

Prime Numbers

Fill in these blanks with these numbers only:

1, 7, 24, 6

_____ is a prime number

If a number is not prime, then it is _____, except for the number _____
Word here

_____ is a factor of every number

_____ is a multiple of _____

_____ is a factor of _____

_____ is divisible by _____

_____ divides _____

_____ | _____

Write all factors, in order of these numbers:

1	10	19
2	11	20
3	12	21
4	13	22
5	14	23
6	15	24
7	16	25
8	17	26
9	18	27

Sieve of Eratosthenes

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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1  2  3  4  5  6
7  8  9 10 11 12
13 14 15 16 17 18
19 20 21 22 23 24
25 26 27 28 29 30
31 32 33 34 35 36
37 38 39 40 41 42
43 44 45 46 47 48
49 50 51 52 53 54
55 56 57 58 59 60
61 62 63 64 65 66
67 68 69 70 71 72
73 74 75 76 77 78
79 80 81 82 83 84
85 86 87 88 89 90
91 92 93 94 95 96
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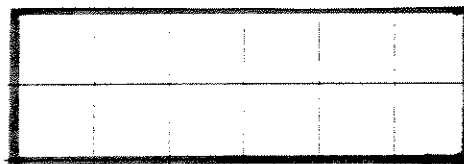
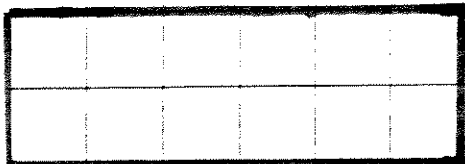
MATERIALS CARD 5.4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
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91	92	93	94	95	96	97	98	99	100

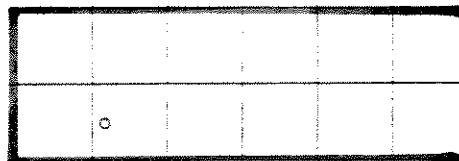
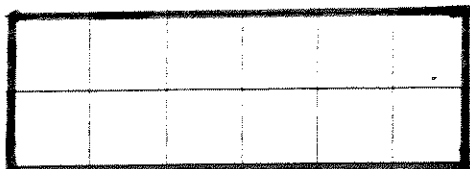
PARTITIONING INTO SQUARES

Any rectangle can be partitioned into squares.
Partition this rectangle into squares:

Is there another way to do it?

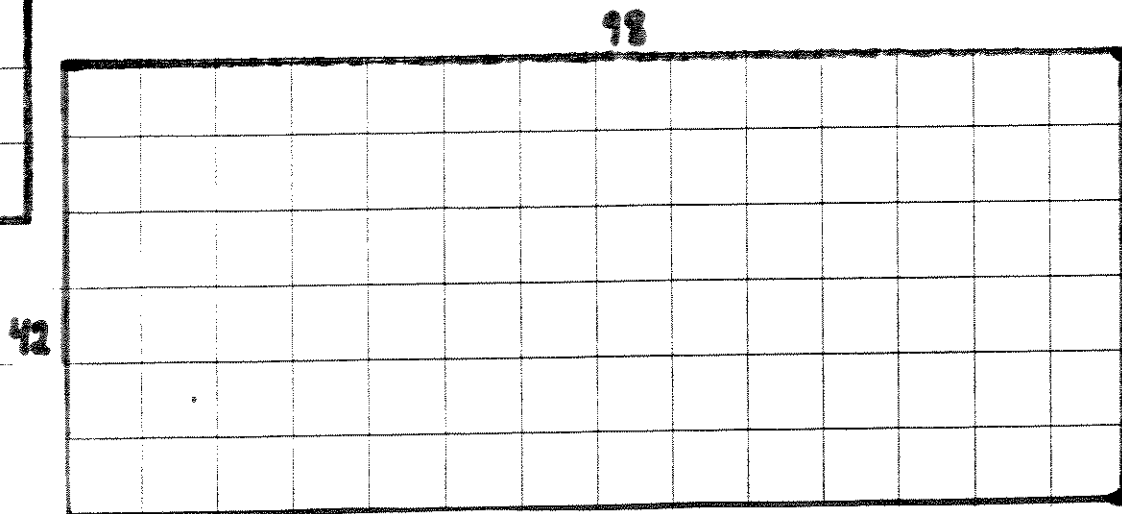
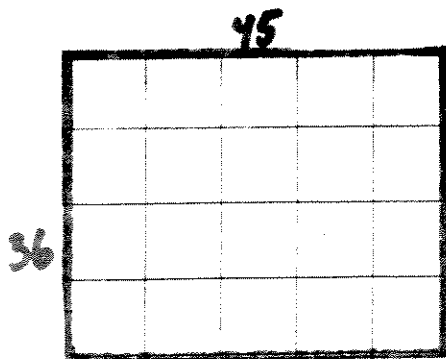
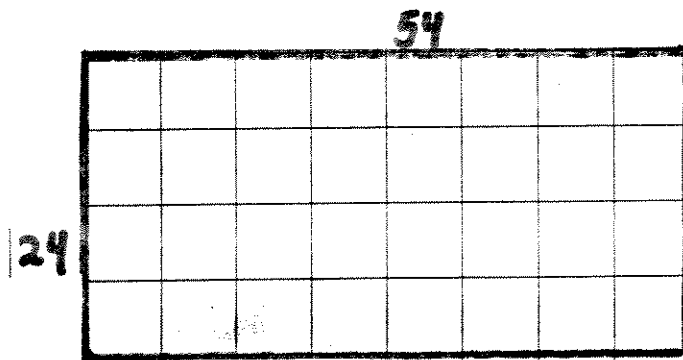
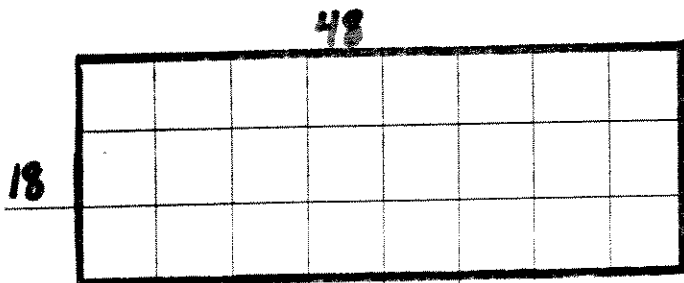


What if the squares do not all have to be the same size? Partition the rectangle into squares of different sizes in two different ways:

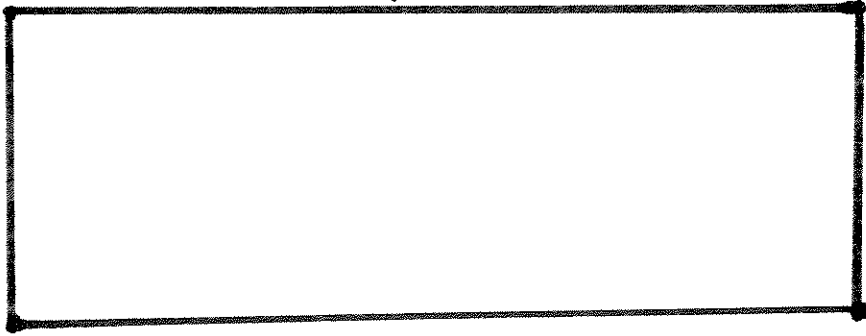


Now, the game is to partition the rectangle into the smallest number of squares possible. Which of the above rectangles is partitioned into the smallest number of squares (not all the same size?)

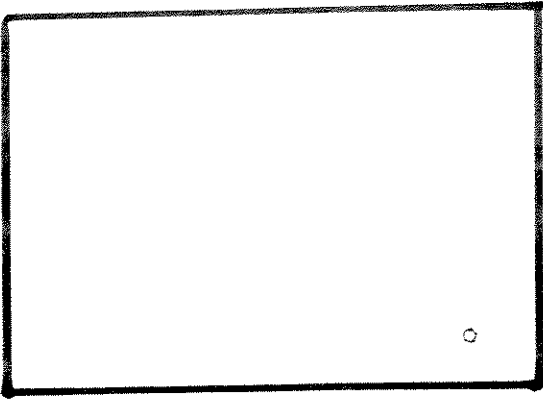
Break these into the fewest squares possible:



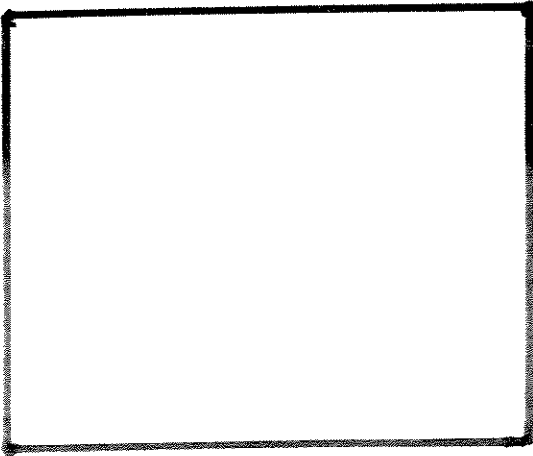
45



84



56



GCF or LCM?

Make a sketch which will help you answer each of these questions. Determine the answer and whether it is the GCF or LCM of the two numbers.

1. Pencils come in packages of 18; erasers that fit on top of these pencils come in packages of 24. What is the smallest number of pencils and erasers that you can buy so each pencil can be matched with an eraser? How many packages of each will you need?

2. Ko has a bag with 45 red candies and another with 75 green candies. She wants to make goody bags so that each goody bag contains the same number of red candies and each goody bag contains the same number of green candies and so that she uses up all of the candies. What is the largest number of goody bags she can make this way? How many of each color will be in the bag?

3. Sam has lots of 8-in sticks he is placing end to end to make a line of sticks. Becky has 12-inch sticks that she is placing end to end to make a line of sticks. If they want their line of sticks to be the same length, how long could they be? What is the shortest such length?

4. If I have a room which is 45 by 36 feet, what is the largest square with which I can tile it without having to cut any tiles?

5. If my tiles are 24 by 36 cm. What is the smallest square room I can tile using the tiles in one direction only and not cutting the tiles?

6. a) I have red lights which are 50 to the string and blue lights which are 30 to the string. To hang them from the house (with a swag), I must put a hanger at the beginning and the end of each strand and evenly space the rest. I want to hang them together. How often must I put the hangers so I can string the two colors together using the smallest number of hangers?

b) How often will I have a common plug? (that is, reach an end of both colors at the same time?)

7. a) Red chips come 75 to the package and blue ones come 50 to the package. How do I stack them in single color stacks so that each stack will be as tall as possible, but both types will have the same height (same number of chips in each stack).

b) I now wants to ship these chips in boxes of single color chips, but want the same number of chips in each box and must use full sets of 75 and 50 as many as necessary, what is the fewest chips I can have per box?

8. Shane, Emily, Jane and Brad play in a string quartet. Their quartet has a 'gig' at a wedding coming up and they need to get together to practice. Emily can only practice with them every 6 days. Shane and Brad can both practice every 4 days. And Jane, who is very busy, can only practice with them every 8 days. Assuming that they can practice together today, when will be the next time they can all get together to practice?

Class Exercise on Fractions

1. Arrange the fractions below in order from the smallest to the largest. DO THIS MENTALLY WITHOUT ANY PAPER OR PENCIL.

$\frac{4}{7}$ $\frac{9}{10}$ $\frac{8}{9}$ $\frac{1}{4}$ $\frac{2}{5}$ $\frac{5}{12}$ $\frac{3}{8}$ $\frac{5}{6}$

2. AGAIN, DO THIS MENTALLY WITHOUT ANY PAPER OR PENCIL.

a: Place each of the fractions below in one of three groups: closer to 0; closer to $\frac{1}{2}$; closer to 1.

$\frac{3}{8}$ $\frac{2}{7}$ $\frac{1}{3}$ $\frac{21}{50}$ $\frac{4}{5}$ $\frac{7}{11}$ $\frac{31}{181}$ $\frac{3}{4}$

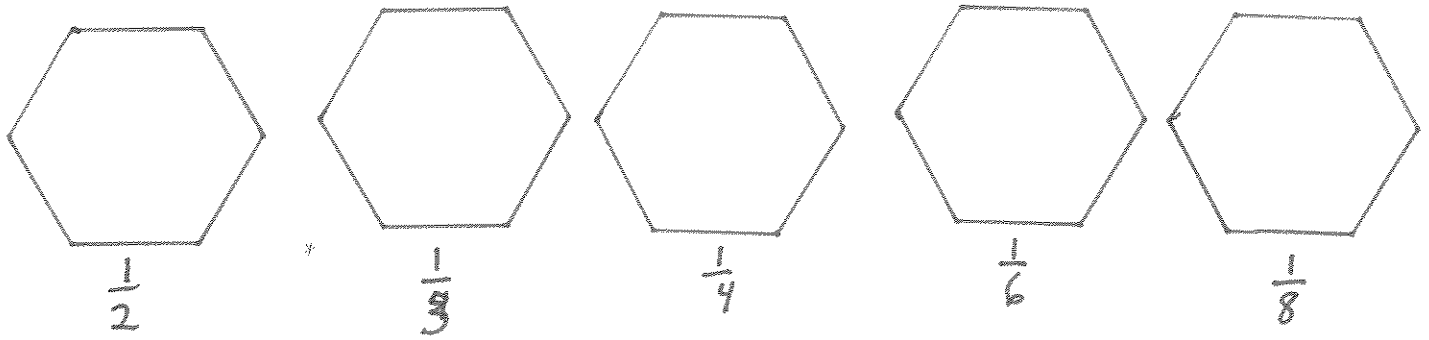
Closer to 0

Closer to $\frac{1}{2}$

Closer to 1

Then justify each choice and discuss what you learned about comparing fractions.

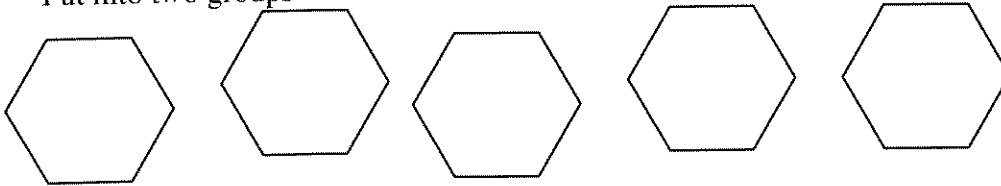
- b. What is a general rule for determining whether a fraction is closer to 0 or closer to $\frac{1}{2}$?
- c. What is a general rule for determining whether a fraction is closer to $\frac{1}{2}$ or closer to 1?
- d. How did the meaning or concept of a fraction help you answer these questions?
3. a. Make a number line and represent $\frac{1}{2}$, $\frac{2}{3}$ and $\frac{3}{4}$ as closely as you can to their "exact" location. Describe your reasoning.
- b. Is $\frac{2}{3}$ closer to $\frac{3}{4}$ or to $\frac{1}{2}$? Can you justify your answer by a means other than that "it looks closer?"



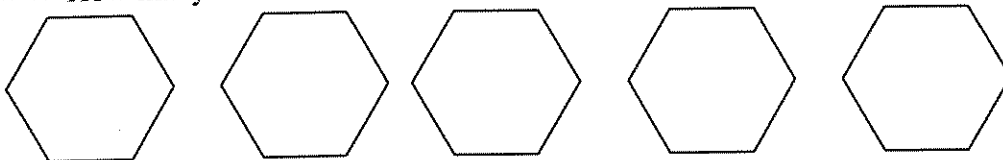
With fractions, sometimes one of the division questions makes more sense than the other:
Which one does?

	Partitive asks:	Measurement asks:
5 divided by 2	Put 5 things into 2 groups	How many groups of 2 are in 5?
5 divided by 1/2	Put 5 things into 1/2 of a group	How many 1/2 s are in 5?
2/3 divided by 2	Put 2/3 into 2 groups	How many 2 are in 2/3?
2/3 divided by 1/2	Put 2/3 into a half a group.	How many 1/2 are in 2/3?

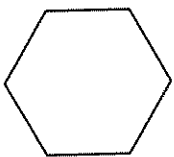
Put into two groups



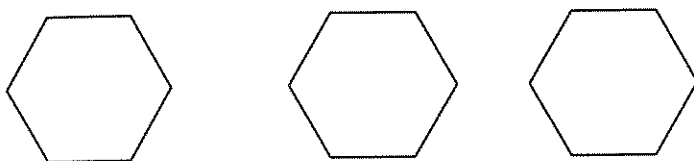
How many 1/2 are there?



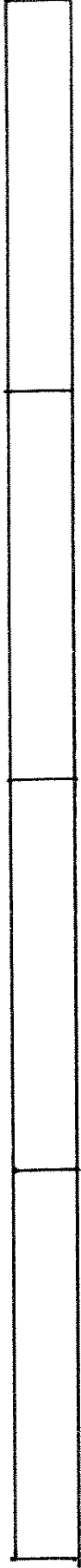
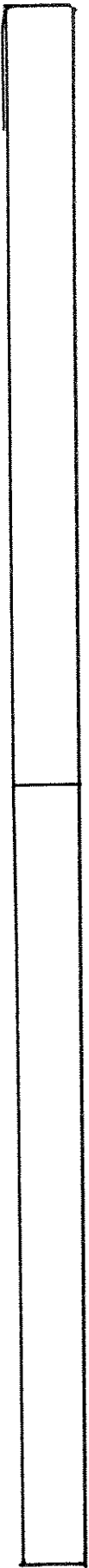
Show 2/3; put it into 2 groups.



Show 2/3; Show 1/2; How many 1/2 are in 2/3?

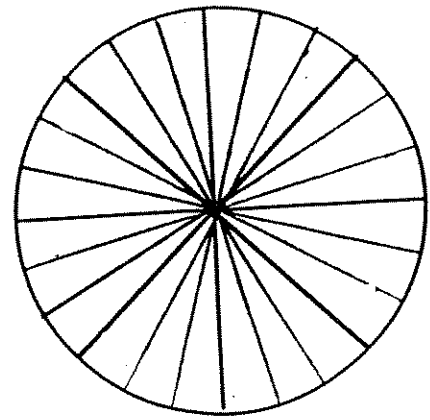
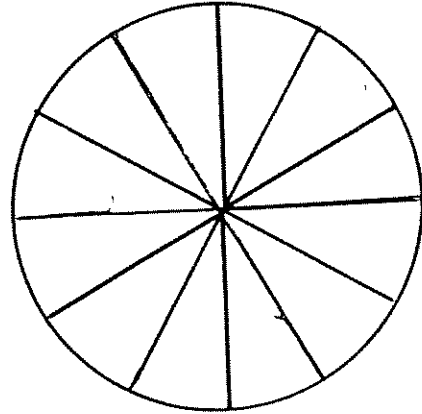
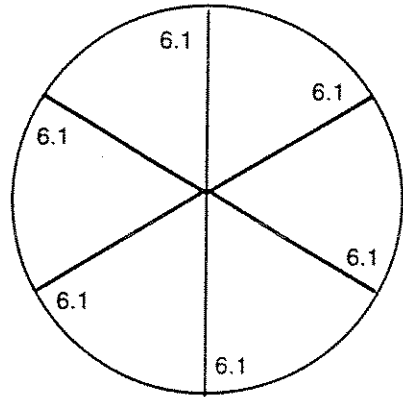
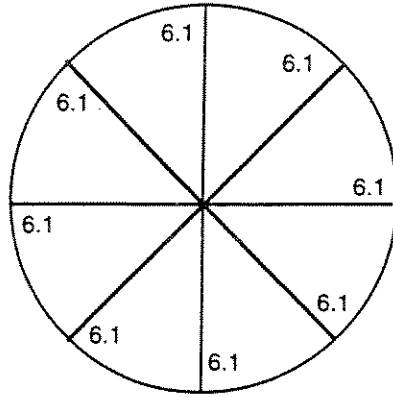
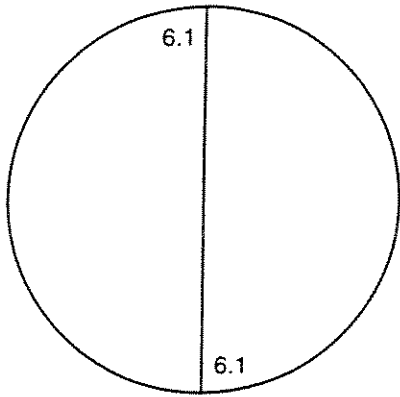
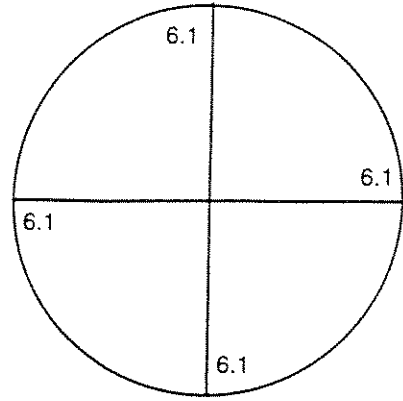
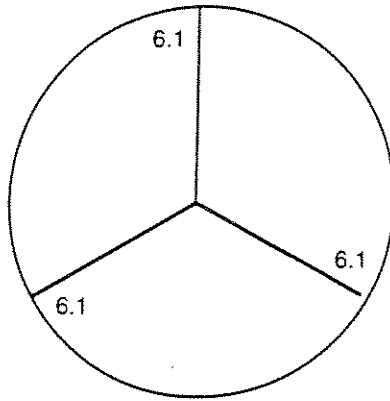
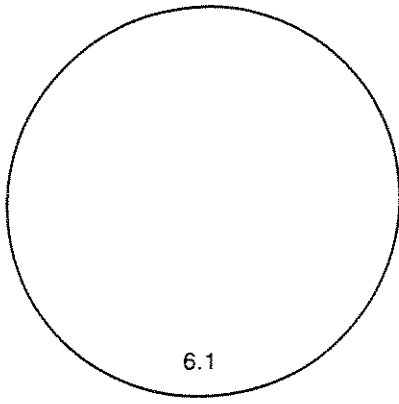


When dealing with 2/3 in a division problem, why is using 2 of 3 objects not a good idea?



MATERIALS CARD 6.1

Remove the circles and then cut on all solid lines.
Save these pieces for use later in the chapter.



Fractions to Decimals

Change the following fractions to decimals. Divide until the quotient (decimal answer) ends or repeats.

$$\frac{1}{2} = \underline{\hspace{2cm}} \quad \frac{1}{3} = \underline{\hspace{2cm}} \quad \frac{1}{4} = \underline{\hspace{2cm}} \quad \frac{1}{5} = \underline{\hspace{2cm}} \quad \frac{1}{6} = \underline{\hspace{2cm}} \quad \frac{1}{8} = \underline{\hspace{2cm}} \quad \frac{1}{9} = \underline{\hspace{2cm}} \quad \frac{1}{10} = \underline{\hspace{2cm}} \quad \frac{1}{11} = \underline{\hspace{2cm}}$$

$$\frac{2}{2} = \underline{\hspace{2cm}} \quad \frac{2}{3} = \underline{\hspace{2cm}} \quad \frac{2}{4} = \underline{\hspace{2cm}} \quad \frac{2}{5} = \underline{\hspace{2cm}} \quad \frac{2}{6} = \underline{\hspace{2cm}} \quad \frac{2}{8} = \underline{\hspace{2cm}} \quad \frac{2}{9} = \underline{\hspace{2cm}} \quad \frac{2}{10} = \underline{\hspace{2cm}} \quad \frac{2}{11} = \underline{\hspace{2cm}}$$

$$\frac{3}{3} = \underline{\hspace{2cm}} \quad \frac{3}{4} = \underline{\hspace{2cm}} \quad \frac{3}{5} = \underline{\hspace{2cm}} \quad \frac{3}{6} = \underline{\hspace{2cm}} \quad \frac{3}{8} = \underline{\hspace{2cm}} \quad \frac{3}{9} = \underline{\hspace{2cm}} \quad \frac{3}{10} = \underline{\hspace{2cm}} \quad \frac{3}{11} = \underline{\hspace{2cm}}$$

$$\frac{4}{4} = \underline{\hspace{2cm}} \quad \frac{4}{5} = \underline{\hspace{2cm}} \quad \frac{4}{6} = \underline{\hspace{2cm}} \quad \frac{4}{8} = \underline{\hspace{2cm}} \quad \frac{4}{9} = \underline{\hspace{2cm}} \quad \frac{4}{10} = \underline{\hspace{2cm}} \quad \frac{4}{11} = \underline{\hspace{2cm}}$$

$$\frac{5}{5} = \underline{\hspace{2cm}} \quad \frac{5}{6} = \underline{\hspace{2cm}} \quad \frac{5}{8} = \underline{\hspace{2cm}} \quad \frac{5}{9} = \underline{\hspace{2cm}} \quad \frac{5}{10} = \underline{\hspace{2cm}} \quad \frac{5}{11} = \underline{\hspace{2cm}}$$

$$\frac{6}{6} = \underline{\hspace{2cm}} \quad \frac{6}{8} = \underline{\hspace{2cm}} \quad \frac{6}{9} = \underline{\hspace{2cm}} \quad \frac{6}{10} = \underline{\hspace{2cm}} \quad \frac{6}{11} = \underline{\hspace{2cm}}$$

$$\frac{7}{8} = \underline{\hspace{2cm}} \quad \frac{7}{9} = \underline{\hspace{2cm}} \quad \frac{7}{10} = \underline{\hspace{2cm}} \quad \frac{7}{11} = \underline{\hspace{2cm}}$$

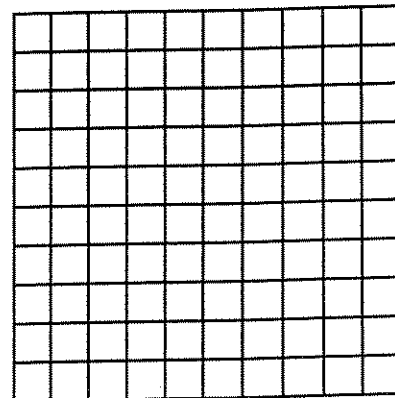
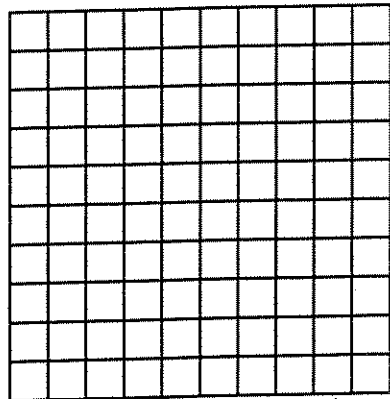
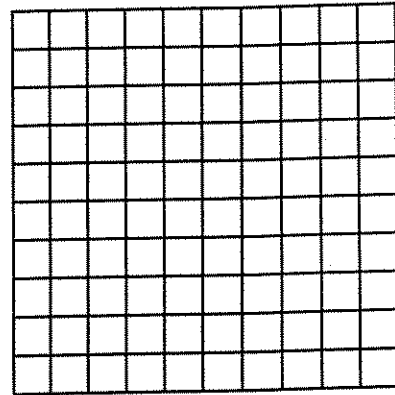
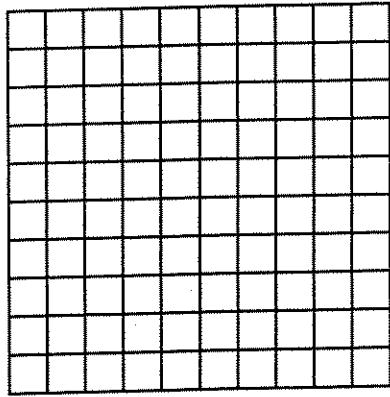
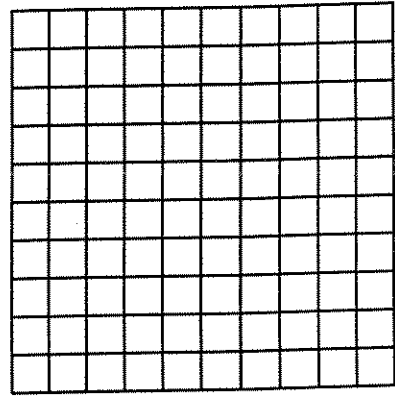
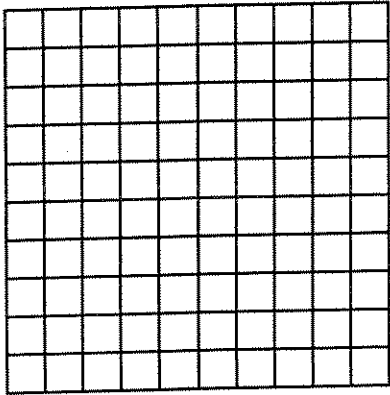
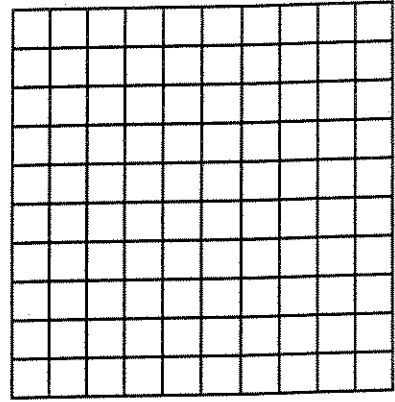
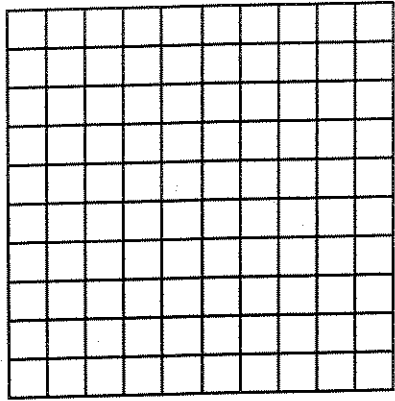
$$\frac{8}{8} = \underline{\hspace{2cm}} \quad \frac{8}{9} = \underline{\hspace{2cm}} \quad \frac{8}{10} = \underline{\hspace{2cm}} \quad \frac{8}{11} = \underline{\hspace{2cm}}$$

$$\frac{9}{9} = \underline{\hspace{2cm}} \quad \frac{9}{10} = \underline{\hspace{2cm}} \quad \frac{9}{11} = \underline{\hspace{2cm}}$$

$$\frac{10}{10} = \underline{\hspace{2cm}} \quad \frac{10}{11} = \underline{\hspace{2cm}}$$

$$\frac{11}{11} = \underline{\hspace{2cm}}$$

***Look for patterns in your answers!

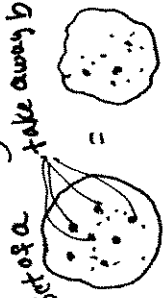
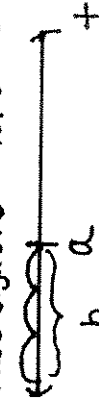
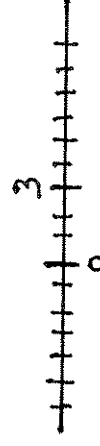

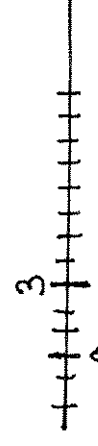
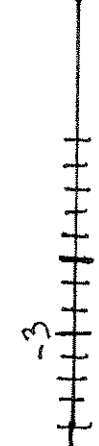


M4010 FRACTION, DECIMAL AND RATIO WORD PROBLEMS

- Draw a picture
 - Write an arithmetic problem
 - Do the math and give an answer.
1. John's teacher gave him a large sheet of red construction paper to make to paper toys. If John used two-sevenths of the sheet for a cart and three-fifths of the sheet for a tent, how much of the sheet of paper was left?
 2. Gianni has $\frac{2}{3}$ of a pizza, Angela has $\frac{3}{4}$ and Renzo has $\frac{1}{6}$. How many pizzas do they have all together?
 3. Each lap of the track is $\frac{3}{4}$ of a mile and Asha runs around 5 and a half times. How far does she run?
 4. You have three and a half feet of ribbon. You are making bookmarks, each of which requires $\frac{5}{8}$ of a foot. How many bookmarks can you make and how much is left over?
 5. Mary was making a skirt. She had $3\frac{1}{5}$ yards of green corduroy. She used three-fourths of the material for the main part of the skirt, and then she used two-thirds of what was left for a fancy belt. How much corduroy was left?
 6. Five rectangular cakes are to be divided into portions with each portion being three-fifths of a cake. How many portions are possible?
 7. A necklace was broken in an amorous struggle. One-third of the pearls fell to the ground, one-fifth stayed on the couch, one sixth were found by the woman, and one tenth were recovered by the man. If six pearls remained on the string, of how many pearls was the necklace composed?
 8. Patrick walks by the cookie jar and takes half of the cookies. Then, Debbie walks by and takes $\frac{2}{5}$ of what is left. Amy takes $\frac{2}{3}$ of what is left after Debbie has been there. If there are now 4 cookies left in the jar, how many were in there to begin with?
 9. If you have three dozen bagels and five people to share, how many dozen or how much of a dozen does each person get?

10. Three-sevenths of a class are girls. If there are 20 boys in the class, how many girls are there?
11. If the ratio of girls to boys in a class is 4 to 5 (i.e., $\frac{\text{no. of girls}}{\text{no. of boys}} = \frac{4}{5}$) and there are 25 boys, girls form what part of the class?
12. If $\frac{5}{8}$ of a pound of apples cost \$2.35, how much would $1\frac{1}{2}$ pounds of these apples cost?
13. Mary can mow 0.65 of the lawn 0.40 hours. How long will it take Mary to mow the whole lawn?
14. If an instructor can grade 15 papers in 40 minutes, how long will it take to grade 80 papers?
15. If it takes Betty 5 hours to walk 9 miles, how far will she have walked in 3 hours? Assume that she walks at a constant rate.
16. Mary invested some money at 7.5% simple interest and got \$15.00 interest at the end of the year. How much did she invest?
17. James paid \$54 for a calculator which was originally \$75. What percent discount did he get?
18. If an item sells for 75% of its original price of \$300.00, what is the sale price?

Modeling Subtraction of Integers

Problem	Pattern	Take-away	Adding the opposite	Missing addend	Measurement Model
$a - b = c$	$a - 0 =$ $a - 1 =$ $a - b =$	Set of a Take away b 	$a - b = a + (-b)$	$a - b = c \Rightarrow a = b + c$	Start at a face sign of b 
$3 - 5$					
$-3 - 5$					
$3 - (-5)$					
$-3 - (-5)$					

Modeling multiplication of Integers

Problem	Pattern	Area Model	Set Model	Repeated Addition	Measurement Model
$c \cdot b = c$	$a \cdot 0 =$ $a \cdot 1 =$ \vdots $a \cdot b =$		a Sets with b elements 	$b + b + \dots + b$ <i>a times</i>	<p>face sign of b. a jumps of length b.</p>
$2 \cdot 3$					
$2 \cdot (-3)$					
$-2 \cdot 3$					
$-2 \cdot (-3)$					

Large and small numbers:

The population of the world:

Six billion _____ hundred million.

Rate of growth of human hair :

One hundred millionth mile per hour.

Number of cigarettes smoked yearly in the US:

Five hundred billion.

Number of people on earth who die each day:

Two hundred fifty thousand.

Radius of an atom:

One ten-thousandth of a meter.

A minute is what part of a year?

Nineteen ten-millionths.

Speed of the space shuttle

How long is a million seconds?

How long is a billion seconds?

Bricks in a house

Words in a novel

States of Rubik's cube?

Shuttle travels: mi/hr

Snail moves: mi/hr

Compare the shuttle to the snail:


The national debt today:

Population of the USA today:

- a. Round to two digits
- b. Put in scientific notation'
- c. Find the debt per person
- d. How much do you owe?
- e. How much does your family owe?

Number Activity

Organize these numbers into groups so that each group can be described as having something in common. Justify why you organized them in the way you did.

0	97	.78	$0.\bar{9}$	$.142857142857\dots$	
$\frac{3}{4}$		38%	$\sqrt[3]{43}$	-1	π
$\sqrt{2}$	$.121121112\dots$	$\frac{22}{7}$	$\sqrt{16}$	$-\frac{2}{3}$	1
-32	$\frac{8}{2}$	3.14	$\sqrt{2}$	$\sqrt{-5}$	365
6.0×10^8	2^3				