

Do Now:

$$1.) \quad 39 \div 3 = 13$$

$$2.) \quad 76 \div 19 = 4$$

$$3.) \quad \begin{array}{l} 2 \cdot 2 \cdot 2 \quad 5 \cdot 5 \\ 2^3 * 5^2 = 200 \\ 8 \cdot 25 \end{array}$$

4.1 Factors and Prime Factorization

7.NS

7.EE

- SWBAT write the prime factorization of numbers.
- SWBAT understand relationships among numbers.
- SWBAT grasp connections among math ideas. Understand how math ideas build on one another.

- **Calculators: No**

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

Activity: Investigating Factors

1. Start with number 2. Circle it. Cross out every multiple of 2 after 2.
2. Move to the next number that is not crossed out, 3. Circle it. Cross out every multiple of 3 after 3.
3. Move to the next number that is not crossed out. Circle it. Cross out all multiples of that number.
4. Repeat step 3 until every number except 1 is either crossed out or circled.

①	②	③	11	⑤	12	⑦	14	15	16
① 1	11	⑬	12	13	14	⑰	15	⑲	16
17	18	⑳	19	20	21	22	23	㉑	24
③①	25	26	27	28	29	③⑦	30	31	32
④①	33	④③	34	④⑤	35	④⑦	36	38	39
40	42	⑤③	44	46	48	50	52	⑤⑨	54
⑥①	56	58	60	62	64	⑥⑦	66	68	70
⑦①	72	⑦③	74	76	78	80	82	⑦⑨	84
86	88	⑧③	90	92	94	96	98	⑧⑨	100
102	104	106	108	110	112	⑨⑦	114	116	118

Answer the following questions on the bottom of your numbers chart:

1. What type of numbers are circled?

Prime Numbers

2. What types of numbers are crossed out?

Composite Numbers

A **prime number** is a whole number that is greater than one and has exactly two whole number factors, 1 and itself.

A **composite number** is a whole number that is greater than 1 and has more than two whole number factors.

Write all the factors of 64:

(multiplication)

$$1 \cdot 64$$

$$2 \cdot 32$$

$$4 \cdot 16$$

$$8 \cdot 8$$

1, 2, 4, 8, 8, 16, 32, 64

Factors: 1, 2, 4, 8, 16, 32, 64

Number	Factors	Prime or Composite
32	1, 2, 4, 8, 16, 32	Composite
39	1, 3, 13, 39	Composite
43	1, 43	Prime
76	1, 2, 4, 19, 38, 76	Composite
149	1, 149	Prime
121	1, 11, 11, 121	Composite

The area of a rectangle is 24 square inches. Find all possible dimensions of the rectangle. Which dimensions produce the rectangle with the least perimeter?

$$A = 24 \text{ in}^2$$

$$A = l \cdot w$$

$$24 = l \cdot w$$

$$P = 20 \text{ in}$$

Possible Dimensions

$$6 \cdot 4 \quad 4 \begin{array}{|c|} \hline 6 \\ \hline \end{array} 4$$

$$P = 22 \text{ in} \quad 8 \cdot 3 \quad 3 \begin{array}{|c|} \hline 8 \\ \hline \end{array} 3$$

$$P = 50 \text{ in} \quad 24 \cdot 1 \quad 1 \begin{array}{|c|} \hline 24 \\ \hline \end{array} 1$$

$$P = 26 \text{ in} \quad 12 \cdot 2 \quad 2 \begin{array}{|c|} \hline 12 \\ \hline \end{array} 2$$

$$l = 6 \text{ in and } w = 4 \text{ in}$$

$$l = 4 \text{ in and } w = 6 \text{ in}$$

What about a rectangle with an area of 26 square inches?

What about a rectangle with an area of 40 square inches?

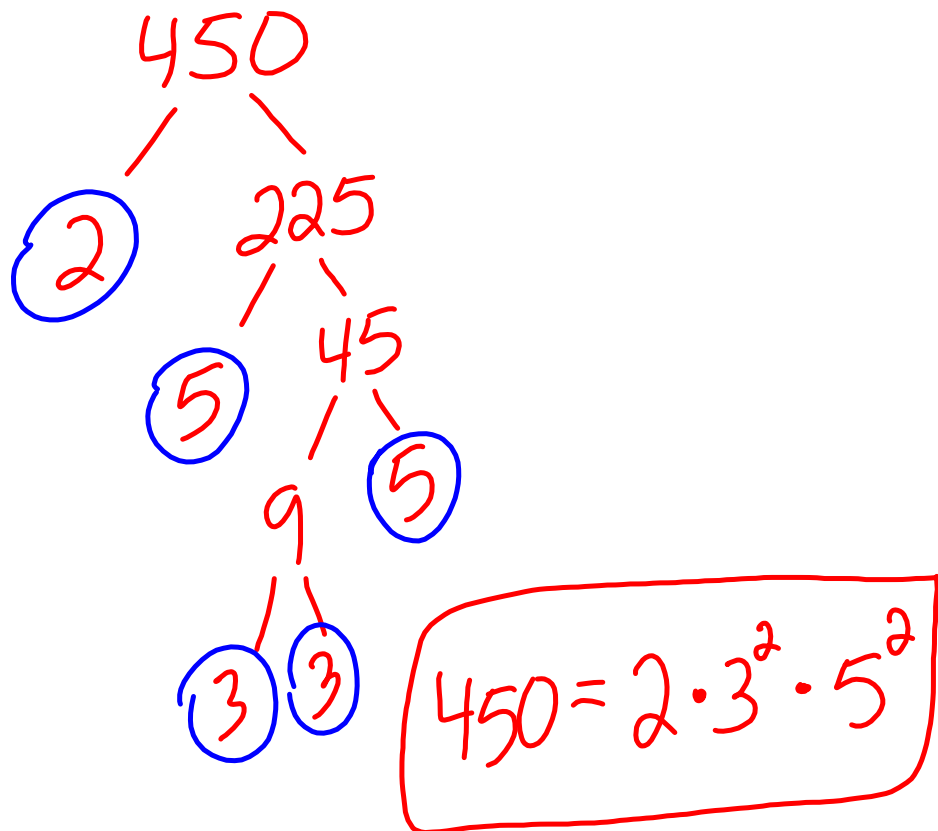
A rectangle has an area of 100 square inches. Without making any calculations, which dimension produces the rectangle with the least perimeter.

Members of the art club are learning to do calligraphy. Their first project is to make posters to display their new lettering style. A poster will display 36 characters in order: the 26 uppercase letters of the alphabet and the digits 0 through 9. How many ways can the art club arrange 36 characters in a rectangular display with rows of equal length?

prime factorization - numbers written as a product of prime numbers

- Factor Tree
- Birthday Cake

Write the prime factorization of 450.
(Using the factor tree and exponents)



Write the prime factorization of 450.
(Using the birthday cake and exponents)

only use prime numbers
to divide

$$450 = 2 \cdot 3^2 \cdot 5^2$$

Prime Numbers

$$\begin{array}{r} \textcircled{3} \overline{) 3} \\ \textcircled{3} \overline{) 9} \\ \textcircled{5} \overline{) 45} \\ \textcircled{5} \overline{) 225} \\ \textcircled{2} \overline{) 450} \end{array}$$

← candle

Write the prime factorization of 640.
(Using the factor tree and exponents)

Write the prime factorization of 640.
(Using the birthday cake and exponents)

Exit Pass 4.1

Tell whether the number is prime or composite. If it is composite, write its prime factorization using exponents.

1. 24
2. 51
3. 73
4. 560

Reflection of Today's Lesson

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Homework

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