October 5, 2015 Math 6 Lesson 1.4

Lesson Objective: Students will be able to write divisibility rules for 2, 3, 5, 6, 9, and 10 and use the divisibility rules to help write the prime factorization of numbers.

Warm Up

$24\overline{)1896}$ $31\overline{)2914}$

$55\overline{)1265}$ $73\overline{)6497}$

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Warm Up Answers

$$24\overline{)1896} \quad 79 \qquad 31\overline{)2914} \quad 94$$

$$55\overline{)1265} \quad 23 \qquad 73\overline{)6497} \quad 89$$

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Homework Answers

You did not have homework last night.

Hope you enjoyed your night off!

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Essential Question:

Without dividing, how can you tell when a number is divisible by another number?

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Self-Evaluation Scale

Score	Description
4	I can teach other students how to write divisibility rules for 2, 3, 5, 6, 9, and 10 and use the divisibility rules to help write the prime factorization of numbers.
3	I can write divisibility rules for 2, 3, 5, 6, 9, and 10 and use the divisibility rules to help write the prime factorization of numbers.
2	I recognize, but still need help to write divisibility rules for 2, 3, 5, 6, 9, and 10 and use the divisibility rules to help write the prime factorization of numbers.
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Activity 1 & 2

With a partner, work on Activity 1 & 2 on pages 15 & 16 of your Big Ideas Record and Practice Journal.

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1 ACTIVITY: Finding Divisibility Tests for 2, 3, 5, and 10

Work with a partner.

	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

a. Highlight all the numbers that are divisible by 2.

b. Put a box around the numbers that are divisible by 3.

c. Underline the numbers that are divisible by 5.

d. Circle the numbers that are divisible by 10.

e. **STRUCTURE** In parts (a)–(d), what patterns do you notice? Write four rules to determine when a number is divisible by 2, 3, 5, and 10.

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2 ACTIVITY: Finding Divisibility Rules for 6 and 9

Work with a partner.

a. List ten numbers that are divisible by 6. Write a rule to determine when a number is divisible by 6. Use a calculator to check your rule with large numbers.

b. List ten numbers that are divisible by 9. Write a rule to determine when a number is divisible by 9. Use a calculator to check your rule with large numbers.

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Factor Pair

the two factors that go together to give a product

Because 2 is factor of 10 and $2 \cdot 5 = 10$, 5 is also a factor of 10.

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Prime Factorization

the number written as a product of its prime factors

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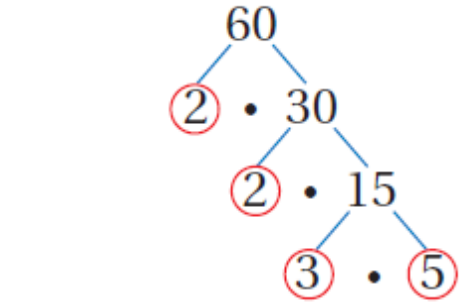
Factor Tree

a way to help find the prime factorization of a number



$60 = 2 \cdot 2 \cdot 3 \cdot 5$, or $2^2 \cdot 3 \cdot 5$

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1 Finding Factor Pairs

The brass section of a marching band has 30 members. The band director arranges the brass section in rows. Each row has the same number of members. How many possible arrangements are there?

Use the factor pairs of 30 to find the number of arrangements.

$30 = 1 \cdot 30$	There could be 1 row of 30 or 30 rows of 1.
$30 = 2 \cdot 15$	There could be 2 rows of 15 or 15 rows of 2.
$30 = 3 \cdot 10$	There could be 3 rows of 10 or 10 rows of 3.
$30 = 5 \cdot 6$	There could be 5 rows of 6 or 6 rows of 5.
$30 = 6 \cdot 5$	The factors 5 and 6 are already listed.

There are 8 possible arrangements: 1 row of 30, 30 rows of 1, 2 rows of 15, 15 rows of 2, 3 rows of 10, 10 rows of 3, 5 rows of 6, or 6 rows of 5.

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On Your Own

List the factor pairs of the number.

1. 18 **2.** 24 **3.** 51

4. **WHAT IF?** The woodwinds section of the marching band has 38 members. Which has more possible arrangements, the brass section or the woodwinds section? Explain.

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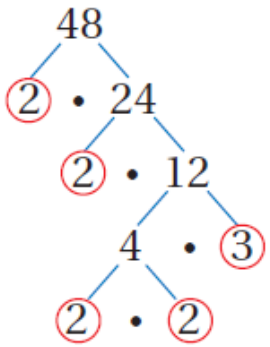
2 Writing a Prime Factorization

Write the prime factorization of 48.

Choose any factor pair of 48 to begin the factor tree.

Tree 1

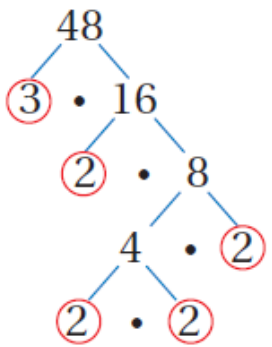


Find a factor pair and draw "branches."

Circle the prime factors as you find them.

Find factors until each branch ends at a prime factor.

Tree 2



$48 = 2 \cdot 2 \cdot 3 \cdot 2 \cdot 2$

$48 = 3 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

∴ The prime factorization of 48 is $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$, or $2^4 \cdot 3$.

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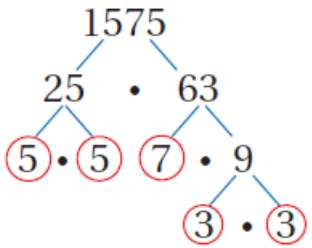
3 Using a Prime Factorization

What is the greatest perfect square that is a factor of 1575?

Because 1575 has many factors, it is not efficient to list all of its factors and check for perfect squares. Use the prime factorization of 1575 to find any perfect squares that are factors.



$$1575 = 3 \cdot 3 \cdot 5 \cdot 5 \cdot 7$$

The prime factorization shows that 1575 has three factors other than 1 that are perfect squares.

$3 \cdot 3 = 9$ $\quad$ $5 \cdot 5 = 25$ $\quad$ $(3 \cdot 5) \cdot (3 \cdot 5) = 15 \cdot 15 = 225$

So, the greatest perfect square that is a factor of 1575 is 225.

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On Your Own

Write the prime factorization of the number.

5. 20 **6.** 88 **7.** 90 **8.** 462

9. What is the greatest perfect square that is a factor of 396? Explain.

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Assignment

Complete problems 8, 9, 16, 17, 26, 36, & 37 on pages 28 & 29 in your Big Ideas Text Book.

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Homework

In your Big Ideas Record and Practice Journal page 18.