Name _____

Festive Factors

Ms. Ramirez is a professional party planner. One of her tasks is to arrange the seating at tables. Ms. Ramirez likes to have the same number of party guests seated at each table.

For each number of guests below, use factors to determine all the ways Ms. Ramirez can arrange tables and chairs to have the same number of guests at each table. You do not have to include the factor 1 and the number itself.

1. 24 guests

   2 tables with 12 chairs each, 3 tables with 8 chairs each, 4 tables with 6 chairs each, 6 tables with 4 chairs each, 8 tables with 3 chairs each, 12 tables with 2 chairs each

2. 56 guests

   2 tables with 28 chairs each, 4 tables with 14 chairs each, 7 tables with 8 chairs each, 8 tables with 7 chairs each, 14 tables with 4 chairs each, 28 tables with 2 chairs each

3. Write Math Two factors that make a product are sometimes called a factor pair. Describe how using factor pairs helped you solve the problems.

   Possible answer: I know that the factor pairs can be reversed. For example, 7 and 8 are factors of 56 and can represent 7 tables with 8 chairs each, or 8 tables with 7 chairs each.

Invisible Divisible

Use the clues to find all possibilities for the unknown digit in each number.

Possible answers are given.

1. The number below has 2 as a factor. What could the unknown digit be?

5,83 ☐

0, 2, 4, 6, 8

2. The number below has 4 as a factor. What could the unknown digit be?

3,2 ☐ 6

1, 3, 5, 7, 9

3. The number below has 5 as a factor. What could the unknown digit be?

1,9 ☐ 5

0, 1, 2, 3, 4, 5, 6, 7, 8, 9

4. The number below has 9 as a factor. What could the unknown digit be?

6,30 ☐

9

5. The number below has 6 as a factor. What could the unknown digit be?

7,71 ☐

6

6. The number below has 3 as a factor. What could the unknown digit be?

4, ☐ 11

0, 3, 6, 9

7. The number below has 3 and 5 as factors. What could the unknown digit be?

6,1 ☐ 5

0, 3, 6, 9

8. The number below has 2 and 9 as factors. What could the unknown digit be?

2,3 ☐ 6

7

9. Stretch Your Thinking A number is divisible by 2 if the last digit is divisible by 2. A number is divisible by 4 if the last two digits form a number divisible by 4. A number is divisible by 8 if the last three digits form a number divisible by 8. Describe a possible pattern in the divisibility rules. Then test each of the following numbers for divisibility by 8.

3,488 5,614 4,320 3,052

Possible answer: $4 = 2 \times 2$ and $8 = 2 \times 2 \times 2$. So, for each successive time 2 is a factor, you need to consider one more digit; 3,488 and 4,320 are divisible by 8.

Common Ground

Find common factors to solve.

1. Desiree has 100 pink, 80 blue, and 120 purple beads. She puts all of the beads into jars equally. Each jar has one type of bead. How many beads can she put in one jar?

1, 2, 4, 5, or 10 beads

2. Sam has 50 blue and 150 red marbles. She puts all of the marbles into bags equally. Each bag has one type of marble. How many marbles can she put in one bag?

1, 2, 5, 10, or 50 marbles

3. The table shows the number of students in each grade at Bayside School. Mrs. Anderson wants to put students into equal rows during an assembly. Each row has students from the same grade. How many students can she put in one row?

Fifth	Sixth	Seventh	Eighth
50	25	75	100

1, 5, or 25 students

4. The table shows the number of instruments a music company has in stock. The company discounts the same number of each type of instrument each month. How many instruments can be discounted in a month?

Trumpet	Clarinet	Flute	Drum
88	42	100	26

1 or 2 instruments

5. **Stretch Your Thinking** Jill wrote three numbers on the board. A common factor of the three numbers is 18. List three possible numbers. Tell how you chose the numbers.

Possible answer: 36, 54, 90; I chose numbers that are multiples of 18 but have factors that vary, for example, 18×2, 18×3, 18×5.

Name _____

Multiple Dates

On January 1, 2011, the Petersons began a new allowance program for their four children:

Every third day, beginning January 3, Adrian will get his allowance.
Every fourth day, beginning January 4, Beth will get her allowance.
Every fifth day, beginning January 5, Zoe will get her allowance.
Every seventh day, beginning January 7, Eddie will get his allowance.

1. What is the first day that Adrian and Beth will get their allowances on the same day?

January 12

2. What is the first day that Beth and Zoe will get their allowances on the same day?

January 20

3. What is the first day that Adrian and Eddie will get their allowances on the same day?

January 21

4. What is the first day that Adrian, Beth, and Zoe will get their allowances on the same day?

March 1

5. **Stretch Your Thinking** How many days will it be until all four children will get their allowances on the same day? **Explain.**

420 days; Possible explanation: I multiplied $3 \times 4 \times 5 \times 7$ to find the first common multiple of 3, 4, 5, and 7. $3 \times 4 \times 5 \times 7 = 3 \times 20 \times 7 = 60 \times 7$, or 420.

Name _____

Prime Search

All the prime numbers from 1 to 100 are listed below.

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

1. Find the prime numbers from 101 to 200.

- First draw a line through all the multiples of 2.
- Then draw a line through all the multiples of 3, then all the multiples of 5, and continue until you have drawn lines through all the multiples of prime numbers less than 100.
- The remaining numbers are the prime numbers from 101 to 200. List these below the table.

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199

2. The number 143 has two lines through it, first as a multiple of 11 and second as a multiple of 13; so, 143 is the product of two prime numbers. Find another number that is the product of two different prime numbers greater than 7.

Possible answer: 187; $11 \times 17 = 187$

3. Write Math **Explain** how you can find all the prime numbers from 201 to 1,000.

Possible answer: I can list all of the numbers from 201 to 1,000 and cross out all the multiples of prime numbers.

Name _____

Pattern Perfect

Write a rule for each pattern. Then use your rule to find the next two terms in the pattern. Possible rules are given.

1. **1, 4, 9, 16, 25, 36, 49, . . .**

   Add 2 more than previously added (add 3, add 5, add 7, add 9, and so on); 64, 81

2. **1, 1, 2, 3, 5, 8, 13, 21, 34, . . .**

   For each new term, add the two previous terms; 55, 89

3. **1, 3, 6, 10, 15, 21, 28, 36, . . .**

   Add 1 more than previously added (add 2, add 3, add 4, and so on); 45, 55

4. **Stretch Your Thinking** Find a rule for the pattern below without using inverse operations (such as "subtract 4, add 4").

   8, 4, 8, 4, 8, 4, 8, 4, . . .

   Then create a similar pattern of your own and give its rule.

   Divide by 2, add 4; Possible pattern: 3, 6, 3, 6, 3, 6, . . ; *multiply by 2, subtract 3*