



SINUS - Thüringen

Steigerung der Effizienz des
mathematisch-naturwissenschaftlichen
Unterrichts

Documentation for the teaching material »Entrance test grade 5«

School:	SINUS I (1999) Lehrerkooperation
Grade:	5
Subject:	Mathematics
Authors:	2009 revised and adapted by Joachim Böttner and Jörg Triebel
Target:	The accountability of 5th grade in the subject mathematics means a multitude of questions for the colleagues regarding the students' prerequisites. This test should provide indications to the proficiency level and the professional-cognitive preconditions of the students.
Organization form/time needed:	Part I: 120 basic tasks in the number range up to 100 Time target: 8 minutes Part II: 12 tasks regarding basic knowledge up to grade 4 Time target: 1 lesson (working time: 40 minutes + 5 minutes introduction and reading time) Part III: 14 tasks with increased educational level Time target: 1 lesson (working time: 40 minutes + 5 min introduction and reading time)
Evaluation of the students' performances:	Grading of the papers is optional. If the teacher grades them, the parts should be assessed separately and the tasks should be weighed within a test part (new allocation of points). In this case, an inspection by parents (for example during the open house) should be possible. (In any case it should be evaluated and discussed with the students!)
Material Requirements:	It is recommended to copy the tests II and III on two sheets each to allow the students additional space on the back for solving the tasks. For a fast and detailed examination of the mental arithmetic tests solution templates are available.
Methodical Indications:	The test parts are realized by the students in independent activities. Before starting, it is definitely recommended to speak about the target of the testing tasks and respond to all questions and fears of the students. A healthy competition in the class can appear and serves as motivation. Before the mental arithmetic test a few training tasks can be worked on in daily exercises, because the students that did not get used to it in elementary school will fail the new methods since they cannot deal with the mathematical requirements. A student-auto-diagnosis sheet after the test parts is advisable.
Students' Materials:	Copies of the test tasks; auto-diagnosis sheet
Literature:	»Unterhaltsames Mathe-ABC«; Verlag Leipziger Volkszeitung Ideas of Johannes Lehmann: »2 mal 3 plus Spaß dabei«; Verlag Volk und Wissen

Part I

Last name:

First name:

Grade 5

120 tasks in the number range up to 100 in minutes.

8 + 7			1 · 1			9 - 2			0 + 0		
8 + 8			3 · 3			5 - 3			15 - 7		
4 · 9			7 + 0			18 : 3			49 : 7		
12 - 3			9 - 4			0 + 2			6 · 8		
45 : 5			7 · 7			9 - 3			64 : 8		
9 · 4			72 : 8			8 · 6			15 - 8		
9 + 8			1 + 8			48 : 6			9 · 7		
10 - 1			48 : 6			7 - 3			8 + 9		
0 - 0			9 - 5			4 + 5			72 : 9		
7 · 6			12 - 7			5 - 2			5 + 5		
0 + 7			7 + 5			3 + 2			3 · 3		
8 · 8			12 - 5			7 - 4			4 - 3		
7 · 8			7 + 5			3 · 2			9 - 7		
64 : 8			12 + 5			9 + 3			3 + 4		
14 - 8			42 : 7			17 - 9			8 · 7		
14 - 6			8 · 4			8 : 4			7 + 6		
8 + 6			27 : 9			6 + 3			12 : 2		
6 + 8			7 + 2			3 + 6			3 - 6		
3 · 2			2 + 0			12 : 3			6 + 7		
8 - 8			0 · 9			9 - 6			13 - 7		
7 · 9			8 + 1			9 - 3			5 + 1		
9 + 1			9 · 9			1 · 0			35 : 5		
2 - 0			18 : 2			28 : 4			17 - 3		
5 + 4			4 + 4			7 - 6			4 + 3		
6 · 9			7 · 8			4 · 8			5 · 8		
54 : 6			7 - 0			56 : 8			3 + 9		
9 · 6			7 - 7			2 + 7			2 · 4		
54 : 9			36 : 4			9 · 5			9 · 0		
7 - 1			1 : 0			6 + 6			12 - 9		
5 + 5			4 · 2			24 : 6			7 · 5		

/30 p

/30 p

/30 p

/30 p

Number of solved tasks:

Total points:

/120 p

A:

/30 p

S:

/29 p

M:

/27 p

D:

/22 p

Z:

/12 p

Part I – Assessment sheet

print on foil → cut out light green fields → correct and count

120 tasks in the number range up to 100 in minutes.

n. sol. = not solvable

8 + 7	15		1 · 1	1		9 - 2	7		0 + 0	0	
8 + 8	16		3 · 3	9		5 - 3	2		15 - 7	8	
4 · 9	36		7 + 0	7		18 : 3	6		49 : 7	7	
12 - 3	9		9 - 4	5		0 + 2	2		6 · 8	48	
45 : 5	9		7 · 7	49		9 - 3	6		64 : 8	8	
9 · 4	36		72 : 8	9		8 · 6	48		15 - 8	7	
9 + 8	17		1 + 8	9		48 : 6	8		9 · 7	63	
10 - 1	9		48 : 6	8		7 - 3	4		8 + 9	17	
0 - 0	0		9 - 5	4		4 + 5	9		72 : 9	8	
7 · 6	42		12 - 7	5		5 - 2	3		5 + 5	10	
0 + 7	7		7 + 5	12		3 + 2	5		3 · 3	9	
8 · 8	64		12 - 5	7		7 - 4	3		4 - 3	1	
7 · 8	56		7 + 5	12		3 · 2	6		9 - 7	2	
64 : 8	8		12 + 5	17		9 + 3	12		3 + 4	7	
14 - 8	6		42 : 7	6		17 - 9	8		8 · 7	56	
14 - 6	8		8 · 4	32		8 : 4	2		7 + 6	13	
8 + 6	14		27 : 9	3		6 + 3	9		12 : 2	6	
6 + 8	14		7 + 2	9		3 + 6	9		3 - 6	n. sol./-3	
3 · 2	6		2 + 0	2		12 : 3	4		6 + 7	13	
8 - 8	0		0 · 9	0		9 - 6	3		13 - 7	6	
7 · 9	63		8 + 1	9		9 - 3	6		5 + 1	6	
9 + 1	10		9 · 9	81		1 · 0	0		35 : 5	7	
2 - 0	2		18 : 2	9		28 : 4	7		17 - 3	14	
5 + 4	9		4 + 4	8		7 - 6	1		4 + 3	7	
6 · 9	54		7 · 8	56		4 · 8	32		5 · 8	40	
54 : 6	9		7 - 0	7		56 : 8	7		3 + 9	12	
9 · 6	54		7 - 7	0		2 + 7	9		2 · 4	8	
54 : 9	6		36 : 4	9		9 · 5	45		9 · 0	0	
7 - 1	6		1 : 0	n. sol.		6 + 6	12		12 - 9	3	
5 + 5	10		4 · 2	8		24 : 6	4		7 · 5	35	

/30 p	/30 p	/30 p	/30 p
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Number of solved tasks:	Total points: /120 p
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A: /30 p	S: /29 p	M: /27 p	D: /22 p	>Z: /12 p
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Part I – Assessment

An assessment can be given according to the calculation method.

Calculation method	I	II	III	IV	Total
Addition	8	7	7	8	30
Subtraction	6	5	10	8	29
Multiplication	9	7	4	7	27
Division	4	6	7	5	22
Calculation with zero	3	5	2	2	12

Part II

Last name:

First name:

Grade 5

Total points: /40 p

1. Write out the number for

eight hundred thousand fifty seven

/1 p

2. Calculate!

a) $316 + 98 =$

b) $109 - 58 =$

c) $600 \cdot 70 =$

d) $5\,600 : 700 =$

e) $4 \cdot 0 \cdot 16 =$

f) $120 : 0 =$

/6 p

3. Calculate!

a) $7 + 3 \cdot 11 =$

b) $15 - (3 + 5) =$

c) $(5 + 15) : (6 - 2) =$

e) $5 \cdot 6 - 3 \cdot 4 =$

d) $24 - 18 : 3 =$

e) $(5 + 4) \cdot 6 =$

/6 p

4. Calculate!

a) $2\,117 + 4\,935 + 504$

b) $2\,761 - 678$

c) $12\,901 - 3\,427 - 5\,658$

d) $8\,349 \cdot 35$

/5 p

4. Calculate and check the result!

$25\,677 : 9$

rough estimate

calculation

test

/3 p

Part II

Last name:	First name:	Grade 5
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6. a) Calculate the ratio of 56 and 7.
- b) Give the number to which you have to add 29 to get 71?

/2 p

- 7.** Fill in the correct numbers!

a) $650 + \dots = 910$

c) $41 - \dots\dots\dots > 39$

b) : 6 = 90

/4 p

- 8.** Convert into the specified unit.

a) 5 km = m

c) 3 h 15 min = min

b) 20 000 g = kg

/3 p

9. A truck can carry 3 tons of gravel in one ride. A building contractor orders 45 tons of gravel. How many loads are necessary?

Calculate

Answer

[illegible]

.....

.....

.....

/2 p

10. The Meyer family pays Euro 660 a month in rent for their apartment and Euro 40 for the garage. How much Euro does the family pay a total of per year?

Calculate

Answer

[illegible]

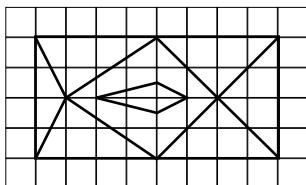
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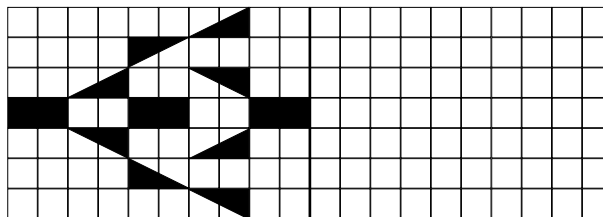
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/3 p

- 11. a)**
Draw the axis of reflection.

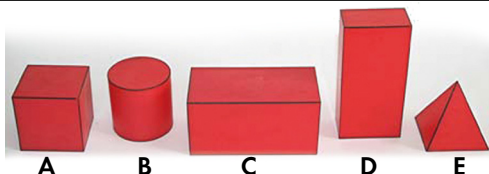


- b)**
Add to the axially symmetric shape.



/3 p

- 12.



Which of the bodies are rectangular?
Make a cross.

☐ A ☐ B ☐ C ☐ D ☐ E

/2 p

Part II – Assessment

Last name:

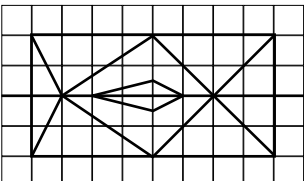
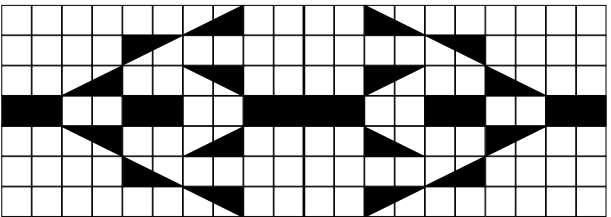

First name:

Grade 5

Total points: /40 p

<p>1. Write out the number for</p> <p>eight hundred thousand fifty seven 800 057</p>	<p>1 point for the right number notation</p> <p>/1 p</p>
<p>2. Calculate!</p> <p>a) $316 + 98 = \mathbf{414}$ b) $109 - 58 = \mathbf{51}$</p> <p>c) $600 \cdot 70 = \mathbf{42\,000}$ d) $5\,600 : 700 = \mathbf{8}$</p> <p>e) $4 \cdot 0 \cdot 16 = \mathbf{0}$ f) $120 : 0 = \mathbf{n.l.}$</p>	<p>1 point for each right result</p> <p>/6 p</p>
<p>3. Calculate!</p> <p>a) $7 + 3 \cdot 11 = \mathbf{40}$ b) $15 - (3 + 5) = \mathbf{7}$</p> <p>c) $(5 + 15) : (6 - 2) = \mathbf{5}$ e) $5 \cdot 6 - 3 \cdot 4 = \mathbf{18}$</p> <p>d) $24 - 18 : 3 = \mathbf{18}$ e) $(5 + 4) \cdot 6 = \mathbf{54}$</p>	<p>1 point for each right result</p> <p>/6 p</p>
<p>4. Calculate!</p> <p>a) $2\,117 + 4\,935 + 504$ b) $2\,761 - 678$</p> $\begin{array}{r} 2\,117 \\ + 4\,935 \\ + 504 \\ \hline 7\,556 \end{array}$ $\begin{array}{r} 2\,761 \\ - 678 \\ \hline 2\,083 \end{array}$ <p>c) $12\,901 - 3\,427 - 5\,658$ d) $8\,349 \cdot 35$</p> $\begin{array}{r} 12\,901 \\ - 3\,427 \\ - 5\,658 \\ \hline 3\,816 \end{array}$ $\begin{array}{r} 8\,349 \cdot 35 \\ \hline 25047 \\ \hline 41745 \\ \hline 292215 \end{array}$	<p>a) to c) 1 point for each right result;</p> <p>d) 2 points for the right result: 1 point for the right multiplication, 1 point for the right addition</p> <p>/5 p</p>
<p>5. Calculate and check the result!</p> <p>rough estimate calculation test</p> <p>$25\,680 : 10 = 2\,568$ $25\,677 : 9 = 2\,853$ $\frac{2853 \cdot 9}{25677}$</p> $\begin{array}{r} -18 \\ 76 \\ -72 \\ 47 \\ -45 \\ 27 \\ -27 \\ 0 \end{array}$	<p>1 point for the right result,</p> <p>1 point for a reasonable rough estimate,</p> <p>1 point for the right test</p> <p>/3 p</p>

Part II – Assessment

Last name:	First name:	Grade 5
6. a) Calculate the ratio of 56 and 7. 56 : 7 = 8 b) Give the number to which you have to add to 29 to get to 71? 71 - 29 = 42		1 point for each right solution /2 p
7. Fill in the correct numbers! a) $650 + \mathbf{260} = 910$ c) $41 - \mathbf{0}; 1 > 39$ b) $\mathbf{540} : 6 = 90$		1 point for each right solution /4 p
8. Convert into the specified unit. a) 5 km = 5000 m c) 3 h 15 min = 195 min b) 20000 g = 20 kg		1 point for each right solution /3 p
9. A truck can carry 3 tons of gravel in one ride. A building contractor orders 45 tons of gravel. How many loads are necessary? Calculate Answer 45 : 3 = 15 15 loads are necessary.		1 point for the right approach, 1 point for the right result in the answer sentence, (0 points if the approach is wrong) /2 p
10. The Meyer family pays Euro 660 a month in rent for their apartment and Euro 40 for the garage. How much Euro does the family pay a total of per year? Calculate Answer (660 + 40) · 12 = 8400 or 660 · 12 + 40 · 12 = 8400 The Family pay 8,400 Euro total per year.		1 point for two necessary sub-steps, 1 point for the right result in the answer sentence /3 p
11. a) Draw the axis of reflection.  b) Add to the axially symmetric shape. 		a) 1 point for the right drawing in of the symmetry axis, b) 1 point for realizing and continuous application of the principle, 2 points for the complete and correct solution /3 p
12.  Which of the bodies are cuboids? Make a cross. <div style="display: flex; justify-content: space-around;"><div>A <input checked="" type="checkbox"/></div><div>B <input type="checkbox"/></div><div>C <input checked="" type="checkbox"/></div><div>D <input checked="" type="checkbox"/></div><div>E <input type="checkbox"/></div></div>		1 point for C and D, 1 point for A /2 p

Part III

Last name:

First name:

Grade 5

Total points:

/40 p

1. Complete the sequence of numbers.

a) 7,, 21, 28, 35 b) 4, 7,, 13, 16 c) 1, 4, 9, 16,, 36

/3 p

2. »How old is this oak tree?« asks Jan the forester. »Just think about it«, he replied mischievously. »Add up the largest single-digit number and the biggest two-digit number, and the largest three-digit number. Subtract off this sum the smallest four-digit number. Then you know how old the oak tree is.« Give Jan the answer and explain how you got it.

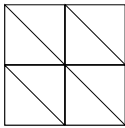
.....

.....

.....

/3 p

3. How many squares and triangles do you recognize?



..... squares

..... triangles

/3 p

4. The Erfurt Theater has 426 seats. For a student performance 287 tickets are already sold. One school wants to have 78 tickets, another school 52. Can both schools get their tickets? Explain.

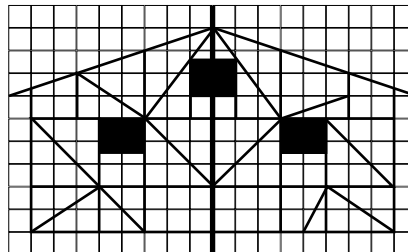
.....

.....

.....

/2 p

5. During a field trip, Jörg has sketched half of a gable and then at home he completed the rest of the drawing axially symmetric. But, he has made a mistake. Help him and mark these.



/2 p

6. Which wording is correct, »9 and 7 is 15« or »9 plus 7 equals 15«? Give a reason.

.....

.....

/2 p

7. Birgit is younger than Jutta, but older than Heike. Jutta is younger than Christiane. Place the names in order by age.

.....

/3 p

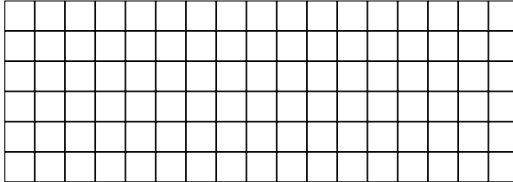
Part III

Last name:

First name:

Grade 5

8. On the blackboard is written: $25 + 17 + * + 12 + * + 18 = 100$

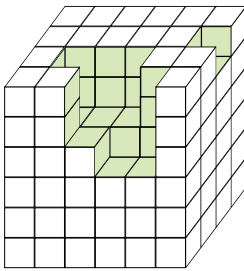


Which of the two equal numbers are missing at the position of the spots?

Answer: and

/3 p

- 9.



- a) How many cubes have to be inserted so that the cube is complete?

.....

- b) How many cubes are built up here?

.....

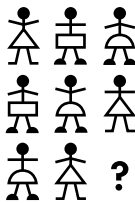
/3 p

10. Before an exhibition, a rabbit weighs in at 1.75 kg. How much weight should be gained if the ideal weight of 2500 g is to be reached? Make a cross.

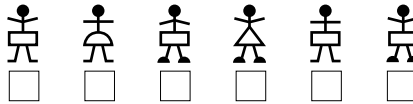
A ☐ 0,75 kg B ☐ 5,25 kg C ☐ 1250 g D ☐ 23,25 kg E ☐ 750 g

/2 p

- 11.



Which of the six figures should logically be in the place of the question mark? Make a cross!



/3 p

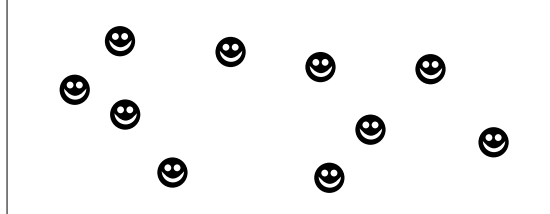
12. Each stated letter stands for a number. Find out the missing numbers!

$E + R + I + K + A = 350$ $E = R : 40$ $K = A \cdot 3$ $R = K + A$ $A = 280 : 7$

E = R = I = K = A =

/5 p

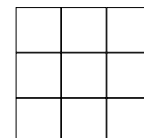
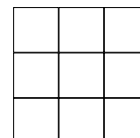
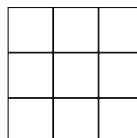
- 13.



Divide the following field by 3 straight lines in exactly 5 fields. In each field there should be 2 smileys.

/3 p

14. Put the numbers 1, 1, 1, 2, 2, 2, 3, 3, 3 that way in the square so that the numbers 1, 2 and 3 appear only once in every row and column. Find different possibilities!



/3 p

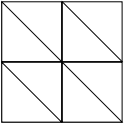
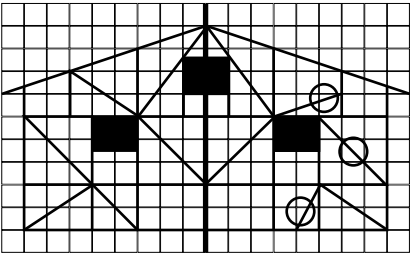
Part III – Assessment

Last name:

First name:

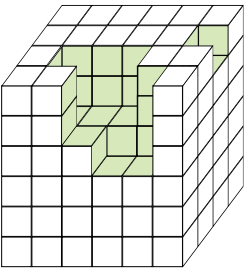
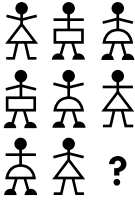
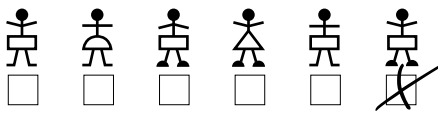
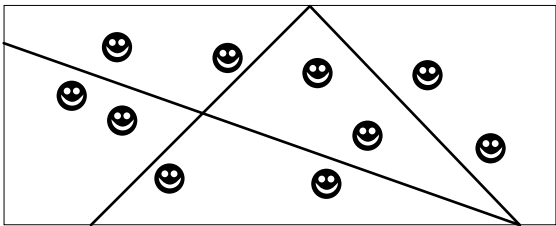
Grade 5

Total points: /40 p

<p>1. Complete the sequence of numbers.</p> <p>a) 7, 14, 21, 28, 35 b) 4, 7, 10, 13, 16 c) 1, 4, 9, 16, 25, 36</p>	<p>1 point for the right number sequence</p> <p>/3 p</p>
<p>2. »How old is this oak tree?« asks Jan the forester. »Just think about it«, he replied mischievously. »Add up the largest single-digit number and the biggest two-digit number, and the largest three-digit number. Subtract off this sum the smallest four-digit number. Then you know how old the oak tree is.« Give Jan the answer and explain how you got it.</p> <p>(9 + 99 + 999) – 1000 = 1107 – 1000 = 107</p> <p>Die Eiche ist 107 Jahre alt.</p>	<p>1 point for the right approach (or addition), 1P point for the right interim result (or subtraction), 1 point for the right result in the answer sentence</p> <p>/3 p</p>
<p>3. How many squares and triangles do you recognize?</p>  <p>5 squares 10 triangles</p>	<p>1 point each for 8 small triangles with inner squares, 1 point for 1 big square, 1 point for 2 big triangles,</p> <p>/3 p</p>
<p>4. The Erfurt Theater has 426 seats. For a student performance 287 tickets are already sold. One school wants to have 78 tickets, another school 52. Can both schools get their tickets? Explain.</p> <p>Several solution approached possible: 426 – 287 = 139, 78 + 52 = 130 130 < 139 or 426 – 287 – 78 – 52 = 9</p> <p>There are still 9 tickets left. Yes, both schools can receive there tickets.</p>	<p>1 point for each right answer, 1 point for the reason</p> <p>/2 p</p>
<p>5. During a field trip, Jörg has sketched half of a gable and then at home he completed the rest of the drawing axially symmetric. But, he has made a mistake. Help him and mark these.</p> 	<p>1 point for finding 2 mistakes, 1 point for finding exactly 3 mistakes</p> <p>/2 p</p>
<p>6. Which wording is correct, »9 and 7 is 15« or »9 plus 7 equals 15«? Give a reason.</p> <p>Non of the claims are true because 9 + 7 = 16.</p>	<p>1 point for each right answer, 1 point for the reason</p> <p>/2 p</p>
<p>7. Birgit is younger than Jutta, but older than Heike. Jutta is younger than Christiane. Place the names in order by age.</p> <p>Birgit < Jutta, Birgit > Heike, Jutta < Christiane Heike, Birgit, Jutta, Christiane</p>	<p>1 point for each realized inequation</p> <p>/3 p</p>

Teil III – Bewertung

Last name:		First name:		Grade 5
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<p>8. On the blackboard is written: $25 + 17 + * + 12 + * + 18 = 100$</p> <p> $(100 - (25 + 17 + 12 + 18)) : 2$ $= (100 - 72) : 2$ $= 28 : 2$ $= 14$ </p> <p>Which of the two equal numbers are missing at the position of the spots?</p> <p>Answer: 14 and 14</p>	<p>1 point for right addition, 1 point for the difference to 100, 1 point for cutting in halves</p> <p>/3 p</p>																												
<p>9. </p> <p>a) How many cubes have to be inserted so that the cube is complete? 15</p> <p>b) How many cubes are built up here? $6 \cdot 6 \cdot 4 = 144$ $144 - 15 = 129$</p>	<p>a) 1 point for the right solution, b) 1 point for defining the total number of the cubes when completed, 1 point for the right difference with a)</p> <p>/3 p</p>																												
<p>10. Before an exhibition, a rabbit weighs in at 1.75 kg. How much weight should be gained if the ideal weight of 2500 g is to be reached? Make a cross.</p> <p>A <input checked="" type="checkbox"/> 0,75 kg B <input type="checkbox"/> 5,25 kg C <input type="checkbox"/> 1250 g D <input type="checkbox"/> 23,25 kg E <input checked="" type="checkbox"/> 750 g</p>	<p>1 point for the right solution</p> <p>/2 p</p>																												
<p>11. </p> <p>Which of the six figures should logically be in the place of the question mark? Make a cross!</p> <p></p>	<p>1 point for fig. 5 (realized. 1 char.*), 2 points for fig. 1 or 3 (realized 2 char.*), 3 points for figure 6 (realized. 3 char.*)</p> <p>/3 p</p>																												
<p>12. Each stated letter stands for a number. Find out the missing numbers!</p> <p>$E + R + I + K + A = 350$ $E = R : 40$ $K = A \cdot 3$ $R = K + A$ $A = 280 : 7$</p> <p>$A = 280 : 7 = 40$ $K = 40 \cdot 3 = 120$ $R = 120 + 40 = 160$ $E = 160 : 40 = 4$ $I = 350 - (40 + 120 + 160 + 4) = 26$</p>	<p>1 point for A, 1 point for K, 1 point for R, 1 point for E, 1 point for I</p> <p>/5 p</p>																												
<p>13. </p> <p>Divide the following field by 3 straight lines in exactly 5 fields. In each field there should be 2 smileys.</p>	<p>1 point for 2 smileys only, 1 point for 3 straight lines only, 1 point for 5 fields only</p> <p>/3 p</p>																												
<p>14. Put the numbers 1, 1, 1, 2, 2, 2, 3, 3, 3 that way in the square so that the numbers 1, 2 and 3 appear only once in every row and column. Find different possibilities!</p>	<table border="1" data-bbox="730 1881 869 2016"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>3</td><td>1</td><td>2</td></tr> <tr><td>2</td><td>3</td><td>1</td></tr> </table> <table border="1" data-bbox="912 1881 1051 2016"> <tr><td>2</td><td>3</td><td>1</td></tr> <tr><td>3</td><td>1</td><td>2</td></tr> <tr><td>1</td><td>2</td><td>3</td></tr> </table> <table border="1" data-bbox="1094 1881 1233 2016"> <tr><td>2</td><td>1</td><td>3</td></tr> <tr><td>3</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>3</td><td>2</td></tr> </table>	1	2	3	3	1	2	2	3	1	2	3	1	3	1	2	1	2	3	2	1	3	3	2	1	1	3	2	<p>1 point for completing each square</p> <p>/3 p</p>
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