

Patterns in Arithmetic
Basic Skills Placement PDF
End of Grade 2
Beginning of Grade 3
Parent/Teacher Guide

Subjects covered:

General Concepts

Place Value

Associative Property of Addition

Number Sentences

Families of Facts

Difference Between

Expansion of Numbers

Concept of Multiplication

Fraction Notation

Conservation of Number

Arithmetic Skills

Addition

Subtraction

Multiplication

Division

Speed Tests

Patterns

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Based on methods developed by Prof. Michael Butler at the
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University of California, Irvine

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Assessment Guide

For students entering Grade 3

Work manipulatively with each student to observe his level of confidence and emotional relationship to math, as well as his skill level. Choose a problem in each operation and ask him to build the problem, solve it, and prove the answer. Have him make and solve an easy, medium, and very hard problem in addition and subtraction. Then repeat this process in multiplication and division if he is familiar with these concepts. **"You don't have to solve the hard ones if you can't; just make them up."**

Push to the limits of the student's ability. Each mistake provides valuable information. Ask the student what he is doing or thinking. Listen.

Give the written assessment to find out what the student knows and doesn't know and to identify strengths, areas of weakness, and confusion of the concepts. **"Do every problem on the worksheet that is possible for you to do now. Put a ? next to any problem you can't solve."**

Clarify directions but do not assist the student with any math problem. Do not teach or correct during the evaluation. Make notes about what the student does know and what needs to be learned in future lessons. Use this information to decide where to begin instruction. At the end of the assessment is the record sheet listing basic math knowledge required to succeed in *Patterns in Arithmetic* Booklets for Grade 3. Individual lessons list prerequisites.

Materials

Assessment Worksheets, pages 10 - 18

Assessment record sheet, page 19

Pencil

Base Ten Blocks

Colored blocks

Counters

Summary of Assessment Tools

General Concepts

Place Value

Associative Property of Addition

Number Sentences

Families of Facts

Difference Between

Expansion of Numbers

Concept of Multiplication

Fraction Notation

Conservation of Number

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Patterns in Arithmetic: Basic Skills Placement

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Assessment Guide

Assessment Tools

There are nine worksheets in five sections. The first section is on general concepts. The second section evaluates arithmetic skills. The third section reviews Circle Math. The fourth section is a speed test on basic addition and subtraction facts. The fifth section is on patterning. It is best not to give all five sections at once. One each day is suggested.

Make sure the student receives no assistance in completing any part of the worksheet other than clarification of directions. Tell the student to do every problem on the worksheet that is possible for him to do. Tell the student to put a '?' next to any problem that he can't solve. Do not give any lessons at this time.

Along with the written evaluation test, it is useful to work manipulatively with each student to observe his level of confidence and emotional relationship to math, as well as his skill level.

General Concepts

1. Place Value

This problem set tests the understanding of numeration. Can the student write the numerals that represent a given number? Pictures of ones, tens, and hundreds are shown. The student is asked to write the numerals that go with the pictures. Pictures a and b are warm-ups. Pictures c and e test the identification of the ones and the tens place. Pictures d, f, g, and i test the concept of place holders, using zeros to show no ones or no tens. Picture j tests the concept of grouping by tens. There are twelve ones shown next to two tens. There is an additional ten in the ones group and the student records 32, not 312 or 22. The "Write the number that comes after" (Problem k) tests place value symbolically: what number comes after a number that has a 9 in the ones place? The concept of place value is abstract and very important. Any uncertainty in this area can be remedied using blocks and recording. (See the Place Value sections in *Patterns in Arithmetic: Books 1 and 2.*)

2. Associative Property of Addition

Does changing the order of the numbers in an addition problem change the answer? If a student knows that it does not, then he would select the two addition problems that have the same numbers as the given problem without having to check his equality by actually adding them. If the student adds to find the answer, assume the concept is weak. The two problems that equal the given problem are $5 + 6 + 3$ (the first box in the top row) and $3 + 5 + 6$ (the second box in the bottom row).

3. Number Sentences

This section tests the ability to formulate a number sentence in response to a word problem. If a calculation error occurs, give the student another problem of the same type. If the student simply puts down the final answer, ask him to tell you how he got the answer to each problem. Then have him write down the problem (number sentence) that he did to find the answer. If he can't do that, review the lesson on number sentences for that operation. Addition and Subtraction Number Sentences are in *Patterns in Arithmetic: Book 1* and the Multiplication Number Sentence is in *Patterns in Arithmetic: Book 2*. If he doesn't know how to approach the problems at all, then focus on the word problems in the number sentences lessons.

Answers:

- a. $3 + 5 + 4 = 12$ Nan has 12 balls.
- b. $17 - 6 = 11$ Henry has \$11 left.
- c. $3 \times 7 = 21$ Toby collects 21 eggs each week.

4. Families of Facts

This problem tests for understanding of Families of Facts. Can the student produce the three related number sentences? If the student has trouble thinking of the subtraction problems, then you can conclude that the concept of reversal of operations, the main idea in the Families of Facts, needs to be reviewed. If he can't think of the other addition problem, review the Commutative Property of Addition. The three other number sentences are: $3 + 2 = 5$, $5 - 2 = 3$, and $5 - 3 = 2$.

5. Difference Between

This problem tests the understanding of the concept of difference between. Can the student say how much larger one number is than another, or how many numbers are in between two given numbers? Note whether the student counts or uses subtraction. Counting indicates a lower level of understanding. Give harder problems, with a greater distance between the numbers, to press the student to come up with a more efficient method of figuring. Answer: 24 is 9 larger than 15.

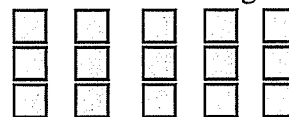
6. Expansion of Numbers

This problem set tests whether the student recognizes that there are many ways to build or expand (break up) a number. The student should not have any difficulty doing this problem set without a manipulative, other than fingers, for calculating. The 23 is broken up in three entirely different ways. Examples: $23 = 8 + 5 + 9 + 1$, or $23 = 10 + 10 + 3$, or $23 = 7 + 9 + 7$, and so on.

7. Concept of Multiplication

This problem set tests the student's ability to recognize a given multiplication problem from a pictorial representation of a physical model and to create a picture for a given problem. In the first picture there are six groups of two squares. This represents $2 \times 6 = 12$; the 2 is repeated 6 times. A student who is new to this math series may write 6×2 . That is OK. Switching to the format used in this series is not difficult. Review Multiplication Concepts and Conventions in the Multiplication Section.

If the student is unable to do the problem at all, you will need to go back to the Concept of Multiplication and review it as well as the Multiplication Number Sentence. The second picture shows three groups of four, or $4 \times 3 = 12$. The picture of $3 \times 5 = 15$ should look similar to this:



8. Fraction Notation

This problem set tests the concept of fractional notation (how one writes a fraction).

The $\frac{1}{2}$ is shown by box 3 and by box 8. The $\frac{1}{3}$ is shown by box 6. The $\frac{3}{4}$ is shown by box 7. Does the student know that the bottom number (denominator) tells the number of pieces the whole is divided into? Choosing box 10 for $\frac{1}{3}$ (because it has three pieces shaded) or box 4 for $\frac{1}{2}$ indicates confusion on this point. Does the student know that each piece must be of equal size? Choosing box 2 for $\frac{1}{2}$ or box 5 for $\frac{1}{3}$ indicates confusion on this point. Does the student know the top number (numerator) tells how many pieces of a certain size should be shaded in? Choosing boxes 8 or 9 for $\frac{3}{4}$ indicates confusion on this point. Can the student identify the $\frac{1}{3}$ on the number line? In Fractions: Booklet 1 review Pattern Block Fractions, Recording Fractions: Prism Set, and My Fractions Booklet: Number Lines.

9. Conservation of Number (in the Circle Math section)

Does the student know that the way a problem is expanded (broken up) does not change the answer? As long as there are no errors in breaking up the numbers 26 and 19, the answers to the little subtraction problems (in the circles) will sum up to the same answer. This is because the 26 and the 19 do not change their values when they are broken up. As long as you are subtracting 19 from 26, the answer will remain 7, regardless of the method of calculation.

If the student is new to this program and does not know how to do Circle Math, give this test instead. Have the student count seven blocks into your hand. Close your hands over all the blocks, mix them up. Leave some blocks in one hand and some in the other one. Open your hands palms up and ask, "**How many now?**" Sometimes you have to ask, "**How many are in both hands?**" If the student:

- A) Says the correct amount, mix the blocks up and put a different combination in each hand but use the same amount of blocks. Again ask how many blocks. If the student says the correct amount, add another block and repeat with a couple of different combinations. If the student says the correct amount, make it a higher number (but raise the amount only by two or three blocks). Mix the blocks up again and ask how many. Have him look and tell you how many blocks there are in total with an increasing amount of blocks. Record the highest number he does correctly or stop at about twenty blocks. The student understands conservation.
- B) Stops and counts each block or guesses the wrong amount, have him count the blocks one by one. Mix them up and have him count again. Ask, "**How many blocks altogether?**" If he counts by touching each block and does not automatically say the total amount of blocks, it means he doesn't understand conservation. Try a lower number of blocks. Record the highest number he can do correctly. To remediate go back to *Patterns in Arithmetic: Book 2* and start with Breaking Up Numbers: Three Circles. The student is not ready for Grade 3 Booklets if he doesn't conserve numbers.

Arithmetic Skills

Unobtrusively observe the student doing the problems. Note his speed and whether or not he uses counting to find answers. If he does use counting, do not prohibit it. Simply note it and plan drill work on the basic facts to improve fluency. If he seems to be struggling or shows signs of frustration, remind him to skip problems that he feels are too difficult.

The problems are organized into seven sets with three problems in each set. The first problem in each set is an expanded problem. The second and third problems are to be done the short notation way. Look at problems D and F for example. In problem F, the student adds the 4 and the 8 to make 12. He writes a 2 in the ones place and carries the 1 to the second column and writes it above the 6. Then 1 is added to the 6 and the 2 to get 9. The 9 will be written next to the 2 to get the final answer of 92. Many students do not understand that the 1 that he carries to the second column is actually a ten. How the $1+6+2$ turns into a 90 is somewhat of a mystery. He has practiced adding by rote without thinking about the true value of the numbers he is working with. Problem D will reveal this weakness if it is there. In problem D, the student adds the 9 and the 5 to get 14. The 4 is written in the ones place and a 10 is carried and written above the 20 in the second column. The 10, 20, and 30 are added to get 60. The 60 is added to the 4 to get 64. See the example below. Problem P, an expanded borrowing problem, is also shown.

$$\begin{array}{r} \text{D.} \\ 29 = \overset{10}{\underline{20}} + \underline{9} \\ + 35 = \underline{30} + \underline{5} \\ \hline 64 = \underline{60} + \underline{4} \end{array}$$

$$\begin{array}{r} \text{P.} \\ 53 = \overset{40}{\underline{50}} + \overset{10}{\underline{3}} \\ - 27 = \overset{-20}{\underline{-20}} + \overset{+7}{\underline{+7}} \\ \hline 26 = \underline{20} + \underline{6} \end{array}$$

If on problems D and P, you see the student do something similar to this,

$$\begin{array}{r}
 \text{D. } 29 = \overset{1}{\underline{20}} + \underline{9} \\
 + 35 = \underline{30} + \underline{5} \\
 \hline
 \underline{55} = \underline{51} + \underline{4}
 \end{array}$$

$$\begin{array}{r}
 \text{P. } 53 = \overset{49}{\underline{\cancel{50}}} + \overset{13}{\underline{}} \\
 - 27 = \underline{} + \underline{} \\
 \hline
 \underline{35} = \underline{29} + \underline{6}
 \end{array}$$

then you know that there is confusion on the values of the numbers. If this happens or if the student does not know how to do an expanded problem, see the Circle Math Addition and Regrouping sections in *Patterns in Arithmetic: Book 2* and the subtraction section in *Subtraction: Booklet 3*.

Problems A, B, and C test 2 digit addition without carrying.

Problems D, E, and F test 2 digit addition with carrying into the tens place.

Problems G, H, and I test 3 digit addition with carrying into the hundreds place. No carrying to tens

Problems J, K, and L test 3 digit addition with carrying to both the tens and the hundreds

Problems M, N, and O test 2 digit subtraction without regrouping (borrowing).

Problems P, Q, and R test 2 digit subtraction with regrouping. Some students will use Circle Math to solve these and may use nonstandard regrouping. If so, begin work on standard regrouping.

Problems S, T, and U test regrouping in two places. This is not covered in *Patterns in Arithmetic: Book 2*, but a few students will be able to do it based on what they already know.

Problems V, W, and X test calculation of basic multiplication facts.

Problems Y and Z test short, two digit multiplication. Most students will do this with addition at this point.

Word Problems

This page tests if a student can formulate an addition, a subtraction, and a multiplication word problem. If he can't, then he doesn't understand the structure of word problems and should review them.

Notes for Arithmetic Skills

Items that are missed should be examined to determine if the error is conceptual or if it is a miscalculation difficulty. Conceptual errors will tend to be repeated from problem to problem. If miscalculations on a single operation are frequent, work on basic facts is in order. It is also possible that the student has not gained fluency with a certain type of problem. Widespread mistakes usually indicate the student worked too fast or he is feeling poorly about his ability to do math.

Two Common Conceptual Errors

$$\begin{array}{r}
 37 \\
 + 46 \\
 \hline
 713
 \end{array}$$

1. This answer indicates that the student does not understand place value and has not mastered carrying. The fact that the 7 is pushed into the hundreds place shows lack of understanding of place value. The student also does not have a sense of a reasonable answer (that $37 + 46$ can't possibly be 713). After the test is finished, have the student make a model of 713 with the blocks. Then do the problem with blocks. He will be able to see that the total is much less than 713. Some students will then correct their own error. Lots of practice on this type of problem should then follow. A student who can't correct the error should review the lessons on regrouping in *Patterns in Arithmetic: Book 2*.

2. This error indicates a lack of understanding of the meaning of the positions of the numbers in a subtraction problem. The student, when confronted with $2 - 9$, changes it to

$$\begin{array}{r} 32 \\ -19 \\ \hline 17 \end{array}$$

9 - 2, not realizing that this completely alters the problem and that the bottom number is what is taken away from the top number. Review basic subtraction in Circle Math Review in the Subtraction section of this book. Then give the student a chance to redo the problem knowing that the situation is 2 - 9. He may or may not know how to proceed from that point. It may be necessary to review the subtraction section in *Patterns in Arithmetic: Book 2*.

Circle Math

Do not give this section to a student who is new to this series.

1. In this problem, the student breaks up the 14 into the three circles, breaks up the 21, then solves the little addition problems in the circles, and records the totals in the three circles under the line. A final sum is obtained by adding up the numbers in the bottom circles. If the student has forgotten how to solve Circle Math problems, see Circle Math Addition: Review. Example:

$$\begin{array}{r} 14 = (5) + (4) + (5) \\ +21 = (9) + (8) + (4) \\ \hline 35 = (14) + (12) + (9) \end{array}$$

2. This problem is done the same way as Problem 1, but with different numbers.

3. This problem is done the same way as the previous two except that the broken up 19 is subtracted from the broken up 26. The final answer is obtained by adding the partial differences in the bottom row of circles. Example:

$$\begin{array}{r} 26 = (9) + (8) + (9) \\ -19 = (-7) + (-6) + (-6) \\ \hline 7 = (2) + (2) + (3) \end{array}$$

4. In this problem, the numbers have already been broken up. But you will notice that in the last circles, the number on the top is smaller than the number on the bottom. The student is instructed to 'fix' it so that the subtraction can be done. In this case the numbers in the bottom row can't be rearranged without recreating the same difficulty. The easiest way to fix this situation is to 'trade' some numbers from the 17 to make the 5 larger. There are many ways to solve this. One way is in the example. If the student insists on completely scrubbing the given numbers and starting over, that's fine. There will be practice with this situation in the lesson Discovering Easier Ways.

$$\begin{array}{r} \\ \\ 26 = (\cancel{17}) + (4) + (\cancel{5}) \\ -19 = (-7) + (-4) + (-8) \\ \hline 7 = (7) + (0) + (0) \end{array}$$

Example:

5. This is new material for most students. An advanced student may be able to solve the problem. It tests the limit of knowledge in regard to standard regrouping. The problem asks the student to solve the problem using tens and ones. The student may or may not borrow a ten. The standard solution to this type of problem is taught in the subtraction section in this book.

Conservation of Number, Concept 9, is discussed in the General Concepts Section.

Speed Test

The speed test measures fluency in basic addition and subtraction facts. Give the speed tests several days after the other Assessment Worksheets. This allows the student a few days of brushing up before having to work at top speed. The test is in four parts with six problems in each part. Each section is timed separately.

Part A tests basic sums to 9. Record results on Assessment Sheet, Addition 1.

Part B tests intermediate sums from 10 to 18. Record results on Assessment Sheet, Addition 2.

Part C tests basic subtractions from numbers 3 through 9. Record results on Assessment Sheet, Subtraction 1.

Part D tests intermediate subtractions from numbers 10 through 18. Record results on Assessment Sheet, Subtraction 2.

For most seven- and eight-year-old students, parts B and D are difficult to do quickly.

For a Large Group

Allow exactly 30 seconds for each section. This may seem like a very short time (especially to the students) but actually allows 5 seconds per problem. If a student thinks that he can not possibly work that fast, have him count out 5 seconds to see how long a time 5 seconds really is. This rate does not require an automatic response to the problem, which is what the goal is. For eight years old and up, the goal is an accurate response within 3 seconds by the end of the school year.

"You will have 30 seconds to do each part. Work as fast as you can but don't panic if you can't finish before the time is called. If you come to a problem you don't know the answer to, skip it and come back to it if you have time. You must stop at the end of each part. The word STOP is written on the test to show you where to stop."

Have the students help correct their work. To the side of each problem set is a 30 with a line under it followed by an = sign. To find the time spent per problem, count up the number of correct answers and write that number under the line beneath the 30. Divide the 30 by the number of correctly done problems to obtain the time spent per problem. Since these students probably don't know how to divide, put a chart on the board that gives the scores:

6 problems correct = 5 seconds or less per problem,

5 problems correct = 6 seconds per problem,

4 problems correct = 7 1/2 seconds per problem and so on. A score of 6 seconds per problem or more indicates lack of fluency. Make a game of trying to get faster, where the amount of improvement is rewarded rather than the speed itself. See Expansion at the end of this section.

For Individuals or Small Groups

Tell the student that you are going to time him and that he should work as quickly as he can. Time each section separately. Instead of giving 30 seconds per section, time how long it takes the student to complete the section. To obtain the time spent per problem, count up the correct answers and divide that number into the number of seconds it took the student to complete that section.

If the student is being home educated and is not required to take timed achievement tests, you may want to skip the speed tests. However, there are other reasons for knowing the basic facts quickly. First, it makes doing longer problems easier. Second, practicing thinking quickly is a mental calisthenic. Many students enjoy the challenge of trying to improve their speed, especially if there is no grade pressure.

Patterns

The student continues representational and numeric patterns. The blank line in front is for extending the pattern in the other direction. If patterns is new to a student, review Patterns in *Patterns in Arithmetic: Book 2*.

Organizing the Results

Use the Assessment: Record Sheet to record the student's aptitude on each skill and concept tested. If his current level is adequate, put a \checkmark in the first box, labeled OK, next to that skill or concept. If you want to work further with the student on a particular thing, put a check in the second box, labeled NW for needs work.

In the Arithmetic Skills section, you will notice that on some items there are two sets of boxes. One set is labeled EX for expanded problems, and one is labeled SN for short notation. Record the results for the expanded problems separately from the short notation problems. It is common for a student to be able to do an expanded problem but not a short notation problem, or vice versa.

You will also notice that Circle Math problems are included in the list of skills to be checked off. Ignore these if the student has not done *Patterns in Arithmetic: Book 2*.

If your student is new to this series and is competent in addition and subtraction, you may want to skip Circle Math addition and subtraction or do it quickly later in the year after having done multiplication and division. If your student needs work on regrouping, it would make his understanding much stronger if you do the Circle Math lessons before you teach the standard methods of regrouping.

When you have finished recording all the results, look over your list of Needs Work items, if there are any. Note whether the items are individually developed ideas, like Families of Facts or the Associative Property, that are taught as a single idea or if the items are linked, such as multiplication number sentences, the concept of multiplication, and the multiplication facts. Did the student have difficulty on all the multiplication questions or only one section of them? Could the student do subtraction without regrouping but not the problems with regrouping? The answers to these kinds of questions will help you decide where to start.

Using the Results

On another piece of paper, write a list of the things you want to work on with that student. Note whether you want to review a skill separately or if it is the starting point for a whole series of lessons. For example, a student who had difficulty with the multiplication word problem may need just a quick brush-up on word problems, or he may need to work on the entire concept of multiplication itself which spans several lessons. (The latter situation would be diagnosed by difficulty on all or most of the multiplication questions.)

Put your list into an order that seems reasonable to you and use it to begin your lessons.

Needing further work on some items in *Patterns in Arithmetic: Book 1* or *Book 2* does not mean that the student can't begin working on some of the things in Grade 3 Booklets. Work on addition or subtraction can proceed separately from work on multiplication and division. Work on fractions is related to division, but they are not directly linked to each other at this point. Items needing further work would hold up the beginning of new material in Grade 3 Booklets only if mastery of the material that needs to be worked on is a prerequisite for the new lesson.

In planning your approach, you might consider this point. If it is the beginning of a new school year or session or if you are integrating a new student, *do not start with trouble areas*. Start on something brand-new and fresh or not related to the weak material. A student who is struggling with arithmetic, or one who says that he hates math, might start on geometry or patterns and cycles. Psychologically, this makes a world of difference to the student. It avoids the "Oh no, not this again" syndrome and helps him feel he is making real progress. His good feelings about the work is one of your greatest allies. You can circle around to the trouble areas after he has gained momentum.

You will find yourself working on several fronts at once. That's the way learning goes. We humans hardly ever learn things in a linear fashion. One way not to be overwhelmed by this is to use the Sequence Guides to chart what has been accomplished. (These sheets can also serve home schoolers who need to show progress to local school districts.)

Students love charting their own progress. Invite them to participate in directing their own learning. Try to follow current interests, and change the order of lessons to suit the student's needs. Our ordering is a possible path, not the only path a learner might take as he adds to his skills and knowledge. A student who is eager to learn to divide, for example, need not do all the multiplication lessons first. Since multiplication and division are closely linked, doing division first would assist the learning of multiplication later. The conventional route is to learn multiplication first, but that would not take precedence over a strong desire to learn division.

Expansion

One way to increase speed on basic addition and multiplication facts is to use Picture My Learning (at the end of the addition and multiplication sections in this book and in the booklets Addition: Booklet 3 and Multiplication: Booklet 1). The teacher or another student gives the problem, pointing with a pencil to the appropriate square if possible; the student writes in the answer as fast as he can. If the correct response is given in 3 seconds or less, the student then colors that problem square green. A 4 to 6 second response square is colored orange. A 7 to 10 second response square is colored yellow. An incorrect response or no response after 10 seconds square is colored red.


One way to speed the process up is to write the letter "g" for green, "o" for orange, "y" for yellow and "r" for red in the squares and color them in after all the problems have been given.

If you are working with a large group, give the problem, then after 3 seconds say, "Green." Any student who answered within that time span writes a little "g" in the square. After 6 seconds say, "Orange," and any student who answered in that time span writes an "o" in his square. At 10 seconds say yellow, at 11 seconds say red and give the correct answer. Any student who missed the problem automatically codes the square for red. A student who writes an answer in 4 seconds, for example, realizes the answer is wrong, and rewrites it by 9 seconds would code the square yellow.

The value of this type of chart is that it shows in a very graphic way the student's improvement as the distribution of colors shifts from red and yellow to green and orange. It also shows the student which problems need work (generally fewer than the student would have guessed), allowing him to focus on the few that are hard and not be concerned about the others. This method results in very rapid improvement for most students. Most enjoy coloring in the charts. Twice per week seems to be an adequate number of times to do this activity.

1. Place Value


This little square □ stands for 1.

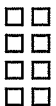
This tower  stands for 10.


This big square  stands for 100.

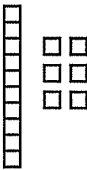
Write the number that each drawing stands for.

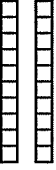
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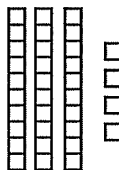
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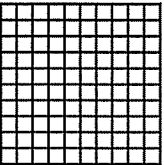
a.  =

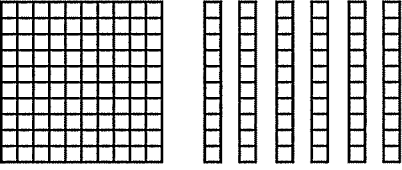
b.  =

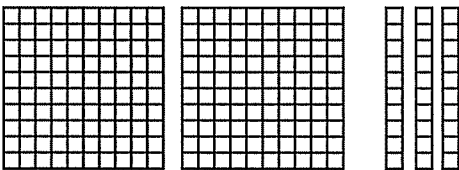
c.  =

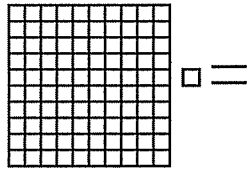
d.  =

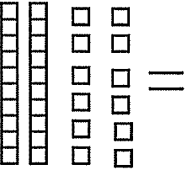
e.  =

f.  =

g.  =

h.  =

i.  =

j.  =

k. Write the number that comes after each of these numbers.

39, _____ 99, _____
 109, _____ 111, _____

2. Associative Property

Don't add these! Just look at the problems. Circle the two that will have the same answer as this addition problem, $6 + 3 + 5 = \underline{\quad}$.

$$5 + 6 + 3 = \underline{\quad}$$

$$2 + 4 + 5 = \underline{\quad}$$

$$5 + 6 + 2 = \underline{\quad}$$

$$4 + 5 + 3 = \underline{\quad}$$

$$3 + 5 + 6 = \underline{\quad}$$

$$4 + 6 + 5 = \underline{\quad}$$

3. Number Sentences

Write the number sentence (the problem you do) that goes with each word problem. Then find the answer.

a. Nan has 3 blue balls, 5 green balls, and 4 red balls. How many balls does Nan have?

Number Sentence _____

b. Henry had \$17. Somehow he lost \$6. How much does he have left?

Number Sentence _____

c. Every day Toby collects 3 eggs from the chicken coop. How many eggs does Toby collect each week?

Number Sentence _____

4. Families of Facts

Use only these three numbers to make four different number sentences.

2, 3, 5

DO NOT use any other numbers.

The first one is done for you.

$$2 + 3 = 5$$

5. Difference Between

Which number is larger: 24 or 15? _____

How much larger? _____

6. Expansion of Numbers

Break up 23 three different ways.

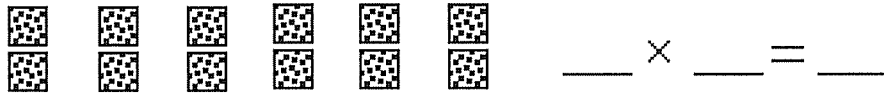
$$23 = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$23 = \underline{\quad} + \underline{\quad} + \underline{\quad}$$

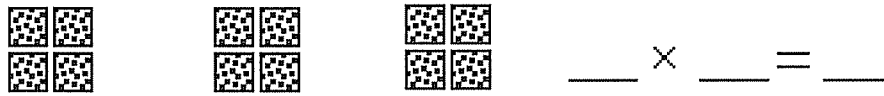
$$23 = \underline{\quad} + \underline{\quad}$$

7. Concept of Multiplication

What multiplication problem is shown in this picture?



What multiplication problem is shown in this picture?



Draw a picture of $3 \times 5 = 15$.

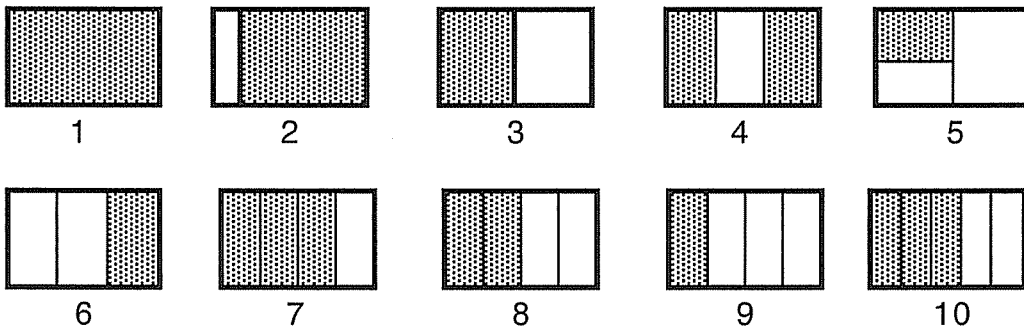
8. Fraction Notation

There are ten boxes below.

Circle the one that has $\frac{1}{2}$ shaded in.

Put an X on the one that has $\frac{1}{3}$ shaded in.

Underline the one that has $\frac{3}{4}$ shaded in.

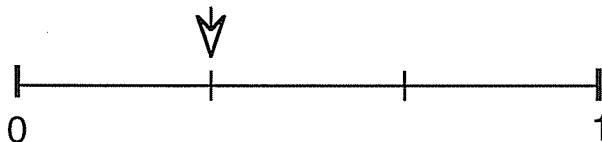


In a fraction what is the top number called? _____

In a fraction what is the bottom number called? _____

What information does the bottom number give? _____

The arrow points to which fraction on the number line? _____



Here are two ways to solve arithmetic problems.

Expanded way

$$\begin{array}{r} 34 = 30 + 4 \\ + 25 = 20 + 5 \\ \hline 59 = 50 + 9 \end{array}$$

Short way

$$\begin{array}{r} 34 \\ + 25 \\ \hline 59 \end{array}$$

Solve these problems the Expanded way.

A. 10s 1s

$$\begin{array}{r} 52 = \underline{50} + \underline{2} \\ + 37 = \underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \underline{\quad} \end{array}$$

D.

$$\begin{array}{r} 29 = \underline{\quad} + \underline{\quad} \\ + 35 = \underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \underline{\quad} \end{array}$$

G.

$$\begin{array}{r} 147 = \underline{\quad} + \underline{\quad} + \underline{\quad} \\ + 271 = \underline{\quad} + \underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \underline{\quad} + \underline{\quad} \end{array}$$

J.

$$\begin{array}{r} 364 = \underline{\quad} + \underline{\quad} + \underline{\quad} \\ + 177 = \underline{\quad} + \underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \underline{\quad} + \underline{\quad} \end{array}$$

Solve these problems the Short way.

B. C.

$$\begin{array}{r} 23 \\ + 12 \\ \hline \end{array} \qquad \begin{array}{r} 51 \\ + 47 \\ \hline \end{array}$$

E. F.

$$\begin{array}{r} 52 \\ + 49 \\ \hline \end{array} \qquad \begin{array}{r} 64 \\ + 28 \\ \hline \end{array}$$

H. I.

$$\begin{array}{r} 284 \\ + 393 \\ \hline \end{array} \qquad \begin{array}{r} 472 \\ + 454 \\ \hline \end{array}$$

K. L.

$$\begin{array}{r} 385 \\ + 345 \\ \hline \end{array} \qquad \begin{array}{r} 201 \\ + 399 \\ \hline \end{array}$$

Start at the top and work across these subtraction problems.

Solve these problems the expanded way.

Solve these problems the short way.

M.

$$\begin{array}{r} 46 = \underline{\quad} + \underline{\quad} \\ - 23 = -\underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \end{array}$$

N.

$$\begin{array}{r} 38 \\ - 27 \\ \hline \end{array}$$

O.

$$\begin{array}{r} 59 \\ - 36 \\ \hline \end{array}$$

P.

$$\begin{array}{r} 53 = \underline{\quad} + \underline{\quad} \\ - 27 = -\underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \end{array}$$

Q.

$$\begin{array}{r} 32 \\ - 14 \\ \hline \end{array}$$

R.

$$\begin{array}{r} 76 \\ - 38 \\ \hline \end{array}$$

These next three problems are difficult. If you don't know how to do them, skip them and go on to the next part.

S.

$$\begin{array}{r} 452 = \underline{\quad} + \underline{\quad} + \underline{\quad} \\ - 274 = -\underline{\quad} + \underline{\quad} + \underline{\quad} \\ \hline \underline{\quad} = \underline{\quad} + \underline{\quad} + \end{array}$$

T.

$$\begin{array}{r} 347 \\ - 158 \\ \hline \end{array}$$

U.

$$\begin{array}{r} 404 \\ - 255 \\ \hline \end{array}$$

These are multiplication problems.

V.

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

W.

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

X.

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

Y.

$$\begin{array}{r} 14 \\ \times 5 \\ \hline \end{array}$$

Z.

$$\begin{array}{r} 25 \\ \times 4 \\ \hline \end{array}$$

Word Problems

1. Write a word problem that uses this problem: $4 + 7 = 11$.

2. Write a word problem that uses this problem: $14 - 8 = 6$.

3. Write a word problem that uses this problem: $4 \times 3 = 12$.

1. Solve this addition problem.
Use all the circles.

$$\begin{array}{r}
 14 = \bigcirc + \bigcirc + \bigcirc \\
 + 21 = \bigcirc + \bigcirc + \bigcirc \\
 \hline
 \underline{\quad} = \bigcirc + \bigcirc + \bigcirc
 \end{array}$$

2. Solve it again a different way.

$$\begin{array}{r}
 14 = \bigcirc + \bigcirc + \bigcirc \\
 + 21 = \bigcirc + \bigcirc + \bigcirc \\
 \hline
 \underline{\quad} = \bigcirc + \bigcirc + \bigcirc
 \end{array}$$

3. Solve this subtraction problem.
Use all the circles.

$$\begin{array}{r}
 26 = \bigcirc + \bigcirc + \bigcirc \\
 - 19 = -\bigcirc + -\bigcirc + -\bigcirc \\
 \hline
 \underline{\quad} = \bigcirc + \bigcirc + \bigcirc
 \end{array}$$

4. Fix this problem.

$$\begin{array}{r}
 26 = \bigcirc 17 \bigcirc + \bigcirc 4 \bigcirc + \bigcirc 5 \bigcirc \\
 - 19 = \bigcirc -7 \bigcirc + \bigcirc -4 \bigcirc + \bigcirc -8 \bigcirc \\
 \hline
 \underline{\quad} = \bigcirc + \bigcirc + \bigcirc
 \end{array}$$

5. Break up this problem into tens and ones.

$$\begin{array}{r}
 26 = \bigcirc + \bigcirc \\
 - 19 = -\bigcirc + -\bigcirc \\
 \hline
 \underline{\quad} = \bigcirc + \bigcirc
 \end{array}$$

Concept #9 Conservation of Number

Problems 3, 4, and 5 are broken up different ways. Does that change the answer?

Explain _____

Section 1: Addition

$\begin{array}{r} A \quad 8 \\ + 1 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ + 2 \\ \hline \end{array}$	$\begin{array}{r} 3 \\ + 6 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ + 3 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ + 3 \\ \hline \end{array}$	$30 =$ _____ STOP
---	---	---	---	---	---	-------------------------

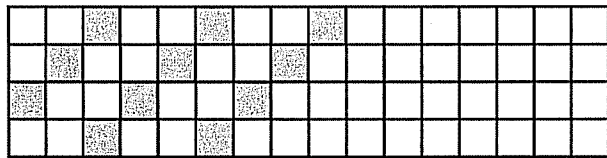
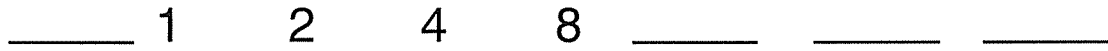
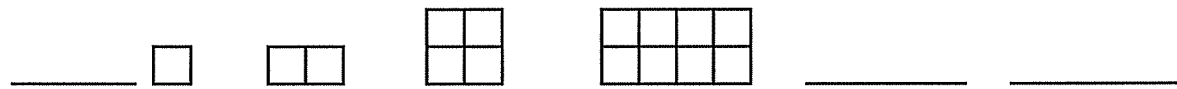
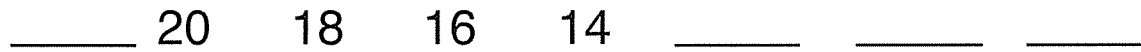
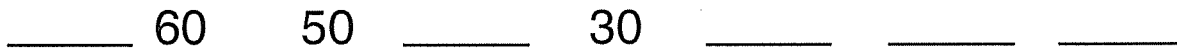
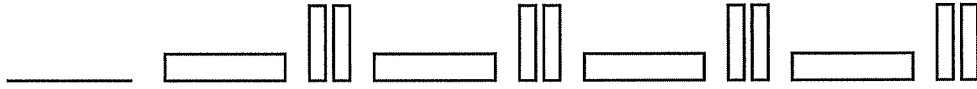
$\begin{array}{r} B \quad 7 \\ + 3 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ + 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ + 9 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ + 4 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ + 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ + 7 \\ \hline \end{array}$	$30 =$ _____ STOP
---	---	---	---	---	---	-------------------------

Section 2: Subtraction

$\begin{array}{r} C \quad 7 \\ - 4 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ - 1 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ - 2 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ - 5 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ - 6 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ - 3 \\ \hline \end{array}$	$30 =$ _____ STOP
---	---	---	---	---	---	-------------------------

$\begin{array}{r} D \quad 11 \\ - 3 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ - 6 \\ \hline \end{array}$	$\begin{array}{r} 15 \\ - 7 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ - 4 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ - 5 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ - 9 \\ \hline \end{array}$	$30 =$ _____ STOP
--	--	--	--	--	--	-------------------------

Continue each pattern as far as you can.



Make up two more patterns.

Assessment: Record Sheet

Name _____

Date _____

General Concepts

- | | OK | NW |
|---|--------------------------|--------------------------|
| 1. Place Value to the hundreds | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Commutative and Associative Properties | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Number sentences - addition | <input type="checkbox"/> | <input type="checkbox"/> |
| - subtraction | <input type="checkbox"/> | <input type="checkbox"/> |
| - multiplication | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Families of Facts | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Difference Between | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Concept of Multiplication | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Fraction Notation | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Expansion of Numbers (Circle Math) | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Conservation of Number (Circle Math) | <input type="checkbox"/> | <input type="checkbox"/> |

Arithmetic Skills

Addition

- | | | | | |
|--|-----------------------------|--------------------------|----|--------------------------|
| 1. Calculation of Basic Facts | <input type="checkbox"/> | <input type="checkbox"/> | | |
| 2. Calculation of Intermediate Facts | <input type="checkbox"/> | <input type="checkbox"/> | | |
| 3. Nonstandard Addition (Circle Math)..... | <input type="checkbox"/> | <input type="checkbox"/> | | |
| 4. Two digits - No regrouping | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> |
| 5. Two digits - Regrouping | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> |
| 6. Three digits - Regrouping to hundreds place only..... | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> |
| 7. Three digits - Regrouping to tens and hundreds place. | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> |
| 8. Word problems | <input type="checkbox"/> | <input type="checkbox"/> | | |

Subtraction

- | | | | | | |
|---|-----------------------------|--------------------------|-------|--------------------------|--------------------------|
| 1. Calculation of Basic Facts | <input type="checkbox"/> | <input type="checkbox"/> | Speed | _____ | sec/prob |
| 2. Calculation of Intermediate Facts | <input type="checkbox"/> | <input type="checkbox"/> | Speed | _____ | sec/prob |
| 3. Nonstandard Subtraction (Circle Math) | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| 4. Two digits - No regrouping | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Nonstandard Regrouping (Circle Math)..... | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| 6. Two digits - Regrouping..... | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Three digits - Regrouping to tens and hundreds place | EX <input type="checkbox"/> | <input type="checkbox"/> | SN | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Word problems | <input type="checkbox"/> | <input type="checkbox"/> | | | |

Multiplication

- | | | |
|---|--------------------------|--------------------------|
| 1. Calculation of Basic Facts from 2 - 5 Times Tables | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Two digit x one digit using addition | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Word problems | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | |
|----------------|--------------------------|--------------------------|
| Patterns | <input type="checkbox"/> | <input type="checkbox"/> |
|----------------|--------------------------|--------------------------|

OK = adequate
 NW = needs work
 EX = expanded
 SN = short notation


Where to go from here: record on another sheet of paper.


Answer Key

Assessment: General Concepts - Worksheet 1

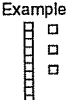
1. Place Value


This little square □ stands for 1.


This tower  stands for 10.

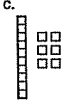
This big square  stands for 100.

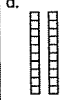
Write the number that each drawing stands for.


Example:
 = 13

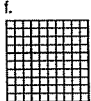
a.  = 8

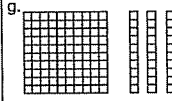
b.  = 5

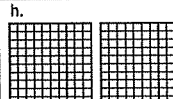
c.  = 16


d.  = 20


e.  = 34

f.  = 100

g.  = 160

h.  = 232

i.  = 101

j.  = 32

k. Write the number that comes after each of these numbers.

39, 40 99, 100
 109, 110 111, 112

Assessment: General Concepts - Worksheet 3

7. Concept of Multiplication

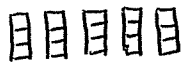
What multiplication problem is shown in this picture?

 $2 \times 6 = 12$

What multiplication problem is shown in this picture?

 $4 \times 3 = 12$

Draw a picture of $3 \times 5 = 15$.



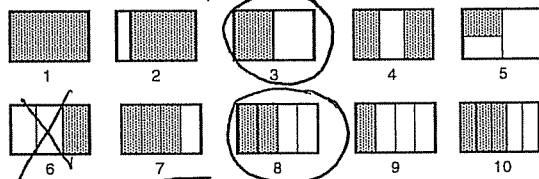
8. Fraction Notation

There are ten boxes below.

Circle the one that has $\frac{1}{2}$ shaded in.

Put an X on the one that has $\frac{1}{3}$ shaded in.

Underline the one that has $\frac{3}{4}$ shaded in.



In a fraction what is the top number called? numerator

In a fraction what is the bottom number called? denominator

What information does the bottom number give? number of pieces in the whole

The arrow points to which fraction on the number line. $\frac{1}{3}$



Assessment: General Concepts - Worksheet 2

2. Associative Property

Don't add these! Just look at the problems. Circle the two that will have the same answer as this addition problem, $6 + 3 + 5 = 14$.

$5 + 6 + 3 =$ $2 + 4 + 5 =$ $5 + 6 + 2 =$
 $4 + 5 + 3 =$ $3 + 5 + 6 =$ $4 + 6 + 5 =$

3. Number Sentences

Write the number sentence (the problem you do) that goes with each word problem. Then find the answer.

a. Nan has 3 blue balls, 5 green balls, and 4 red balls. How many balls does Nan have?
 Number Sentence $3 + 5 + 4 = 12$

b. Henry has \$17. Somehow he lost \$6. How much does he have left?
 Number Sentence $\$17 - 6 = 11$

c. Every day Toby collects 3 eggs from the chicken coop. How many eggs does Toby collect each week?

Number Sentence $3 \times 7 = 21$ or $3 + 3 + 3 + 3 + 3 + 3 + 3 = 21$

4. Families of Facts

Use only these three numbers to make four different number sentences. DO NOT use any other numbers.

(2, 3, 5)
 The first one is done for you.
 $2 + 3 = 5$ $5 - 2 = 3$
 $3 + 2 = 5$ $5 - 3 = 2$

5. Difference Between

Which number is larger: 24 or 15? 24

How much larger? 9

6. Expansion of Numbers

Break up 23 three different ways.

23 = 7 + 12 + 4 + 0 Example
 $23 = \underline{\quad} + \underline{\quad} + \underline{\quad}$
 $23 = \underline{\quad} + \underline{\quad}$

Assessment: Arithmetic Skills - Worksheet 4

Here are two ways to solve arithmetic problems.

Expanded way	Short way
$34 = 30 + 4$	34
$+25 = 20 + 5$	$+25$
<u>$59 = 50 + 9$</u>	<u>59</u>

Solve these problems the Expanded way.

A. $52 = 50 + 2$
 $+ 37 = 30 + 7$
 $89 = 80 + 9$

D. $29 = 20 + 9$
 $+ 35 = 30 + 5$
 $64 = 50 + 14$

G. $147 = 100 + 40 + 7$
 $+ 271 = 200 + 70 + 1$
 $418 = 300 + 110 + 8$

J. $364 = 300 + 60 + 4$
 $+ 177 = 100 + 70 + 7$
 $541 = 400 + 130 + 11$

Solve these problems the Short way.

B. 23
 $+ 12$
35

C. 51
 $+ 47$
98

E. 52
 $+ 49$
101

F. 64
 $+ 28$
92

H. 284
 $+ 393$
677

I. 472
 $+ 454$
926

K. 385
 $+ 345$
730

L. 201
 $+ 399$
600

Assessment: Arithmetic Skills - Worksheet 5

Start at the top and work across these subtraction problems.

Solve these problems the expanded way.

M. BUWV Example:

$$\begin{array}{r} 46 = 40 + 6 \\ - 23 = -20 + -3 \\ \hline 23 = 20 + 3 \end{array}$$

Solve these problems the short way.

N.
$$\begin{array}{r} 38 \\ - 27 \\ \hline 11 \end{array}$$

O.
$$\begin{array}{r} 59 \\ - 36 \\ \hline 23 \end{array}$$

P.
$$\begin{array}{r} 53 = \underline{\quad} + \underline{\quad} \\ - 27 = -\underline{\quad} + -\underline{\quad} \\ \hline 26 = \underline{\quad} + \underline{\quad} \end{array}$$

Q.
$$\begin{array}{r} 32 \\ - 14 \\ \hline 18 \end{array}$$

R.
$$\begin{array}{r} 76 \\ - 38 \\ \hline 38 \end{array}$$

These next three problems are difficult. If you don't know how to do them, skip them and go on to the next part.

S.
$$\begin{array}{r} 452 = \underline{\quad} + \underline{\quad} + \underline{\quad} \\ - 274 = -\underline{\quad} + -\underline{\quad} + -\underline{\quad} \\ \hline 178 = \underline{\quad} + \underline{\quad} + \underline{\quad} \end{array}$$

T.
$$\begin{array}{r} 213 \\ 247 \\ - 158 \\ \hline 189 \end{array}$$

U.
$$\begin{array}{r} 3104 \\ - 255 \\ \hline 149 \end{array}$$

These are multiplication problems.

V.
$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

W.
$$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$$

X.
$$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$$

Y.
$$\begin{array}{r} 14 \\ \times 5 \\ \hline 70 \end{array}$$

Z.
$$\begin{array}{r} 25 \\ \times 4 \\ \hline 100 \end{array}$$

Assessment: Speed Test - Worksheet 8

Section 1: Addition

A.
$$\begin{array}{r} 8 \\ +1 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 4 \\ +2 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 3 \\ +6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array}$$
 30 = STOP

B.
$$\begin{array}{r} 7 \\ +3 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 6 \\ +8 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 9 \\ +9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 9 \\ +4 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 6 \\ +5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 8 \\ +7 \\ \hline 15 \end{array}$$
 30 = STOP

Section 2: Subtraction

C.
$$\begin{array}{r} 7 \\ -4 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 6 \\ -1 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 \\ -5 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ -6 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$$
 30 = STOP

D.
$$\begin{array}{r} 11 \\ -3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 10 \\ -4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 11 \\ -5 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 17 \\ -9 \\ \hline 8 \end{array}$$
 30 = STOP

Assessment

Page 34- Answers will vary.

Assessment: Arithmetic Skills - Worksheet 7

1. Solve this addition problem. BUWV
Use all the circles.

$$\begin{array}{r} 14 = \bigcirc + \bigcirc + \bigcirc \\ +21 = \bigcirc + \bigcirc + \bigcirc \\ \hline 35 = \bigcirc + \bigcirc + \bigcirc \end{array}$$

2. Solve it again a different way.

$$\begin{array}{r} 14 = \bigcirc + \bigcirc + \bigcirc \\ +21 = \bigcirc + \bigcirc + \bigcirc \\ \hline 35 = \bigcirc + \bigcirc + \bigcirc \end{array}$$

AWV Example:

3. Solve this subtraction problem.
Use all the circles.

$$\begin{array}{r} 26 = \bigcirc + \bigcirc + \bigcirc \\ -19 = -\bigcirc + -\bigcirc + -\bigcirc \\ \hline 7 = \bigcirc + \bigcirc + \bigcirc \end{array}$$

4. Fix this problem.

$$\begin{array}{r} 26 = \overset{4}{\cancel{17}} + 4 + \overset{+3}{\cancel{5}} \\ -19 = \overset{-}{\cancel{7}} + \overset{-}{\cancel{4}} + \overset{-}{\cancel{8}} \\ \hline 7 = \overset{-}{\cancel{7}} + \overset{-}{\cancel{0}} + \overset{-}{\cancel{0}} \end{array}$$

5. Break up this problem into tens and ones.

$$\begin{array}{r} 26 = \overset{10}{\cancel{20}} + \overset{+6}{\cancel{6}} \\ -19 = \overset{-}{\cancel{10}} + \overset{-}{\cancel{9}} \\ \hline 7 = \overset{-}{\cancel{0}} + \overset{-}{\cancel{7}} \end{array}$$

Concept #9 Conservation of Number

Problems 3, 4, and 5 are broken up different ways. Does that change the answer?

Explain. Answers stay the same no matter how the numbers are broken up.

Assessment: Speed Test - Worksheet 8

Section 1: Addition

A.
$$\begin{array}{r} 8 \\ +1 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 4 \\ +2 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 3 \\ +6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array}$$
 30 = STOP

B.
$$\begin{array}{r} 7 \\ +3 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 6 \\ +8 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 9 \\ +9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 9 \\ +4 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 6 \\ +5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 8 \\ +7 \\ \hline 15 \end{array}$$
 30 = STOP

Section 2: Subtraction

C.
$$\begin{array}{r} 7 \\ -4 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 6 \\ -1 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ -2 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 \\ -5 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ -6 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$$
 30 = STOP

D.
$$\begin{array}{r} 11 \\ -3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$$

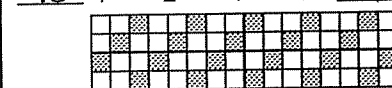
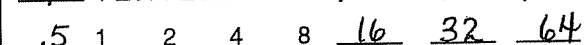
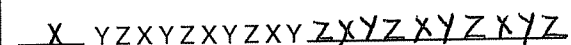
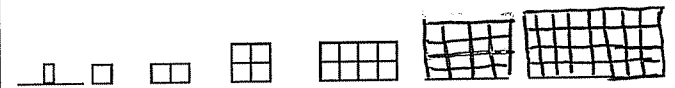
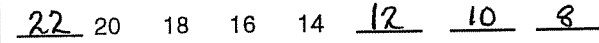
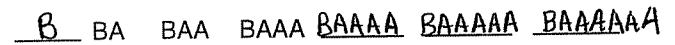
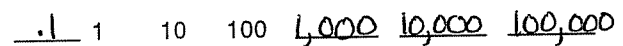
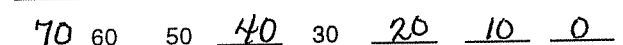
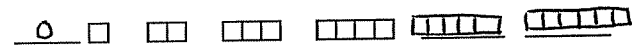
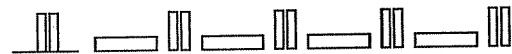
$$\begin{array}{r} 10 \\ -4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 11 \\ -5 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 17 \\ -9 \\ \hline 8 \end{array}$$
 30 = STOP

Assessment: Patterns - Worksheet 9

Continue each pattern as far as you can.



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