MASTERING MATH FACTS

Sample Pages for Mastering Math Facts

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Raising Classroom Achievement

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Mastering Math Facts.

Mastering Math Facts is a structured program for sequential practice of math facts. Successful practice on math facts requires that students practice and learn few enough facts at a time so that they can simply remember or memorize the answers. Facts in ***Mastering Math Facts*** are introduced in sets of two and their reverses. The program is structured the same way for all four operations (addition, subtraction, multiplication, and division) so teachers can implement a simple daily routine that can be followed all year. Quicker learners can move onto master higher operations, e.g., division, while slower students proceed at their own rate without disrupting the routine. Each day's routine practice should take no more than six or seven minutes of class time. See page 2 for a more detailed description of the steps of implementing ***Mastering Math Facts***.

The program's daily component consists of one-page practice sheets lettered A-Z. The top half of each page gives practice focused on 2 facts and their reverses. Then the bottom half is a timed test on all the facts learned thus far. If the student does not pass, s/he repeats the page again the next day. If the student passes 40 problems correct in one minute, s/he goes on to the next page.

The next page adds only two more facts and their reverses to the ones already mastered. This gradual accumulation of small numbers of facts to be learned each time is the unique feature that makes work in ***Mastering Math Facts*** so successful and motivating for students. [See page 3-5 for **Sets A**, **B**, **and C** of Addition facts practice.] The routine is the same the following day: students practice on the top half-focused on the facts learned thus far, then take a timed test on the bottom half. [See page 6 for a sample sheet for **subtraction**, page 7 for **multiplication**, or page 8 for **division**.] Students record their efforts on a **rocket chart** [see sample on page 9] on which they color in lettered squares for each sheet they pass.

There are placement tests (see sample "Where should I begin in Subtraction?" test on page 10) for accelerating students into an operation in which they already have some proficiency. Because not all children can write the answers to 40 problems in one minute there is a test of writing speed titled "How fast can you write?" on page 11. The results indicate what accommodated goals (see page 12 for the Goal Sheet) are appropriate for students who can't write fast enough to answer 40 problems in a minute. Students with such adjusted goals are expected to always meet or beat their previous best to pass.

Within each operation there are also ten progress-monitoring tests of ALL the facts (see the 2-minute timing on page 13). Every week or two students take these two-minute tests and graph the results on the Graph of My Progress provided [p. 14]. This enables the teacher and students to keep track of their progress in memorizing these facts. The graphs can also be used for IEP goals and objectives as well as for evidence of learning for Title 1 plans.

Coloring in the rocket chart gives an opportunity for children to savor their incremental successes. Additional recognition of student success can be given in the form of certificates [p. 18]. Parental assistance in practicing can be promoted by use of a parent letter [p. 19]. The program also comes with extensive directions and suggestions for successful implementation.

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Steps of implementing *Mastering Math Facts*

BEGIN WITH INITIAL ASSESSMENTS

1. Administer the test, "**How fast can you write**?" [p. 11].
2. Use **Goal sheet** [p. 12] to select goals for each student based on writing speed.
3. Begin the whole class at Set A or administer the
   "**Where should I begin** in . . . " test (one for each operation)[p. 10]

ESTABLISH THE DAILY ROUTINE

1. Each student has the lettered sheet on which they're working.
2. Each student has an **answer key** packet [p. 15].
3. Students practice in pairs for 90 seconds to 3 minutes each.
   a) One student says the facts and the answers on the **top half of the sheet**.[p. 16]
   b) Partner with answer key gives corrective feedback.
   c) Then students switch roles.
4. Students write their goal for the 1-minute timing at the bottom of the sheet.
5. One-**minute timing/test** on the **bottom half** [p. 17] is administered to whole class.
6. All students fill in the date on the **rocket chart** [p. 9].
7. Students who pass—meet or beat their goal (previous high score):
   a) turn in sheet to teacher for checking
   b) move on to a new sheet the next day
   c) are recognized in some way ("Stand up, take a bow!")
8. Student who do not pass:
   a) keep sheet and take it home for homework practice
   b) do the same sheet again the next day.

ROUTINE FOR WEEKLY 2-MINUTE TIMING

1. Give all students the same **2-minute timing** [p. 13].
2. Teacher administers timing for 2 minutes
3. Students correct each others timings
4. Have students chart their scores on the **Graph of My Progress** [p. 14].
5. Recognize anyone who beats their previous best score.

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Set A [1+2, 2+1, 1+3, 3+1] Practice on facts in Set A

3	1	1	3	2	1	3	1	1	2
+1	+2	+3	+1	+1	+2	+1	+2	+2	+1
1	3	1	2	1	1	3	3	1	3
+2	+1	+2	+1	+2	+3	+1	+1	+2	+1
2	1	3	1	1	2	3	1	[illegible]	3
+1	+2	+1	+2	+2	+1	+1	[illegible]	+1	+1
1	2	1	1	3	3	1	1	2	3
+2	+1	+2	+3	+1	+1	[illegible]	+3	+1	+1

One Minute Timing on facts in Set A

1	3	1	3	1	1	2	2	1	3
+2	+1	[illegible]	+1	+2	+3	+1	+1	+2	+1
2	1	3	1	1	2	2	1	3	2
+1	[illegible]	+1	+2	+3	+1	+1	+2	+1	+1
3	1	1	2	3	1	3	1	1	2
[illegible]	+2	+2	+1	+1	+3	+1	+2	+3	+1
2	1	3	2	1	3	1	2	1	1
+1	+3	+1	+1	+2	+1	+2	+1	+3	+2

1 minute timing goal _____ Number of problems correct_____

Sample page

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Set B [1+4, 4+1, 1+1] Practice on facts through Set B

4	1	1	2	4	1	3	1	1	2
+1	+4	+1	+1	+1	+2	+1	+1	+4	+1
1	4	2	4	1	1	1	3	1	1
+2	+1	+1	+1	+1	+3	+4	+1	+2	+1
2	1	3	1	1	2	4	1	[illegible]	2
+1	+4	+1	+1	+3	+1	+1	[illegible]	[illegible]	+1
1	3	1	1	4	3	[illegible]	[illegible]	2	3
+2	+1	+1	+3	+1	+1	[illegible]	+4	+1	+1

One Minute Timing on facts through Set B

1	4	1	2	1	1	3	4	1	1
+2	+1	+3	+1	[illegible]	+4	+1	+1	+2	+1
4	1	1	1	2	1	1	3	2	[illegible]
[illegible]	[illegible]	+1	+4	+3	+1	+1	+2	+1	+1
[illegible]	1	1	1	4	1	2	1	1	4
[illegible]	+4	+3	+1	+1	+2	+1	+2	+1	+1
2	1	1	3	1	4	1	2	1	1
+1	+4	+1	+1	+2	+1	+3	+1	+4	+1

1 minute timing goal _____ Number of problems correct_____

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Set C [1+5, 5+1, 2+2] Practice on facts through Set C

5	1	2	4	3	1	1	5	1	2
+1	+5	+2	+1	+1	+2	+1	+1	+5	+2
1	3	1	1	5	1	2	3	1	4
+2	+1	+4	+1	+1	+5	+2	+1	+2	+1
2	5	1	2	1	2	4	1	[illegible]	2
+1	+1	+5	+2	+4	+1	+1	[illegible]	+1	+1
1	3	1	1	5	1	2	1	[illegible]	3
+2	+1	+1	+3	+1	[illegible]	+2	+3	+1	+1

One Minute Timing on facts through Set C

1	3	1	4	1	1	2	5	1	2
+2	+1	+5	[illegible]	+1	+3	+1	+1	+4	+2
5	[illegible]	[illegible]	[illegible]	2	1	3	1	4	1
+1	+2	1	+4	+1	+2	+1	+5	+1	+3
1	1	1	3	2	4	1	1	2	5
5	+4	+2	+1	+2	+1	+1	+3	+1	+1
1	1	5	2	1	3	1	4	1	2
+1	+4	+1	+2	+2	+1	+5	+1	+3	+1

1 minute timing goal _____ Number of problems correct_____

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SUBTRACTION

Set F [9–1, 9–8, 10–5] Practice on facts through Set F

8	8	7	9	4	7	9	4	10	8
–1	–7	–6	–8	–2	–1	–1	–3	–5	–4
6	9	5	4	10	8	8	7	9	6
–5	–1	–1	–1	–5	–7	–4	–6	–8	–3
8	3	6	9	7	10	9	6	8	[illegible]
–7	–2	–1	–8	–6	–5	–1	–3	[illegible]	[illegible]
8	7	9	5	8	10	9	[illegible]	[illegible]	10
–4	–1	–1	-4	–1	–5	–8	3	–1	–5

One Minute Timing on facts through Set F

6	4	10	7	[illegible]	[illegible]	9	4	3	9
–1	–2	–5	–6	[illegible]	–7	–1	–1	–2	–8
8	9	6	[illegible]	10	7	5	6	9	2
–1	–8	[illegible]	4	–5	–1	–1	–5	–1	–1
7	[illegible]	[illegible]	6	4	9	6	8	10	7
–1	–4	–8	–1	–2	–1	–3	–4	–5	–6
10	3	9	6	5	8	3	8	4	9
–5	–2	–8	–5	–1	–7	–1	–1	–3	–1

1 minute timing goal _____ Number of problems correct_____

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MULTIPLICATION

Set M [3x5, 5x3, 8x8] Practice on facts through Set M

4	3	7	2	3	8	6	5	8	9
x3	x4	x2	x6	x5	x8	x6	x3	x9	x7
9	8	3	2	9	5	6	7	4	[illegible]
x8	x8	x5	x5	x4	x3	x9	x7	x3	[illegible]
5	8	1	3	7	8	5	2	[illegible]	8
x3	x2	x4	x5	x7	x9	x2	[illegible]	x4	[illegible]
9	4	3	3	8	6	[illegible]	7	0	5
x8	x3	x5	x4	x8	x6	x3	[illegible]	x7	x3

One Minute Timing on facts through Set M

5	5	1	0	[illegible]	8	2	3	1	7
x9	x3	x7	x6	[illegible]	x8	x5	x4	x8	x7
2	9	[illegible]	9	6	8	1	3	5	3
[illegible]	[illegible]	x1	x4	x2	x9	x9	x0	x3	x3
4	7	1	6	4	0	3	9	6	4
x4	[illegible]	x4	x6	x3	x9	x5	x1	x9	x2
2	1	3	2	8	5	9	1	9	3
x2	x9	x5	x2	x8	x5	x6	x1	x5	x2

1 minute timing goal _____ Number of problems correct_

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DIVISION

Set S [7 and 6 divided into 42, 7 and 5 divided into 35]

Practice on facts in Set S

7) 56 7) 35 7) 42 4) 32 8) 32 6) 42 5) 35 8) 40 8) 48 1) 3

6) 42 8) 56 9) 81 5) 40 5) 35 6) 48 3) 21 7) 35 7) 42 8) [illegible]

7) 42 8) 40 4) 32 5) 35 8) 48 5) 40 6) 48 7) [illegible] 6) [illegible] 56

7) 14 5) 35 5) 40 7) 35 8) 56 8) 32 6) [illegible] 32 8) 40 7) 42

One Minute Timing on facts in Set S

7) 35 5) 45 7) 14 4) 12 6) [illegible] [illegible]) 8 3) 21 1) 4 7) 42 9) 81

5) 35 6) 36 4) [illegible] [illegible]) [illegible] 3) [illegible]2 3) 24 5) 25 6) 42 7) 21 8) 64

[illegible] 7) 42 [illegible] 8) 56 2) 8 4) 32 6) 42 8) 40 8) 3 7) 35

6) 48 2) 6 5) 10 8) 32 1) 3 6) 18 7) 21 5) 35 5) 40 7) 14

1 minute timing goal _____ Number of problems correct_

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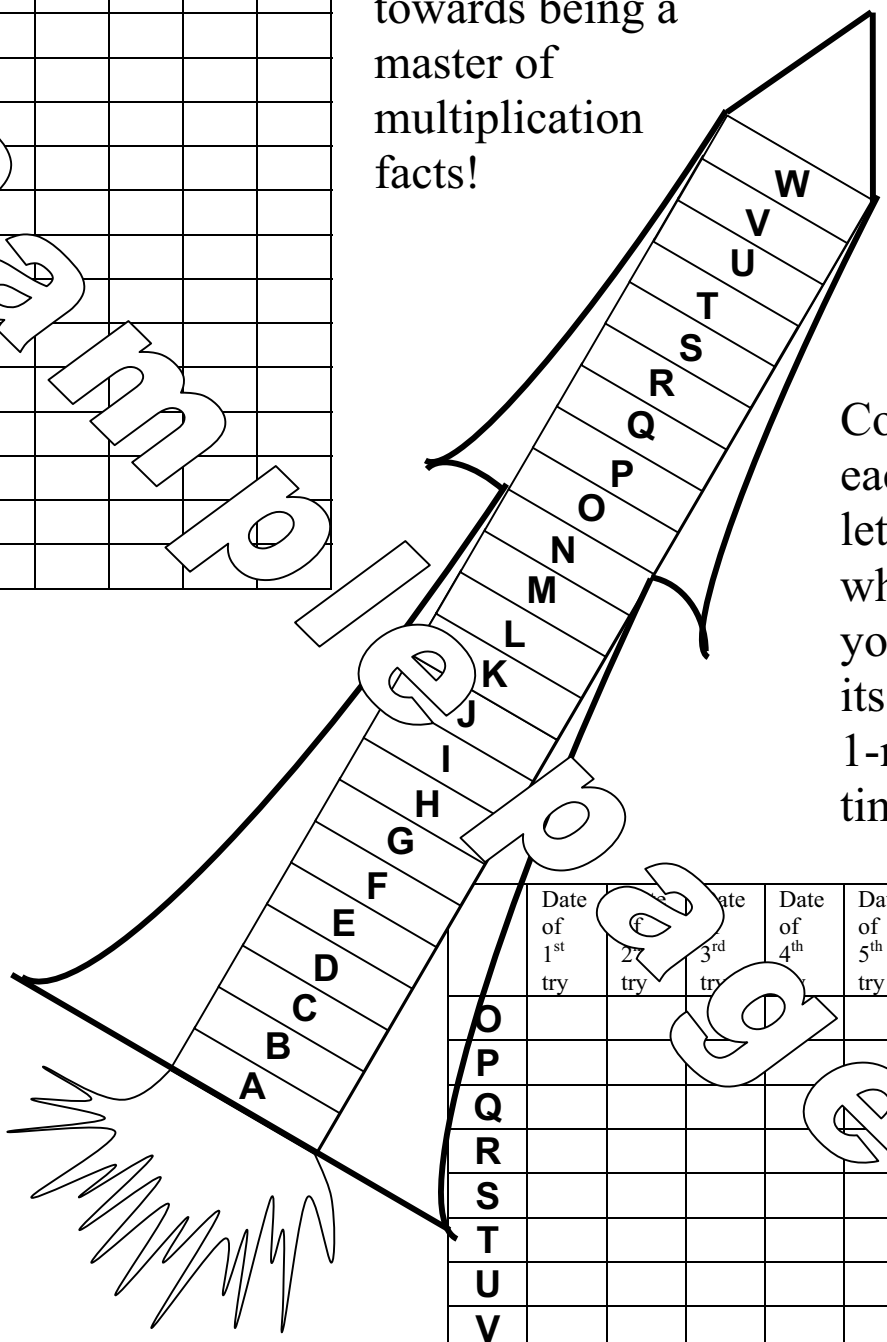
ROCKET CHART

	Date of 1st try	Date of 2nd try	Date of 3rd try	Date of 4th try	Date of 5th try	Date of 6th try
A						
B						
C						
D						
E						
F						
G						
H						
I						
J						
K						
L						
M						
N						

_____ is ROCKETING towards being a master of multiplication facts!



Color in each letter when you pass its 1-minute timing.

	Date of 1st try	Date of 2nd try	Date of 3rd try	Date of 4th try	Date of 5th try	Date of 6th try
O						
P						
Q						
R						
S						
T						
U						
V						
W						

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Where should I begin in Subtraction? **Test to pass Sets A - E**

Try each set to see where you should begin practicing your facts. Wait for my signal to begin. Before you begin enter your goal for a 15 second timing. You will have 15 seconds to answer as many of the problems below as you can. Write as quickly as you can. Ready, set, go!

4	6	6	5	8	3	8	4	2	4
—1	—3	—5	—1	—7	—2	—4	—3	—1	—2

8	7	6	3	4	6	5	2	8	[illegible]
—4	—1	—3	—1	—2	—1	—4	—1	[illegible]	[illegible]

Goal _____ Number of problems corr[illegible]

Where should I begin in Subtractio[illegible] **Test to pass Sets F - J**

Wait for my signal to begin. Before y[illegible] beg[illegible] enter your goal for a 15 second timing. You will have 15 seconds to answer as ma[illegible] roble[illegible] [illegible]ow as you can. Write as quickly as you can. Ready, set, go!

12	7	[illegible]	6	16	5	9	9	7	10
—6	—5	[illegible]	—2	—8	—2	—8	—0	—2	—5

9	10	10	6	5	16	12	10	14	6
—1	—5	—9	—0	—3	—8	—6	—1	—7	—4

Goal _____ Number of problems correct_____

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How fast can you write?

Wait for my signal to begin. You will have 1 minute to copy the numbers shown in the corner of each box. Write as quickly as you can. Ready, set, go!

3	72	8	32	9	15	1

[illegible] boxes

94	7	80	2	28	0	[illegible]

14 boxes

4	56	6	36	[illegible]	[illegible]	8

21 boxes

27	3	81	[illegible]	55	1	64

28 boxes

2	19	6	18	4	21	7

35 boxes

24	8	48	5	75	3	35

42 boxes

Count how many boxes you completed. _____

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GOAL SHEET

What is your goal? It's to meet or beat your best score ever, each time.

To find a fair **starting** place find the number of boxes you copied in the column below. To find what your goals are for timings circle that entire row. You'll circle your goal for how many problems correct to pass a 15 second, a 1 minute timing, and annual goal (by the time you know all the facts) in a 2 minute timing.

Boxes copied	15 sec. timing	1 minute timing	2 min. annual goal
24 or less	Place into ***Mastering Numerals*** to imp[illegible] writi[illegible]		
25	6	23	[illegible]
26	6	24	4[illegible]
27	6	25	[illegible]
28	7	26	52
29	7	27	54
30	7	8	56
31	8	[illegible]	58
32	8	3[illegible]	60
33	8	[illegible]	62
34	[illegible]	32	64
35	9	33	66
36	9	34	68
37	10	35	70
38	[illegible]	36	72
39	10	37	74
[illegible]	10	38	76
41	10	39	78
42	10	40	80

[illegible]your STARTING goals here. Remember, whenever you beat your goal, cross it out and write down your new "record score" as your new goal!

How many problems do I need to complete to pass:

a 15– second timing?_____

a 1 minute timing?_____

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Two Minute Multiplication Timing #10 (Do this weekly to see your progress)

6	6	5	3	3	8	7	8	9	0
x 5	x 1	x 9	x 4	x 8	x 6	x 2	x 4	x 6	x 5
7	5	5	3	2	9	2	2	7	6
x 4	x 3	x 9	x 5	x 6	x 4	x 2	x 1	x 9	3
7	0	9	8	5	4	6	9	[illegible]	[illegible]
x 5	x 4	x 1	x 2	x 1	x 9	x 2	[illegible]	[illegible]	x 2
5	0	8	7	4	[illegible]	8	4	6	8
x 6	x 8	x 5	x 3	x 2	[illegible]	x 7	[illegible]	x 9	x 7
7	0	3	6	2	[illegible]	9	8	4	4
x 7	x 6	x 1	[illegible]	0	x 4	x 3	x 9	x 7	x 1
2	5	0	[illegible]	4	7	3	0	3	5
x 5	x 5	[illegible]	x 2	x 6	x 8	x 7	x 5	x 9	x 7
2	[illegible]	7	6	7	9	4	3	8	5
x 7	[illegible]	x 1	x 7	x 6	x 5	x 8	x 3	x 3	x 4
8	2	9	8	2	4	5	6	3	0
x 1	x 8	x 7	x 8	x 4	x 5	x 8	x 6	x 6	x 9

Goal _____ Number of problems correct_____

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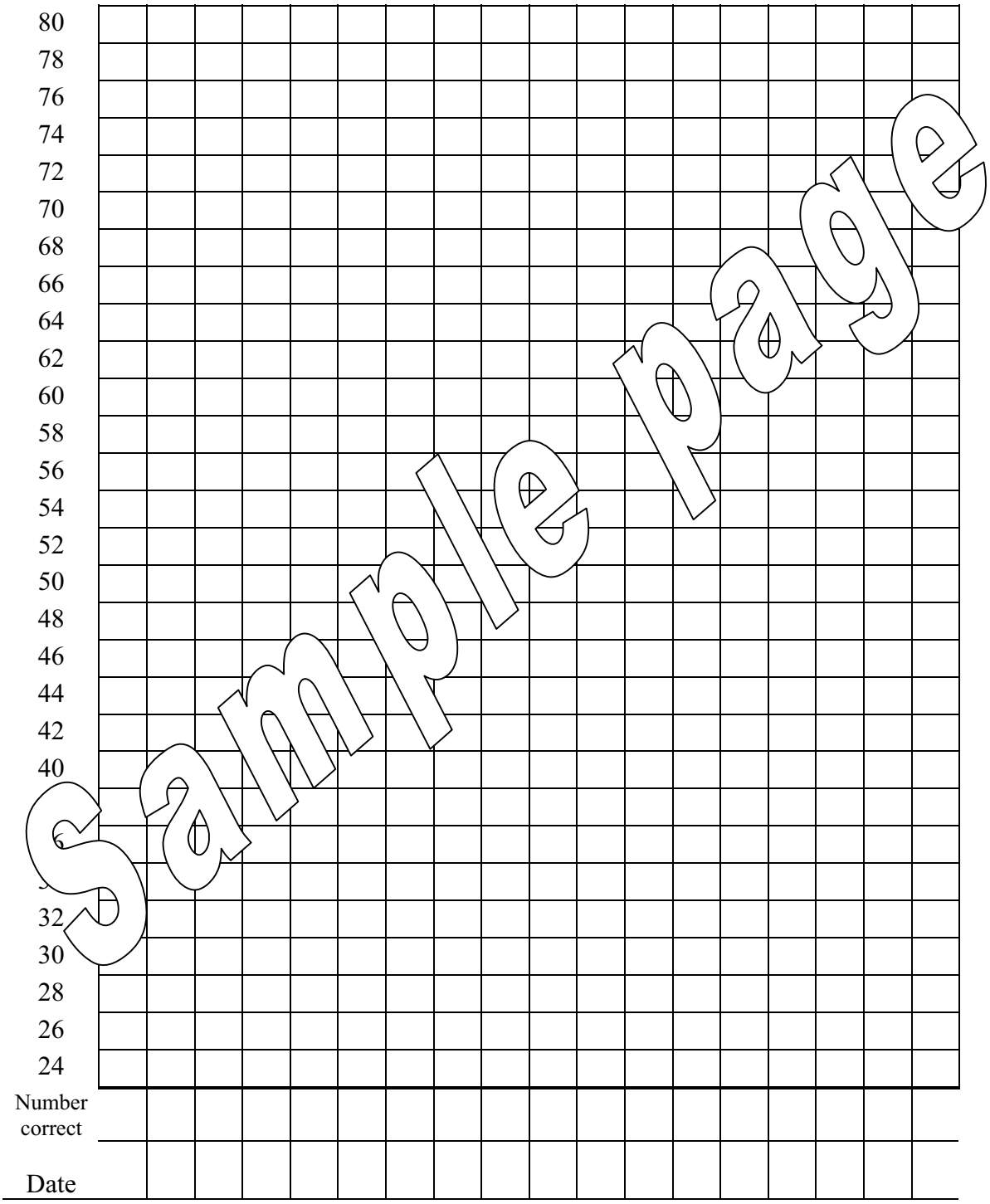
Graph of my Progress

Goal _____

(Graph of the number of problems correct in each **2 minute timing**)



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Answer Key

Set I [6-2, 6-4, 14-7] **Practice on facts through Set I**

8	8	6	3	6	10	14	5	5	6
–7	–0	–4	–2	–5	–1	–7	–3	–2	–2
1	**8**	**2**	**1**	**1**	**9**	**7**	**2**	**3**	**4**
12	9	14	10	10	5	6	7	6	10
–6	–1	–7	–1	–5	–3	–2	–1	[illegible]	–9
6	**8**	**7**	**9**	**5**	**2**	**4**	[illegible]	[illegible]	**1**
6	5	10	12	6	9	9	[illegible]	[illegible]	14
–4	–2	–9	–6	–2	–1	[illegible]	[illegible]	–3	–7
2	**3**	**1**	**6**	**4**	**8**	[illegible]	**2**	**3**	**7**
8	6	9	6	4	1[illegible]	8	7	5	12
–4	–2	–0	–4	–2	–7	–1	–6	–2	–6
4	**4**	**9**	**2**	[illegible]	**7**	**7**	**1**	**3**	**6**

One Minute Timing on Facts through Set I

6	3	[illegible]	[illegible]	5	12	6	10	3	5
–4	–1	[illegible]	–7	–4	–6	–2	–1	–2	–3
2	[illegible]	**1**	**7**	**1**	**6**	**4**	**9**	**1**	**2**
[illegible]	[illegible]	[illegible]	6	10	10	5	6	9	14
[illegible]	[illegible]	–6	–4	–5	–1	–2	–5	–8	–7
7	**2**	**1**	**2**	**5**	**9**	**3**	**1**	**1**	**7**
10	6	12	7	4	9	14	8	6	7
–9	–2	–6	–1	–3	–1	–7	–4	–3	–0
1	**4**	**6**	**6**	**1**	**8**	**7**	**4**	**3**	**7**
4	5	10	6	6	8	4	5	6	9
–1	–1	–9	–4	–1	–7	–2	–2	–2	–8
3	**4**	**1**	**2**	**5**	**1**	**2**	**3**	**4**	**1**

1 minute timing goal ____ Number of problems correct_____

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Set F [9–1, 9–8, 10–5] Practice on facts through Set F

8	8	7	9	4	7	9	4	10	8
–1	–7	–6	–8	–2	–1	–1	–3	–5	–4
6	9	5	4	10	8	8	[illegible]	9	6
–5	–1	–1	–1	–5	–7	–4	[illegible]	–8	–3
8	3	6	9	7	10	[illegible]	6	8	3
–7	–2	–1	–8	–6	[illegible]	–1	–3	–1	–1
8	7	9	5	8	10	9	4	2	10
–4	–1	–1	–4	–1	–5	–8	–3	–1	–5

One Minute Training on facts through Set F

6	4	10	7	5	8	9	4	3	9
–1	–2	–5	–6	–4	–7	–1	–1	–2	–8
			5	8	10	9	4	2	10
				[illegible]		[illegible]		[illegible]	

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			8		9		2	1	
		-4	–1	–5	–8	–3	–1	–5	

One Minute Timing on facts through Set F

6	4	10	7	5	8	9	4	3	9
–1	–2	–5	–6	–4	–7	–1	–1	–2	–8
8	9	6	8	10	7	5	[illegible]	9	2
–1	–8	–3	–4	–5	–1	[illegible]	[illegible]	–1	–1
7	5	9	6	4	9	6	8	10	7
–1	–4	–8	–1	–2	[illegible]	–3	–4	–5	–6
10	3	9	6	3	8	3	8	4	9
–5	–2	[illegible]	[illegible]	–1	–7	–1	–1	–3	–1

1 minute timing goal _____ Number of problems correct_____

Sample page

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Dear Parents,

This year my students are going to be spending time daily practicing and learning the math facts, beginning in the operation of _____. Our class will keep working on these facts until everyone knows all the facts in this operation instantly, without any pause before answering. We will be using a program called ***Mastering Math Facts***. It will take only a few minutes each day of class time, but students will keep working until they have mastered all the facts. A fact is mastered when it can be answered instantly, without any pause. ***Mastering Math Facts*** is unique because it teaches only 2 facts and their inverses on each page. The program allows each child to go at his or her own pace, taking as many days to master those two facts as needed. Students are given an opportunity daily to show they have learned a set of facts by passing its test. Once students "pass" a set of facts, they color in the letter for that set on their "Rocket Chart."

You can help your child progress and learn faster by practicing at home the same set of facts your child is learning at school. Any day your child does not pass a set of facts he or she will have that day's practice sheet to bring home as homework. It will help a great deal if you will practice with your child for five minutes with that sheet.

Here's how we recommend you practice. Your child should have the top half of the day's practice sheet (without answers written in) in front of himself or herself. If the answers have been written in, then your child will need to write out the facts without answers on another sheet of paper, but copying the first row will be enough for practice purposes. Work only on the top half of the sheet.

Have your child read each fact aloud and then say the answers to you. If you hear either the slightest hesitation or an error on one of those facts, give your child some extra practice on that fact. The best way to give extra practice is to begin by immediately giving your child the correct answer, then ask him or her to repeat the problem and the answer once more. Next, back up three problems and have your child begin again. If there is no hesitation or mistake when the problem is reached this time, be sure to praise your child and let him or her continue.

Work until finishing the top half of the page, but no more than five minutes in one session. If you wish to do a second session, wait at least an hour, or try it again in the morning. When memorizing facts, two short sessions hours apart are far more helpful than one long session. Your child's hard work should pay off in "passing" within a very few days. Then the next set will be assigned and practice can begin again. Each practice and test sheet is cumulative, including all the facts learned so far.

Learning all the facts in a given operation is a lot of work, but future success in math is dependent upon knowing facts so well that the answers come automatically without much thinking. Especially in a world of calculators, being able to compute math facts mentally is needed just to know if the calculator answer is correct. You can also help by sharing with your child the importance of learning math facts. Thank you so much for your support of this critical learning goal. I will keep you notified of your child's success in this important task.

Sincerely,

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