Virtual Learning

Essential Math 4

Unit 11
Lesson 3: Extending Exponents
May 14, 2020

Essential Math 4
Lesson: May 14, 2020

Learning Target:
I can use multiplication and fractions to understand exponents.

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.

Bell Work:
May 14, 2020

Who Am I?

- I am odd.
- I am a multiple of 5.
- $t > u$
- My tens digit is a perfect square.
- $h = u - 3$

h	t	u

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Bell Work **Key**
May 14, 2020

Who Am I?

h	t	u
2	9	5

- I am odd.

- I am a multiple of 5.

- $t > u$

- My tens digit is a perfect square.

- $h = u - 3$

Practice Problems: Unit 11   Lesson 3 (page 15, # A)

(A) $4^0 = 1$

Students often make the **mistake** that $4^0 = 0$.
Explain what might cause that mistake, and explain logically *why* this is wrong.

Answer Key: After completing the problems, check your answers for page 15 here.

(A) $4^0 = 1$

Students often make the **mistake** that $4^0 = 0$. Explain what might cause that mistake, and explain logically *why* this is wrong.

(Responses will vary.)
Students might make this mistake by thinking that 4^0 is the same as $4 \cdot 0$ or might see the 0 and think "zero." Instead, 4^0 is $4^1 \div 4$, so $4^0 = 1$.

Practice Problems: Unit 11 Lesson 3 (page 15, # B)

(B) You've learned that $10^{-1} = \frac{1}{10}$, but students often make the **mistake** that $10^{-1} = -10$. Why might someone make that mistake? How would you explain *why* this is wrong, and *why* the correct value of 10^{-1} is $\frac{1}{10}$?

Answer Key:
After completing the problems, check your answers for page 15 here.

(B) You've learned that $10^{-1} = \frac{1}{10}$, but students often make the **mistake** that $10^{-1} = -10$. Why might someone make that mistake? How would you explain *why* this is wrong, and *why* the correct value of 10^{-1} is $\frac{1}{10}$?

(Responses will vary.) Students might see the negative and think "negative." Or students might think that 10^{-1} is the same as $10 \cdot -1$. But $10^{-1} \cdot 10^{1} = 10^{0} = 1$. Since multiplying 10^{-1} and 10 gives 1, 10^{-1} must be $\frac{1}{10}$.

Practice Problems:
Unit 11
Lesson 3
page 15,
C-D

C)

$6^3 = 216$

$6^2 =$

$6^1 =$

$6^0 =$

$6^{-1} =$

$6^{-2} =$

$6^{-3} =$

D)

$7^3 = 343$

$7^2 =$

$7^1 =$

$7^0 =$

$7^{-1} =$

$7^{-2} =$

$7^{-3} =$

Answer Key:
After completing the problems, check your answers for page 15 here.

C **Powers of 6**

$6^3 =$	216
$6^2 =$	36
$6^1 =$	6
$6^0 =$	1
$6^{-1} =$	$\frac{1}{6}$
$6^{-2} =$	$\frac{1}{36}$
$6^{-3} =$	$\frac{1}{216}$

D **Powers of 7**

$7^3 =$	343
$7^2 =$	49
$7^1 =$	7
$7^0 =$	1
$7^{-1} =$	$\frac{1}{7}$
$7^{-2} =$	$\frac{1}{49}$
$7^{-3} =$	$\frac{1}{343}$

Practice Problems:
Unit 11
Lesson 3
page 15,
F-H

(F) Write three more equivalent expressions for 5^2.

(G) Write three equivalent expressions for 3^{-1}.

(H) Write three equivalent expressions for 6^0.

Answer Key: After completing the problems, check your answers for page 15 here.

(F) Write three more equivalent expressions for 5^2.

$\dfrac{5^8}{5^6}$

25

$5 \cdot 5$

$5^4 \div 5^2$

(Many possible responses.)

(G) Write three equivalent expressions for 3^{-1}.

$\dfrac{3^4}{3^5}$

$\dfrac{1}{3}$

$3^1 \cdot 3^{-2}$

$3^5 \cdot 3^{-6}$

(Many possible responses.)

(H) Write three equivalent expressions for 6^0.

$\dfrac{6^4}{6^4}$

$\dfrac{1}{6^0}$

$6^3 \cdot 6^{-1} \cdot 6^{-2}$

$6^5 \div 6^5$

(Many possible responses.)

Practice Problems: Unit 11 Lesson 3 page 15, # I-P

(I) $9^{10} \cdot 9^{-2} =$ _____

(J) $2^{-5} \cdot 2^{16} =$ _____

(K) $5^3 \cdot 5^8 \cdot 5^{-1} =$ _____

(L) $m^{10} \cdot m^{-4} =$ _____

(M) $6^8 \cdot 6 \cdot 6^{-4} =$ _____

(N) $c^5 \cdot c^{-13} \cdot c^8 =$ _____

(O) $3^{20} \cdot 3^a = 3^{12}$ $a =$ _____

(P) $5^b \cdot 5^9 = 5^2$ $b =$ _____

Answer Key: After completing the problems, check your answers for page 15 here.

(I) $9^{10} \cdot 9^{-2} =$ 9^8

(J) $2^{-5} \cdot 2^{16} =$ 2^{11}

(K) $5^3 \cdot 5^8 \cdot 5^{-1} =$ 5^{10}

(L) $m^{10} \cdot m^{-4} =$ m^6

(M) $6^8 \cdot 6 \cdot 6^{-4} =$ 6^5

(N) $c^5 \cdot c^{-13} \cdot c^8 =$ $c^0 = 1$

(O) $3^{20} \cdot 3^a = 3^{12}$ $a =$ -8

(P) $5^b \cdot 5^9 = 5^2$ $b =$ -7

Fun Stuff:

Three Brothers on a Farm
Three brothers live in a farm. They agreed to buy new seeds: Adam and Ben would go and Charlie stayed to protect fields. Ben bought 75 sacks of wheat in the market whereas Adam bought 45 sacks. At home, they split the sacks equally. Charlie had paid 1400 dollars for the wheat. How much did Ben and Adam get of the sum, considering equal split of the sacks?

Read more: https://www.mathwarehouse.com/riddles/math-riddles.php#ixzz6KHwt2Qtl

Fun Stuff Answer:

Every farmer's part is $1/3(45 + 75) = 40$ sacks.

Charlie paid $1400 for 40 sacks, then 1 sack costs $\$1400/40 = \$35/\text{sack}$.

Adam got $\$35 * (45 - 40) = 35 * 5 = \$175$.

Ben got $\$35 * (75 - 40) = 35 * 35 = \$1225$.

Answer: Ben $1225, Adam $175

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