on a decimal scale	-1.18
NUM	U&R	A01	Recall basic multiplication/division fact	-1.23
DATA	IMP	B04	Read and interpret tabular data	-1.23
MEAS	A&PS	D06	Analyse a diagram to solve a problem on area	-1.28
ALG	REA	B05	Identify and extend a number pattern	-1.31
DATA	U&R	B15	Order events in terms of likelihood of occurrence	-1.32

NUM	A&PS	F03	Solve routine problem involving multi-digit subtraction	-1.32
MEAS	IMP	B01	Select procedure to solve a problem	-1.38
MEAS	U&R	E06	Select appropriate unit for measuring capacity	-1.50
DATA	A&PS	A04	Solve routine word problem on concept of chance	-1.58
S&S	REA	B09	Make informal deductions about 2-D shapes	-1.59
NUM	IMP	F01	Implement procedure for column addition	-1.67
S&S	REA	C03	Partition a 2-D shape into a set of specified shapes	-1.70
DATA	IMP	A03	Draw a simple line graph	-1.81
DATA	IMP	B02	Read and interpret a bar chart	-1.86
MEAS	A&PS	F24*	Solve routine problem involving operations with fractions	

* This item was not scalable, as it had a negative biserial value.

ALG = Algebra; NUM = Number; S&S = Shape and Space; MEAS = Measures; DATA = Data; A&PS = Apply and Solve Problems; I&C = Integrate and Connect; IMP = Implement; I&CREA = Reason; U&R = Understand and Recall;



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Educational Research Centre
Dublin 9
<http://www.erc.ie>