MSTAR PRACTICE WORKSHEET

Lesson 6-13: Prime Factorization

Grade 6 Mathematics · Standard 6.NOS.4

Name: _____ Date: _____

These are MSTAR-style questions written for this curriculum to rehearse the format. They are not official Maryland assessment items. MSTAR — Maryland's new state test, first given in spring 2027 — uses the same kinds of questions you see here: selected response, select-all, two-part evidence questions, and written responses.

Part A — Skills Check

Warm up with the lesson's core skills — one best answer each.

Question 1 SELECTED RESPONSE · 1 POINT

Which of the following is a prime number?

(A) 9

(B) 15

(C) 17

(D) 21

Question 2 SELECTED RESPONSE · 1 POINT

What is the prime factorization of 30?

(A) 2 × 3 × 5

(B) 2 × 15

(C) 3 × 10

(D) 5 × 6

Question 3 SELECTED RESPONSE · 1 POINT

What is the prime factorization of 18?

(A) 2 × 3 × 3

(B) 2 × 9

(C) 3 × 6

(D) 6 × 3

Question 4 SELECTED RESPONSE · 1 POINT

Which of these numbers is composite?

(A) 23

(B) 27

(C) 29

(D) 31

Question 5 SELECTED RESPONSE · 1 POINT

Two students found different factor trees for 60. Student A started with 2 × 30. Student B started with 6 × 10. Which statement is true?

(A) Only Student A gets the correct prime factorization

(B) Only Student B gets the correct prime factorization

(C) They will get different prime factorizations

(D) Both get the same prime factorization: 2 × 2 × 3 × 5

Question 6 SELECTED RESPONSE · 1 POINT

The first lock panel shows 90. What is the prime factorization of 90?

(A) 2 × 3 × 3 × 5

(B) 2 × 45

(C) 3 × 30

(D) 9 × 10

Part B — Test-Format Questions

These match the state test's formats: two-part questions, select-all, and written responses.

Question 7 TWO-PART QUESTION

Part A

What is the prime factorization of 72?

Fill in the bubble next to the one best answer.

(A) $2^3 \times 3^2$

(B) $2^2 \times 3^3$

(C) $2 \times 3 \times 12$

(D) 8×9

Part B

Answer Part A before Part B — Part B asks about your reasoning.

Which reasoning shows why your answer to Part A is correct?

(A) The tree gives two 2s and three 3s, so the prime factorization is $2^2 \times 3^3$.

(B) Every branch of the factor tree for 72 ends in a prime: 2, 2, 2, 3, 3. Grouping the repeated primes with exponents gives $2^3 \times 3^2$, and $2^3 \times 3^2 = 8 \times 9 = 72$.

(C) 72 splits into $2 \times 3 \times 12$, and the branches can stop there.

(D) 72 splits into 8×9, and those are the factors to report.

Question 8 SELECT ALL THAT APPLY

Select ALL statements that are true about the number 45.

Mark the box next to EVERY answer that is true. More than one is correct.

[A] 45 is a composite number.

[B] The prime factorization of 45 is $3^2 \times 5$.

[C] The prime factorization of 45 is 5×9.

[D] 45 is a prime number.

[E] The only prime factors of 45 are 3 and 5.

[F] 1 is a prime factor of 45.

Part C — Show Your Thinking

Answer in writing, the way the state test's constructed responses work.

Question 9 WRITTEN RESPONSE · 2 POINTS

Choose any two-digit composite number. Show TWO different factor trees that both lead to the same prime factorization. Explain why every composite number has only one prime factorization.

Write your answer in complete sentences. Show or explain your mathematical thinking.

When you finish, check your reasoning with your teacher or family. Your teacher has the scoring guide for the written responses.