



Math Virtual Learning

Essential Math 4

May 7, 2020



Lesson: May 7, 2020

Objective/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.

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Bell Work
May 7, 2020

MysteryGrid **1, 2, 3, 5**

20,•		4,+	
	15,•		3,+
3,•	5	10,+	

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Bell Work **Key**
 May 7, 2020

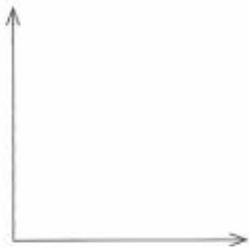
MysteryGrid **1, 2, 3, 5**

20,• 5	2	4,+ 1	3
2	15,• 3	5	3,+ 1
3,• 1	5 5	10,+ 3	2
3	1	2	5

Practice Problems:
Unit 11 Lesson 2
page 37

Unit 11 Additional Practice

- ① Write a situation that shows growth by addition and sketch a graph of your story, labeling the axes.



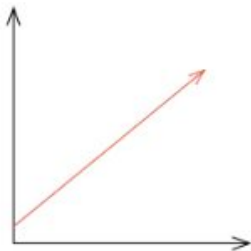
- ② Write a situation that shows growth by multiplication and sketch a graph of your story, labeling the axes.



Answer Key:
After completing the problems, check your answers for page 37 here.

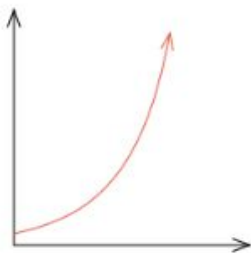
Unit 11 Additional Practice

- ① Write a situation that shows growth by addition and sketch a graph of your story, labeling the axes.



(Responses will vary.) Look for reference to a constant rate of change.
Graph will vary depending on story and may be increasing or decreasing.
Make sure students label the axes.

- ② Write a situation that shows growth by multiplication and sketch a graph of your story, labeling the axes.



(Responses will vary.) Look for reference to doubling, tripling, or other descriptions of multiplication, like growing by a constant percentage growth.
Graph will vary depending on story and may show an increasing or decreasing pattern.
Make sure students label the axes.

Thinking Out Loud

Michael, Lena, and Jay talk about patterns they see in the table in problem 1.

Michael: Each time we move one step up in the table, we're doubling.

Jay: These numbers are related in other ways, too. 4 times 4 is 16, and 4 times 8 is 32, and 8 times 8 is 64.

Michael: So there's more than the doubling pattern. There's also multiplication by 4 and 8. And maybe others, too?

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Pausing to Think

Describe where in the table you see multiplication by 4, multiplication by 8, and any other multiplication patterns.

Jay: Well, it makes sense that we would see the pattern of multiplying by 4, because multiplying by 4 is the same thing as multiplying by 2, then multiplying by 2 again.

Lena: Oh yeah, you can see that in the table! Since multiplying by 4 is the same thing as doubling two times, multiplying by 4 is the same as jumping up 2 spaces on the table.

Michael: I see it. Start at 2^3 , jump up 2 spaces, and you land at 2^5 . You've basically just done 8 times 4, which is 32.

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Practice Problems: Unit 11 Lesson 1 (page 37)

- ③ Figure out the pattern in each table and describe the growth. Is the pattern based on constant addition or constant multiplication? By how much?

①

x	y
1	2
2	6
3	18
4	54
5	162
6	486

②

x	y
1	5
2	125
3	245
4	365
5	485
6	605

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Answer Key: After completing the problems, check your answers for page 37 here.

- ③ Figure out the pattern in each table and describe the growth. Is the pattern based on constant addition or constant multiplication? By how much?

①

x	y
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• 3
 • 3
 • 3
 • 3
 • 3

multiplication
 by 3

②

x	y
1	5
2	125
3	245
4	365
5	485
6	605

+120
 +120
 +120
 +120
 +120

addition
 of 120



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Practice Problems: Unit 11 Lesson 2 (page 37)

- ④ Paulo looks at his homework and sees two problems: $a^4 \cdot a^4 = \underline{\hspace{2cm}}$ and $a^4 + a^4 = \underline{\hspace{2cm}}$. He *knows* that one of the answers is a^8 and the other answer is $2a^4$, but he can't remember which is which. Explain the answer to Paulo and show him a way he could *figure out* the answer on his own next time.
- ⑤ Write three equivalent expressions for $5^6 \cdot 5^4$.
- ⑥ Write three equivalent expressions for c^0 .

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Answer Key: After completing the problems, check your answers for page 37 here.

- ④ Paulo looks at his homework and sees two problems: $a^4 \cdot a^4 = \underline{a^8}$ and $a^4 + a^4 = \underline{2a^4}$. He *knows* that one of the answers is a^8 and the other answer is $2a^4$, but he can't remember which is which. Explain the answer to Paulo and show him a way he could *figure out* the answer on his own next time.

$a^4 = a \cdot a \cdot a \cdot a$. So $a^4 \cdot a^4 = a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a \cdot a$, which equals a^8 .
 Adding $a^4 + a^4$ is like adding $x + x$ or $\blacktriangle + \blacktriangle$. The result is $2\blacktriangle$ or $2x$ or $2a^4$.

- ⑤ Write three equivalent expressions for $5^6 \cdot 5^4$.

$$\frac{5^1}{5} \quad 5^2 \cdot 5^4 \cdot 5^4$$

$$5^{12} \cdot 5^{-2} \quad 5^{10}$$

(Many possible responses.)

- ⑥ Write three equivalent expressions for c^0 .

$$\frac{c^{15}}{c^{15}} \quad 1$$

$$c^2 \cdot c^{-3} \cdot c \quad c^4 \cdot c^{-4}$$

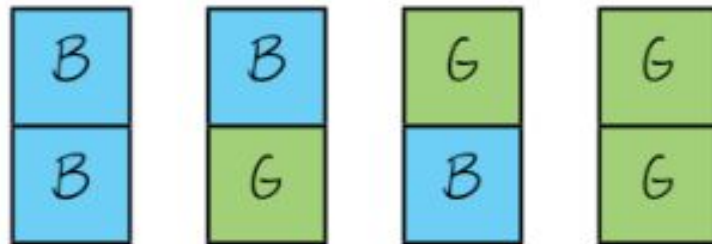
(Many possible responses.)

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Fun Stuff:

You may not need all the towers.

Here are all four ways you can arrange these colors to make a tower that is exactly 2 blocks tall:



① How many different ways can you arrange **two** colors to make a tower that is exactly **3** blocks tall?

This space is for **experimenting**.

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Fun Stuff **Key:**

Organize your solution in a sensible way here.

B	B	B	B	G	G	G	G				
B	B	G	G	B	B	G	G				
B	G	B	G	B	G	B	G				

This is only one of many possible ways to organize the solutions.



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