Inspiring Greatness

ISD

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

Essential Math 4

Unit 11

Lesson 2: Exponents

May 8, 2020

Essential Math 4
Lesson 1: May 8, 2020

Learning Target:
I can use multiplication to understand exponents.

Essential Math 4

You will explore the use of multiplication and its relationship to exponents.

Directions:

1. Click through the slides.
2. Watch all videos on slides.
3. Do what each slide asks on a separate sheet of paper.

Essential Math 4

Bell Work: May 8, 2020

Find each product and use exponents in your answer.

(A) $5^3 \cdot 5^4 =$

(B) $6^3 \cdot 6^{13} =$

(C) $2^{17} \cdot 2^2 =$

(D) $7^2 \cdot 7^4 \cdot 7 =$

Essential Math 4

Bell Work Key
May 8, 2020

Find each product and use exponents in your answer.

(A) $5^3 \cdot 5^4 =$ 5^7

(B) $6^3 \cdot 6^{13} =$ 6^{16} (or 36^8)

(C) $2^{17} \cdot 2^2 =$ 2^{19}

(D) $7^2 \cdot 7^4 \cdot 7 =$ 7^7

Essential Math 4

Practice Problems:
Unit 11
Lesson 2
page 9,
#6-7

⑥ Fill in this table for the powers of 3.

$3^3 =$
$3^2 =$
$3^1 = 3$

⑦ Describe the effect of jumping up 2 spaces (like from 3^2 to 3^4) in *this* table. Explain why this makes sense.

Essential Math 4

Answer Key: After completing the problems, check your answers for page 9 here.

⑥ Fill in this table for the powers of 3.

$3^5 = 243$
$3^4 = 81$
$3^3 = 27$
$3^2 = 9$
$3^1 = 3$

⑦ Describe the effect of jumping up 2 spaces (like from 3^2 to 3^4) in *this* table. Explain why this makes sense.

Jumping up two spaces is like multiplying by 9, since multiplying by 3 twice will always be equivalent to multiplying by 9, no matter what number you start with.

Essential Math 4

Practice Problems: Unit 11 Lesson 2 (page 9, #8)

8 a) $3^2 \cdot \_\_\_\_ = 3^4$

b) $3^3 \cdot 3^2 = \_\_\_\_$

c) $\_\_\_\_ \cdot 3^2 = 3^7$

d) $3^8 \cdot 3^2 = \_\_\_\_$

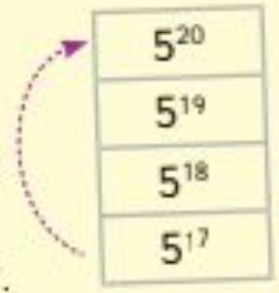
$5^{17} \cdot 5^3$

$= \overbrace{5 \cdot 5 \cdot 5 \cdot \ldots \cdot 5}^{17 \text{ times}} \cdot \overbrace{5 \cdot 5 \cdot 5}^{3 \text{ times}}$

$= \overbrace{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \ldots \cdot 5}^{20 \text{ times}}$

$= 5^{20}$

Jumping up three spaces is like multiplying by 5^3.



Essential Math 4

Answer Key: After completing the problems, check your answers for page 9 here.

8 (a) $3^2 \cdot \underline{3^2 \text{ (or } 9)} = 3^4$

(b) $3^3 \cdot 3^2 = \underline{3^5}$

(c) $\underline{3^5} \cdot 3^2 = 3^7$

(d) $3^8 \cdot 3^2 = \underline{3^{10}}$

$5^{17} \cdot 5^3$

$= \overbrace{5 \cdot 5 \cdot 5 \cdot \ldots \cdot 5}^{17 \text{ times}} \cdot \overbrace{5 \cdot 5 \cdot 5}^{3 \text{ times}}$

$= \overbrace{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \ldots \cdot 5}^{20 \text{ times}}$

$= 5^{20}$

Jumping up three spaces is like multiplying by 5^3.

5^{20}
5^{19}
5^{18}
5^{17}

Essential Math 4

Practice Problems:
Unit 11
Lesson 2
page 9, #9

⑨ Find each product, using exponents in your answer.

ⓐ $3^{15} \cdot 3^4 =$ _____

ⓑ $8^2 \cdot 8^{16} =$ _____

ⓒ $12^3 \cdot 12^2 \cdot 12^5 =$ _____

ⓓ $5^3 \cdot 5 \cdot 5^{10} =$ _____

ⓔ $x^2 \cdot x^3 =$ _____

ⓕ $a^{20} \cdot a^4 =$ _____

ⓖ $h^{10} \cdot h^{23} \cdot h^4 =$ _____

ⓗ $w^{18} \cdot w^3 \cdot w =$ _____

Essential Math 4

Answer Key: After completing the problems, check your answers for page 9 here.

9 Find each product, using exponents in your answer.

a $3^{15} \cdot 3^4 =$ 3^{19}

b $8^2 \cdot 8^{16} =$ 8^{18}

c $12^3 \cdot 12^2 \cdot 12^5 =$ 12^{10}

d $5^3 \cdot 5 \cdot 5^{10} =$ 5^{14}

e $x^2 \cdot x^3 =$ x^5

f $a^{20} \cdot a^4 =$ a^{24}

g $h^{10} \cdot h^{23} \cdot h^4 =$ h^{37}

h $w^{18} \cdot w^3 \cdot w =$ w^{22}

Essential Math 4

Practice Problems: Unit 11 Lesson 2 (page 9, #10)

Discuss & Write What You Think

(10) Both of these statments are true: $x^5 \cdot x^5 = x^{10}$ and $x^5 + x^5 = 2x^5$.
Why do you think students often make the **mistake** of thinking that $x^5 + x^5 = x^{10}$?
How would you explain their mistake to them?

Answer Key:
After completing the problems, check your answers for page 9 here.

Discuss & Write What You Think

(10) Both of these statments are true: $x^5 \cdot x^5 = x^{10}$ and $x^5 + x^5 = 2x^5$.
Why do you think students often make the **mistake** of thinking that $x^5 + x^5 = x^{10}$?
How would you explain their mistake to them?

(Responses will vary.)

Likely they saw the addition sign and added the fives together. That's a mistake because the exponents are a shorthand for multiplication. So multiplying the values $x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$ equals x^{10}, while adding does not.
$x^5 + x^5 = 2x^5$

Essential Math 4

Practice Problems: Unit 11 Lesson 2 (page 9, #11-14)

(11) $2^4 \cdot 2^7 = 2^a$

$a =$ _____

(12) $2^{10} \cdot 2^b = 2^{12}$

$b =$ _____

(13) $5^c \cdot 5^3 = 5^{10}$

$c =$ _____

(14) $3^{35} \cdot 3^d = 3^{100}$

$d =$ _____

Essential Math 4

Answer Key:

After completing the problems, check your answers for page 9 here.

(11) $2^4 \cdot 2^7 = 2^a$

$a =$ 11

(12) $2^{10} \cdot 2^b = 2^{12}$

$b =$ 2

(13) $5^c \cdot 5^3 = 5^{10}$

$c =$ 7

(14) $3^{35} \cdot 3^d = 3^{100}$

$d =$ 65

Essential Math 4

Practice Problems: Unit 11 Lesson 2 (page 9, #15)

(15) Circle all the expressions equivalent to $3^5 \cdot 3^4$.

(A) $3^7 \cdot 3^2$

(B) 3^{20}

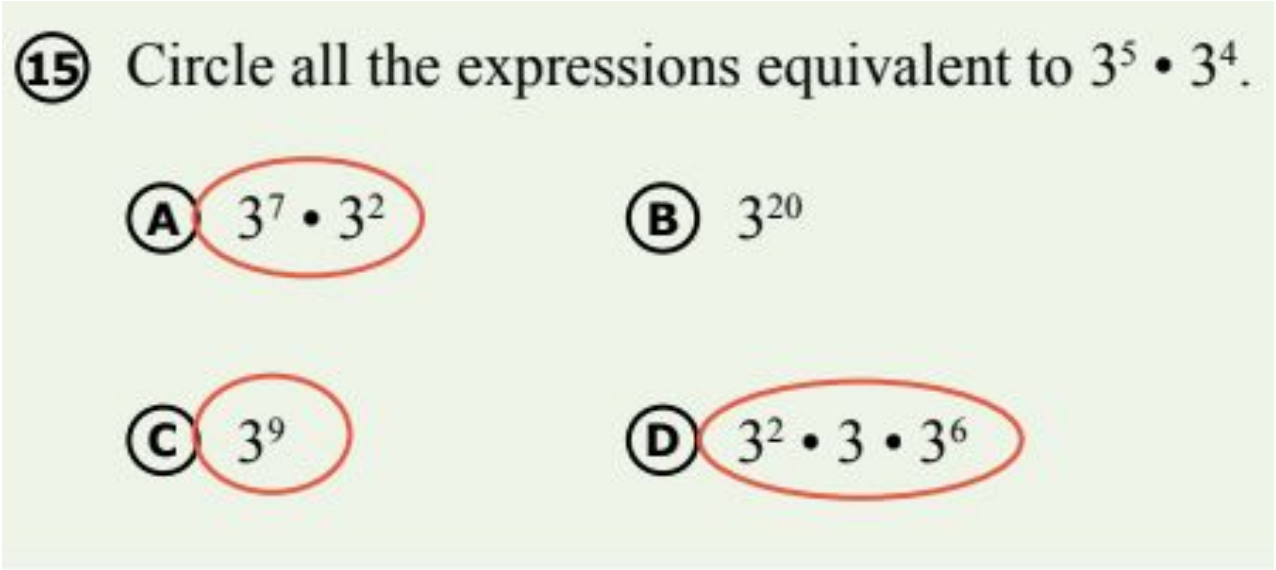
(C) 3^9

(D) $3^2 \cdot 3 \cdot 3^6$

Essential Math 4

Answer Key:

After completing the problems, check your answers for page 9 here.



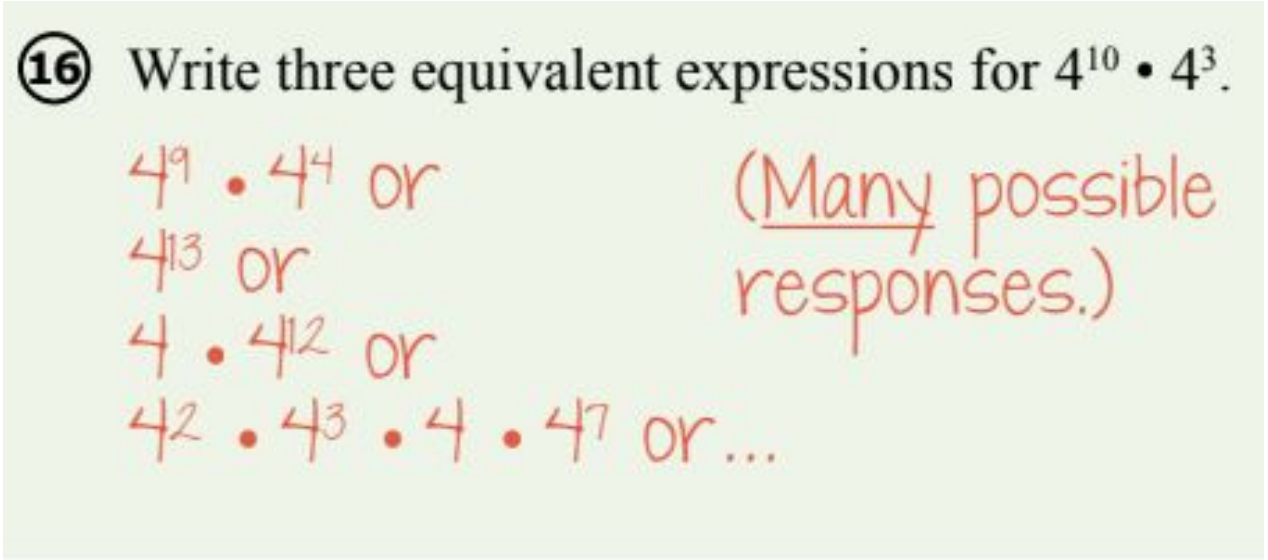
Essential Math 4

Practice Problems: Unit 11 Lesson (page 9, #16)

(16) Write three equivalent expressions for $4^{10} \cdot 4^{3}$.

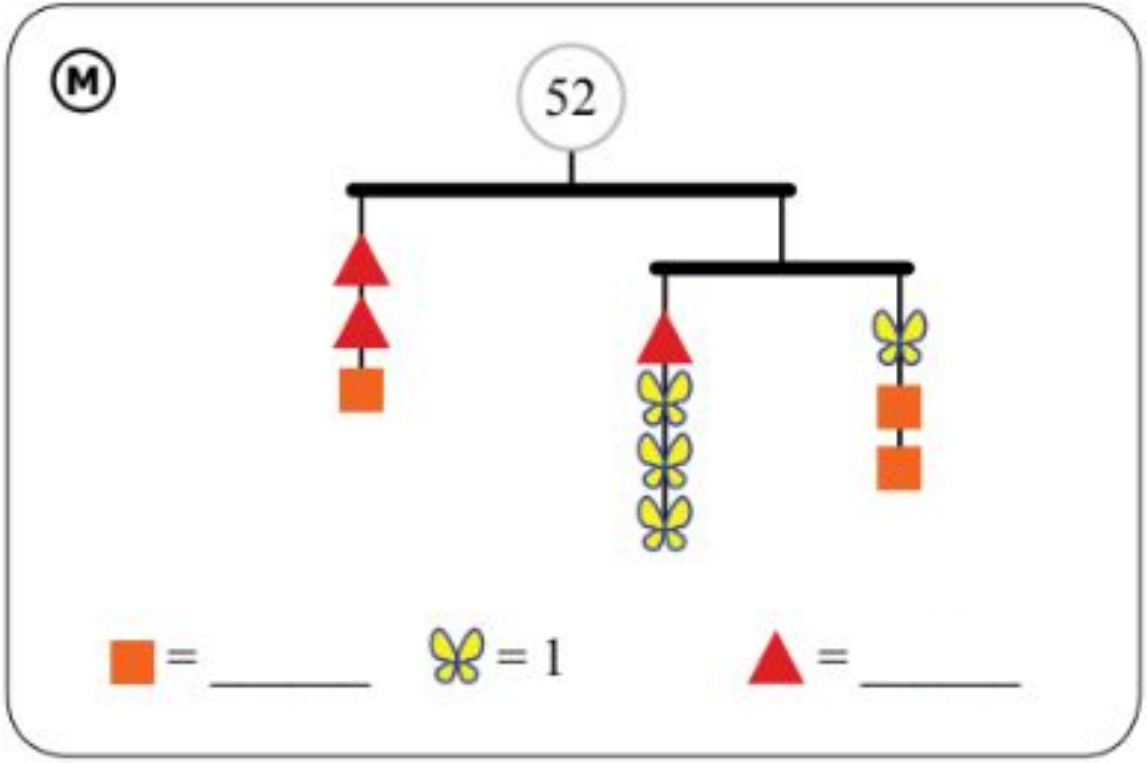
Essential Math 4

Answer Key:
After completing the problems, check your answers for page 9 here.



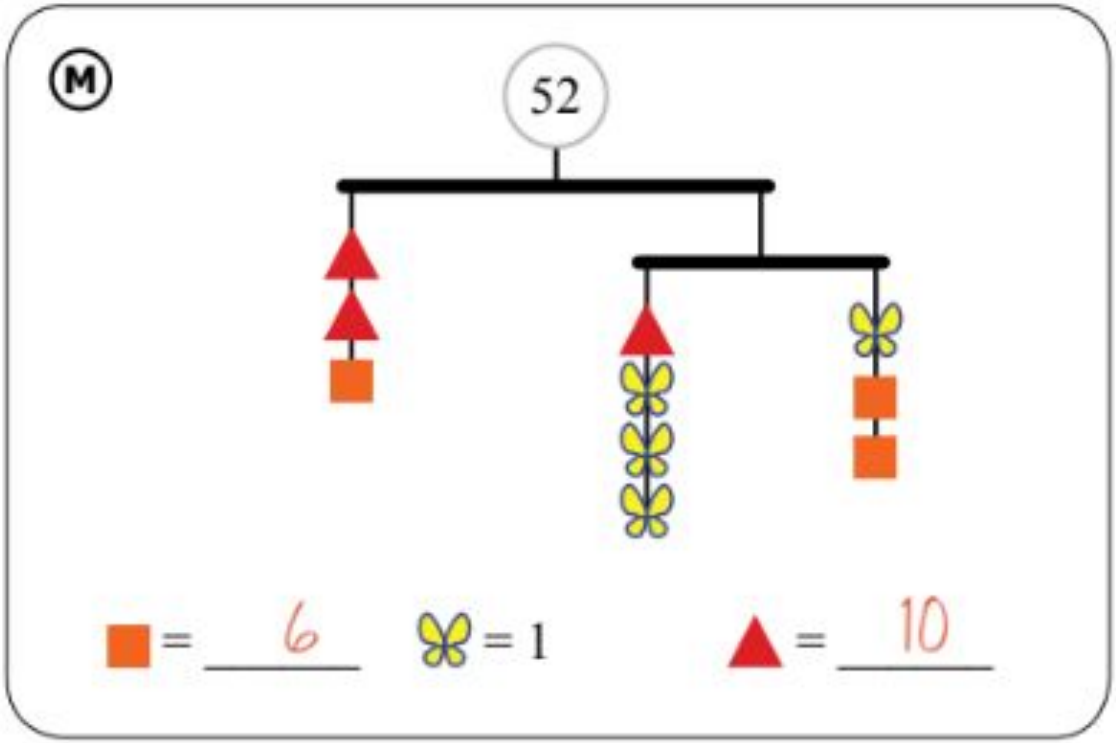
Essential Math 4

Fun Stuff:



Essential Math 4

Fun Stuff Key:



Essential Math 4

Resources were developed at EDC (Education Development Center, Inc).
EDC owns the copyright © 2011-2019

transition to algebra
make algebra make sense

Research-based National Science Foundation-funded

EDC Learning transforms lives.

firsthand HEINEMANN
Dedicated to Teachers™