

Name: Schumacher

Period: ALL

Accommodating: mult. chart + supp aid

ELPS 3A, 5B

Important vocabulary:

Factor - number being multiplied

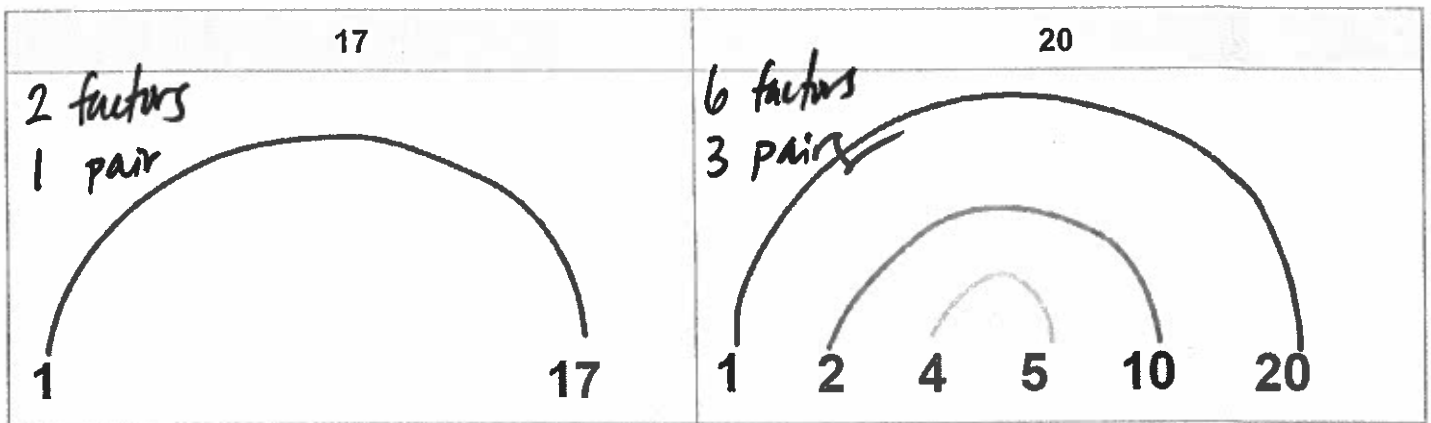
Prime number - only has two factors... 1 and itself (PRime = 1 and ME)

Composite number - has more than two factors (creates a colorful factor rainbow)

- Obj: ① create factor trees to determine prime factorization  
② write the prime factorization of a number using standard and exponential notation

Explore 5 min

Directions: Compare the factor rainbows for 17 and 20 below, then answer the reflection question.



Reflection Question: What is the difference between the factor rainbow for 17 and the factor rainbow for 20?

- The rainbow for 17 only has one arc connecting 1 and 17, while the rainbow for 20 has 3 arcs, each connecting the three different factor pairs.
- 17 has 2 factors
- 20 has 6 factors

**TURN AND TALK**  
DISCUSSION NORMS

- GROUPS OF 2 OR 3
- TURN TO FACE YOUR PARTNER
- EVERYONE SPEAKS AND LISTENS
- STAY ON TOPIC
- INSTEAD OF FOCUSING ON WHAT YOU DON'T KNOW, BUILD ON WHAT YOU DO KNOW.
- BE READY TO SHARE

review  
+ / + norms

Tell sts I'll cold call pairs to share

Explain I 10 min

→ choral response

Key Point 1: A prime number is a number that has only two factors (1 and itself).

- We can also think of prime numbers as numbers with only one factor pair.

Example:

The number 23 is prime because it only has one factor pair:  $1 \times 23$ .

↳ sts can read to their partner

CFUs:

List 3 other examples of prime numbers.

2, 3, 5, 7, 11, 13...

could call pairs for answers + justification

Key Point 2: A composite number is a number that has more than two factors, or more than one factor pair.

↳ choral response

Example:

The number 30 is a *composite* number because it has more than 1 factor pair. The factor pairs for 30 include the following:

12  
 $1 \times 12$   
 $2 \times 6$   
 $3 \times 4$   
 ∴ ↗

30  
 $1 \times 30$   
 $2 \times 15$   
 $3 \times 10$   
 $5 \times 6$   
 ∴ ↗

20  
 $1 \times 20$   
 $2 \times 10$   
~~3~~  
 $4 \times 5$   
 ∴ ↗

CFU:

Number	Factor Pairs	Prime or Composite? Circle one
5	$1 \times 5$	<input checked="" type="radio"/> Prime <input type="radio"/> Composite
12	$1 \times 12$ $3 \times 4$ $2 \times 6$	Prime <input checked="" type="radio"/> Composite
20	$1 \times 20$ $4 \times 5$ $2 \times 10$	Prime <input checked="" type="radio"/> Composite

1/1/17

19

 $1 \times 19$ Prime

Composite

**Key Point 3:** The number one is neither prime nor composite because it only has 1 factor.

Q: Is 1 prime or composite? Why? (cold call)

Elaborate (20 min)

**Directions:** Answer each question below using the sentence stems provided.

**Example:**

Is the number 40 prime or composite? Explain your reasoning using the sentence stem provided.

The number 40 is prime or composite because it has more than one factor pair, such as  $1 \times 40$ ,  $2 \times 20$ , and  $4 \times 10$

40

$$\begin{array}{r} 1 \times 40 \\ 2 \times 20 \\ \cancel{3} \\ 4 \times 10 \\ 5 \times 8 \\ \hline \end{array}$$

Partners

Is the number 21 prime or composite? Explain your reasoning using the sentence stem provided.

The number 21 is prime or composite because it has more than one factor pair, such as  $1 \times 21$  and  $3 \times 7$

$$\begin{array}{r} 21 \\ \hline 1 \times 21 \\ 3 \\ 3 \times 7 \\ \cancel{4} \\ \cancel{7} \end{array}$$

Is the number 11 prime or composite? Explain your reasoning using the sentence stem provided.

The number 11 is prime or composite because it has only 1 factor pair,  $1 \times 11$ .

Is the number 2 prime or composite? Explain your reasoning using the sentence stem provided.

The number 2 is prime or composite because it has one factor pair,  $1 \times 2$ .

Action:

□ justification w/ factor pairs

□ answers



Criteria for Success

- Prime = only 2 factors, only 1 factor pair  
Example: 7 is prime because  $1 \times 7$
- Composite = more than 2 factors, more than 1 factor pair  
Example: 9 is composite because  $1 \times 9$  and  $3 \times 3$

Directions: Complete each question below. Clearly indicate your answer.

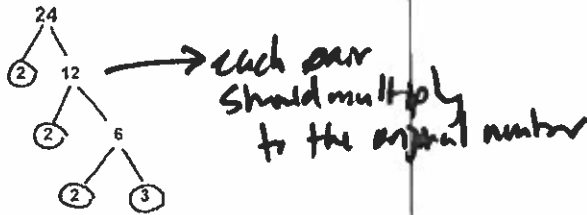
<p>Which of the following is a prime number?</p> <p><math>1 \times 60</math> <math>2 \times 30</math> <math>3 \times 20</math> <math>4 \times 15</math> <math>5 \times 12</math> <math>6 \times 10</math></p> <p><math>1 \times 24</math> <math>2 \times 12</math> <math>3 \times 8</math> <math>4 \times 6</math></p> <p><u><math>1 \times 27</math></u> <math>3 \times 9</math></p> <p><math>1 \times 19</math></p> <p>A) 60    B) 24    C) 27    <b>D) 19</b></p>	<p>Which of the following is a composite number?</p> <p><del>1 x 1</del>    <math>1 \times 8</math> <math>2 \times 4</math></p> <p><math>1 \times 7</math>    <math>1 \times 2</math></p> <p>Neither    composite    prime    prime</p> <p>A) 1    <b>B) 8</b>    C) 7    D) 2</p>
<p>Which of the following is NOT a composite number?</p> <p><math>1 \times 20</math>    <math>1 \times 21</math>    <u><math>1 \times 22</math></u>    <u><math>1 \times 23</math></u> <math>2 \times 10</math>    <math>3 \times 7</math>    <math>2 \times 11</math></p> <p>comp    comp.    comp.    prime</p> <p>A) 20    B) 21    C) 22    <b>D) 23</b></p>	

Explain II 15 min

**Key Point 4:** The prime factorization of a number is a way of breaking down a composite number into the product of prime numbers (factors).

- A **factor tree** is a way to organize factors and help you determine the prime factorization of a composite number.

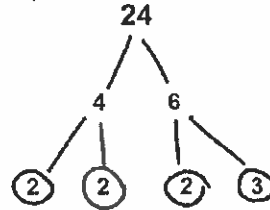
Determine the prime factorization of 24:



Prime Factorization of 24:

$$2 \times 2 \times 2 \times 3$$

Determine the prime factorization of 24:



Prime Factorization of 24:

$$2 \times 2 \times 2 \times 3$$

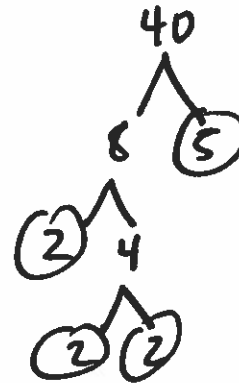
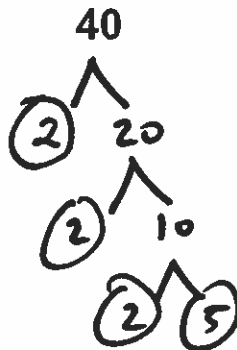
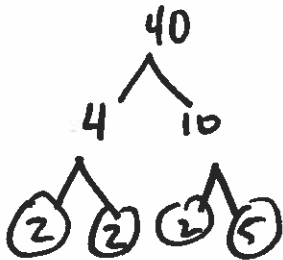
**Steps for Success:**

1. Break every composite number down
2. Circle every prime number
3. Common prime numbers are 2, 3, 5, 7, 11
4. Your final answer should contain ONLY prime numbers

*\* Answer should have multiplication signs*

CFU 1:

Determine the prime factorization of 40:



Prime Factorization of 40:

$$2 \times 2 \times 2 \times 5$$

**Key Point 5:** The prime factorization of a number should be written with **exponents** when possible.

Example:

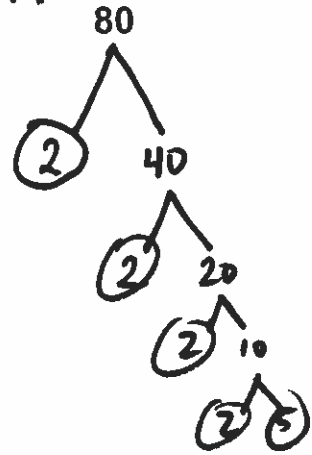
CFU 1:

# Final CTS

## \* Answer Priority

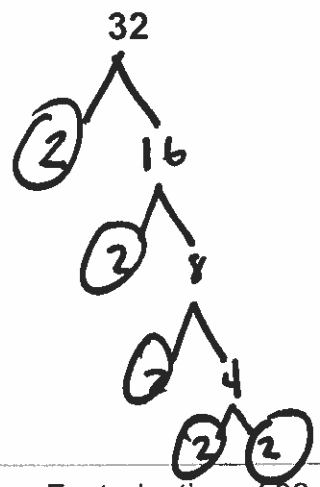
only prime numbers  
multiplication signs  
exponents when possible

Determine the prime factorization of 80:



Prime Factorization of 80:  
 $2^4 \times 5$

Determine the prime factorization of 32:

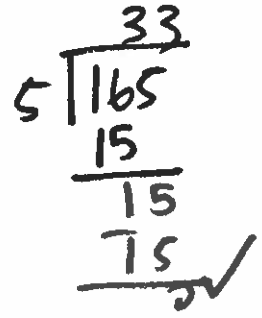
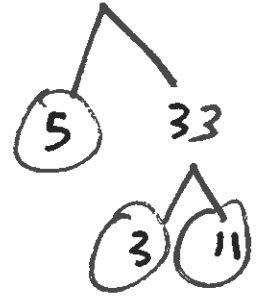


prime  
mult.  
exponents

Prime Factorization of 32:  
 $2^5$

CFU:

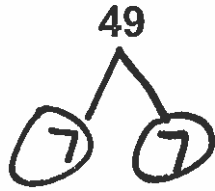
Determine the prime factorization of 165:



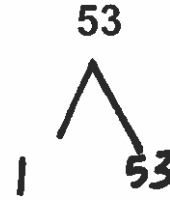
Prime Factorization of 165:  
 $3 \times 5 \times 11$

Elaborate II 10 mm

Directions: Determine the prime factorization of the numbers below. Use exponents in your answers when necessary.

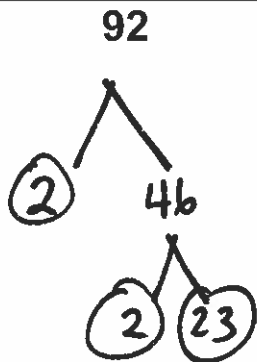


$$7^2$$

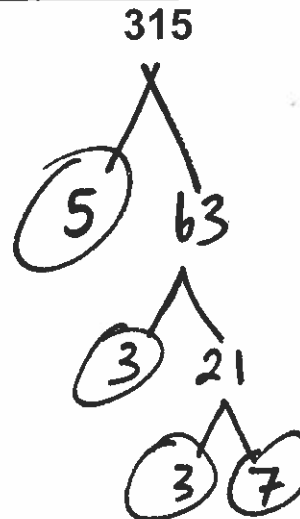


prime

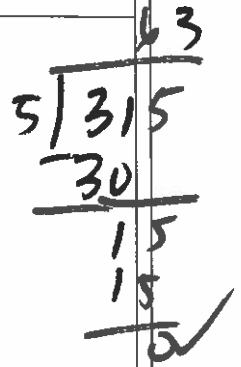
$$1 \times 53$$



$$2^2 \times 23$$



$$3^2 \times 5 \times 7$$



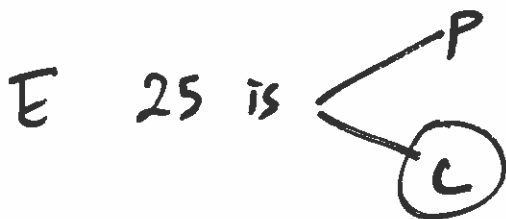
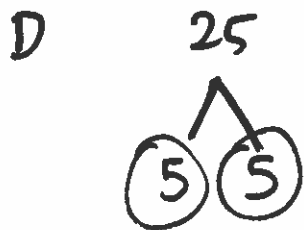
Exit Ticket



Directions: Complete the Exit Ticket in Schoology.

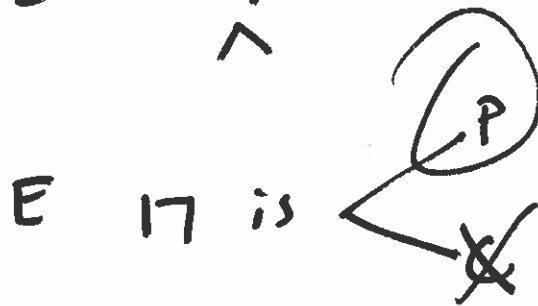
# Exit Ticket

① I 25



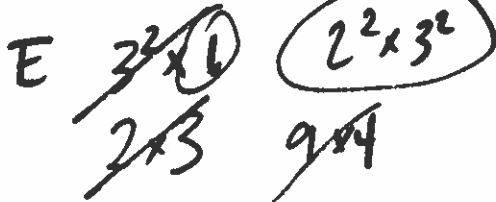
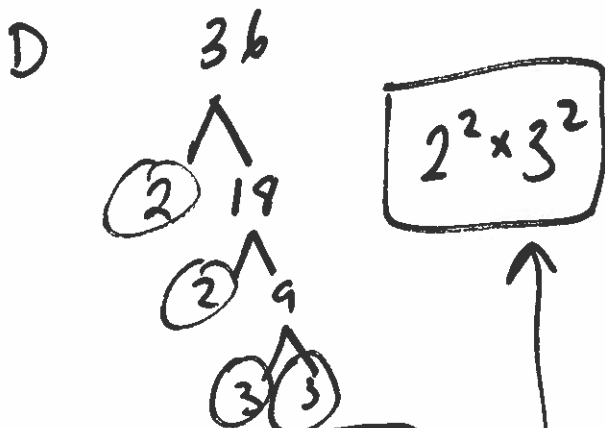
A bc it has more than 1 factor pair

② I 17



A bc it has only 1 factor pair

③ I prime factorization of 36

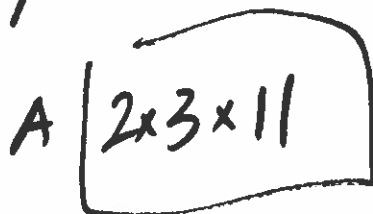


A

④ I P.F. of 66



F





Q W12 - 20 min

2.  $\frac{1}{7.43}$

D  $\frac{243}{\times 7}$   
301

E

A  $\boxed{301}$

3.

D  $\frac{41}{6 \overline{)246}}$   
24  
00

E

A  $\boxed{41}$

4.

What is 66 divisible by?

D 66

$66 \div 2 = 33$

$66 \div 3 = 11$

E  $66 \div 5 = X$

$66 \div 10 = 6.6$  X

$\frac{13}{5 \overline{)66}}$   
13  
15  
1

A 2 & 3

5.

GCF of 27, 30

D 27: 1, 3, 9, 27  
30: 1, 3, 5, 6, 10, 30

E X

A 3

6.

Factors of 132

D  $\frac{33}{4 \overline{)132}}$  ✓  
12  
12

E

$\frac{44}{3 \overline{)132}}$  ✓  
12  
12

A

D

$\frac{12}{11 \overline{)132}}$   
11  
22

$\frac{66}{2 \overline{)132}}$  X  
12  
12

7.

3<sup>5</sup>, (fifth power)

D 3 · 3 · 3 · 3 · 3

E A X B ✓ C X D X

A B

8

Choose 2

- 1 What is true? 2
- D <sup>A</sup> 6 is composite → true b/c  $2 \cdot 3 = 6$
- E B 12 is a factor of  $6^x$  → false 6 is not divisible by 12
- C 6 is an even number → true b/c  $6 \div 2 = 3$
- D 6 is a prime number → false b/c 6 has factors also of 2 & 3

A A & C

9

1 Is 564 divisible by 3?

D

$$\begin{array}{r}
 188 \\
 3 \overline{) 564} \\
 \underline{3} \phantom{0} \phantom{0} \\
 26 \phantom{0} \\
 \underline{24} \phantom{0} \\
 24 \phantom{0} \\
 \underline{24} \\
 0
 \end{array}$$

$$\begin{array}{r}
 22 \\
 188 \\
 \times 3 \\
 \hline
 564
 \end{array}$$

$$\begin{aligned}
 5 + 6 + 4 &= 15 \\
 15 \div 3 &= 5
 \end{aligned}$$

Yes

E	Emilia	Jasmine
	Yes	No
	✓	X

A. A - Emilia

Quiz and Lesson 7: Prime Factorization Day 1

What

Standards: <i>What knowledge and/or skills are students working towards?</i>	Daily Objectives: <i>What will students do today?</i>
<p><b>6.7A [R] generate equivalent numerical expressions using Order of Operations, including whole number exponents, and prime factorization.</b></p>	<ul style="list-style-type: none"> <li>• Students will create factor trees to determine the prime factorization of a number</li> <li>• Students will write the prime factorization of a number using standard and exponential notation</li> </ul>

Key Points: *What will students know today?*

- Key Point 1:** A **prime number** is a number that has only two factors: **1 and itself**.
  - We can also think of prime numbers as numbers with only **one factor pair**.
- Key Point 2:** A **composite** number is a number that has more than two factors, or more than one factor pair.
- Key Point 3:** The number **one** is neither prime nor composite because it only has 1 factor. *tricky*
- Key Point 4:** The **prime factorization** of a number is a way of breaking down a composite number into the product of prime numbers (factors).
  - A **factor tree** is a way to organize factors and help you determine the prime factorization of a composite number.
- Key Point 5:** The prime factorization of a number should be written with **exponents** when possible.

How

**Note about the Quiz Today:** There will not be an entrance ticket to allow time for the quiz and the lesson. It is recommended to administer the quiz during the first part of the block and facilitate the lesson after the quiz. This quiz only includes Section I, which students will take online in Aware. While the time parameters included on the quiz are suggestions, teachers need to remember that we are preparing students for later summative assessments that do have strict time constraints. Therefore, creating a positive testing environment should include a sense of urgency, along with other contributing factors, such as encouragement and a space that is quiet and free of distractions. Additionally, make sure students who receive accommodations are receiving them daily, especially on testing days.

**Supplemental Aid**

Be sure to provide identified students with a copy of the Test Version of the Supplemental Aid to use during their assessment.

**Note about Today's Lesson:** This lesson reviews prime factorization and introduces factor trees as a strategy to determine the prime factorization of any number. A common misunderstanding for students is forgetting what operation is occurring between the factors listed on the factor tree. Students sometimes confuse decomposing values (breaking numbers down into their parts that can be added together to get the original value, e.g.  $25 \rightarrow 20 + 5$ ), with prime factorization, which uses multiplication, e.g.  $25 \rightarrow 5 \times 5$ . Encouraging students to write multiplication symbols in between the factors on the factor tree and reinforcing mathematical vocabulary (such as *factors* are the numbers we *multiply* together) can help quell this misunderstanding.

**Note:** The next lesson, *Prime Factorization Day 2*, students explore using the divisibility rules to assist in prime factorization. When academically monitoring today, make note of students who utilize this strategy to share with the class during the next lesson.

**Formative Assessment Quiz 01 – Section I: Suggested Time 20 minutes**  
Aware – Independent

In 2023 - 2024, we will have two versions of assessments available in Aware - a "standard" version and a "CLS+" version. Teachers will assign the "standard" version to students who do not need accommodations and to students who qualify for the CLS version of assessments; teachers will assign the "CLS+" version of the assessment to students who qualify for

Unit 01 Unit Plan: Prime Factorization and Order of Operations

CLS+. Each test version has a Section I in Aware and a Section II on paper. It is critical to assign the right version to the right students to ensure that students have access to the supports they need and to facilitate accurate scoring.

- If you need assistance with distributing the assessments to your students, please watch [this video](#) from the Assessment Team.
- If you need assistance determining the correct test version to assign to your students, please connect with your campus' Special Populations team.

Section I of Each Version

*need scratch paper*

Section I of each test version is available in Aware for all students. Content clarifiers have been added to this section of the assessment, and the accommodation is activated for students who qualify for Content and Language Supports whether they are taking the "standard" version or the "CLS+" version. Examples of this online designated support include simplified language of instruction and word problems, additional visual supports, and text-to-speech for oral administration.

**Explore (5 minutes)**

Student Notes

Students are asked to compare the factor rainbows for 17 and 20, noting the differences. They will turn and talk with a table partner to share their responses. The goal of this time is for students to notice that some numbers have only two factors (one and the number itself), while others have more. This observation leads nicely to Key Points 1 and 2, which review the terms *prime* and *composite* numbers. **Note:** *Prime numbers* were already briefly introduced in *Lesson 4 – Divisibility Rules*.

**Explain I (10 minutes)**

Student Notes

Teachers review *prime* and *composite numbers* (Key Points 1 through 3).

**Elaborate I (20 minutes)**

Student Notes – *Independent*

Students practice identifying prime and composite numbers. It is important that students understand that 2 is a prime number, so check for this in Questions 3 and 6 when academically monitoring. Additionally, check Question 7 to ensure students understand that 1 is neither prime nor composite (Key Point 3).

*✓/lu  
my*

**Explain II (15 minutes)**

Student Notes

Key Point 4 introduces *prime factorization* and the strategy of creating *factor trees* to determine a number's prime factorization. Encourage students to circle prime numbers in their factor trees and to display their work in a clear, organized manner. Establishing expectations such as these with your students now will help them create a strong foundation with this skill.

**Elaborate II (10 minutes)**

Student Notes – *Independent*

Students practice determining the prime factorization of numbers. While academically monitoring, ensure students are using exponents when possible, and writing multiplication symbols (either  $\times$  or  $\cdot$ ) between the factors.

**Evaluate / Exit Ticket (10 minutes)**

Schoology – *Independent*



*need scratch paper*

Students complete the Exit Ticket independently in Schoology to be evaluated on their learning today. Teachers should use the data from the Mastery Tracker to identify students needing additional support on the skills learned today and / or to adjust subsequent lessons as needed.

Daily Resources and Other Notes

ELPS and Math Examples

**Reading – c4G:** demonstrate comprehension of increasingly complex English by participating in shared reading, retelling, or summarizing material, responding to questions, and taking notes.