Exponents 4^2

I have included a voice recorded power point show that has automatic slide advancement. Please leave feedback if you find this helpful, and I will go back and add it to my other units.

Preview

I have also started adding detailed lesson plans to my units. Please leave feedback on if this addition is helpful to you!!

For Middle/High School Special Education

Lesson Plans

13 days

Exponents Lesson Plan

Preparation

- Print out a vocabulary board for each student to use throughout unit
  - Laminate or place in page protector
- Book
  - Print out, laminate, and bind
  - OR your students can listen to the pre-recorded version
- Vocabulary cards
  - Print out a set of cards onto cardstock and laminate
  - Make one set for each student and also one for the teacher to use in I Spy games

Preassessment (do day 1 before starting lesson)

- Choose the form of the assessment that best fits the learning level of your students
- Give the assessment to assess what your students may already know
- I cannot emphasize enough how important this step is. If you want to see growth, this preassessment is so important!!

Teaching Tips

1. *Color Coding*: this is a really easy way to add more structure to a matching activity. Outline or color in an empty box or sorting label. Outline or color i the corresponding picture symbols the same colors. Becomes a color matching task.
   a. For more info, read more here: https://specialneedsforspecialkids.org/2015/09/05/using-color-coding-fo differentiation/
   b. I also have a blog post on differentiating one activity 3 ways: https://specialneedsforspecialkids.org/2018/10/22/differentiating-1-activ 3-ways-easily-and-effectively/
2. *Make you own copies of the activities*: Every day I review the activity we did yesterday. For that reason:
   a. I often complete the activity myself and often laminated it for easy revi that I could use year after year.
   b. My copies were also helpful as either a model for students who needed more support or as a way for more advanced students to self-check the work.

Quick Look

Day	Activity	Day	Activity
1	• Book: Exponents • Vocabulary activity • Repeated addition and multiplication with models worksheets	7	• Book: Sequences • Vocabulary activity • Arithmetic or geometric sequences worksheets
2	• Book: Exponents • Vocabulary activity • Repeated addition and multiplication with models worksheets	8	• Book: Sequences • Vocabulary activity • Arithmetic or geometric sequences worksheets
3	• Book: Exponents • Vocabulary activity • Match equivalent expressions with exponents worksheets	9	• Book: Graphing • Vocabulary activity • Linear or exponential graph
4	• Book: Exponents • Vocabulary activity • Match equivalent expressions with exponents worksheets	10	• Book: Graphing • Vocabulary activity • Linear or exponential graph
5	• Book: Sequences • Vocabulary activity • Arithmetic or geometric sequences worksheets	11	• Book: your choice • Vocabulary cut and paste • Sudoku puzzle
6	• Book: Sequences • Vocabulary activity • Arithmetic or geometric sequences worksheets	12	• Book: your choice • Vocabulary cut and paste • Close worksheets
	•	13	• Review if needed (plenty of extra worksheets) • Assessment

Day 7

Activity	Notes	Materials
Read or listen to a recording of the book: *Sequences* (10 minutes)	• Read through the story, asking lots of questions • Continue to make connections between book and vocabulary board	• Book • Vocabulary board
Vocabulary cards Go Fish Game inutes)	• Using several completed student sets of vocabulary cards play a traditional go fish game ○ Modify/use devices or buddies as needed for additional support	• Vocabulary cards (student sets) Vocabulary board
ence csheet w inutes)	• Review the worksheet completed yesterday	• System of equations worksheet
metic and netric ences csheets inutes)	• This next set of worksheets has a differentiated version included. • Choose the best level for your students Do 1-2 of the worksheets	• Worksheet •
ng inutes)	• Each student shares one of their finished worksheets with the group using the communication method of their choice	• Completed worksheets • Communication devices

When you see a number that has an exponent, it is a combination of two numbers. The larger number is called the base. In this example, the base is 2.

2^4

3 short books

The exponent tells you how many times to multiply the base to itself. Like this:

$2^4 = 2 \times 2 \times 2 \times 2$

Arithmetic sequences are helpful, because once we determine the pattern, or common difference, we can predict future values.

5, 10, 15, 20, 25, ?, ?

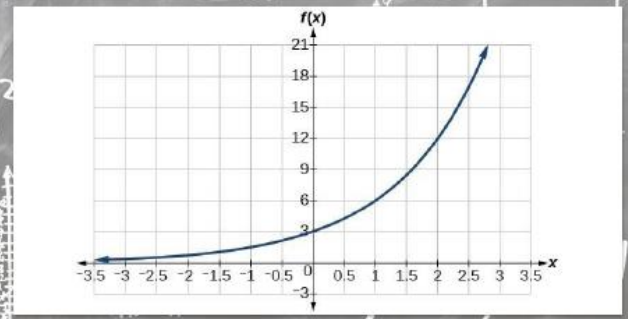
+5 +5 +5 +5 +5 +5

This is an example of a different type of sequence. It is a geometric sequence. A geometric sequence increases by a constant called a common ratio.

2, 4, 8, 16, 32, 64

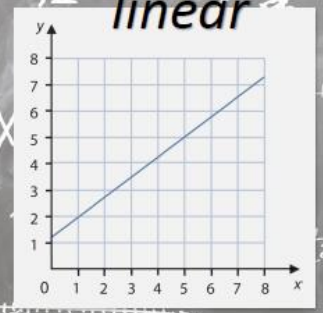
x2 x2 x2 x2 x2

You probably noticed that numbers get really big quickly when you use exponents. That means the graphs are going to look different too.

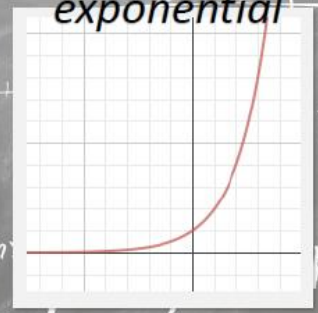


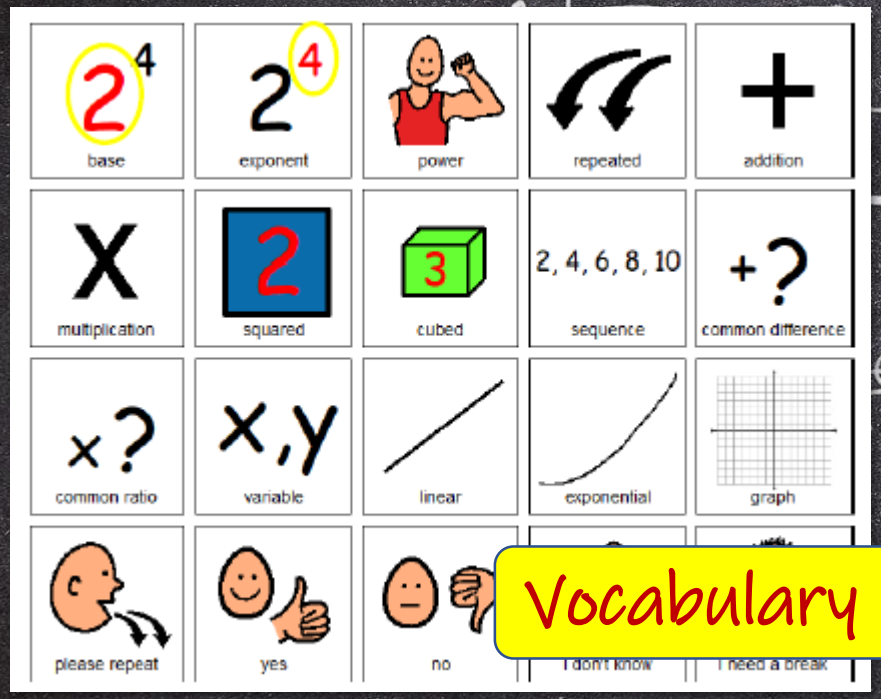
Let's look at them side by side:

linear

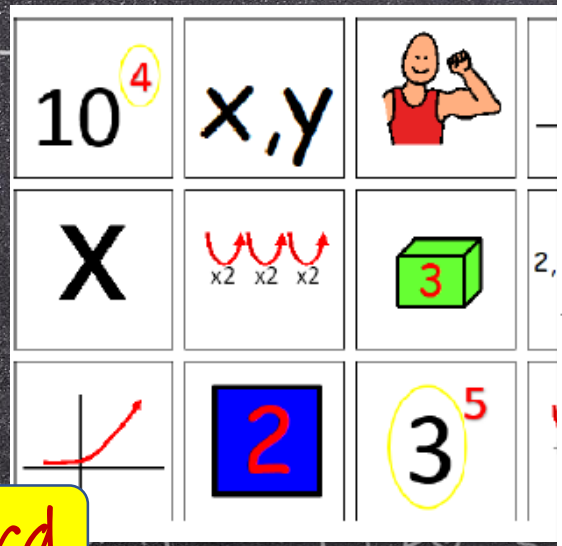


exponential





Vocabulary board



cubed

When the exponent is 3.

sequence

A progression of numbers.

arithmetic sequence

When a sequence of numbers increases or decreases by a constant value.

geometric sequence

When a sequence of numbers increases by a fixed multiple.

Cut & Paste

14 vocab cards

exponent

Smaller number slightly above the base that tells what the power the base is raised to.

2^4

base

The main number in the expression involving an exponent ***that is multiplied*** a repeated number of times.

2^4

power

The smaller number in the expression involving an exponent that tells you ***how many times*** to multiply.

squared

When the exponent is 2.

The main number in the expression involving an exponent ***that is multiplied*** a repeated number of times.

Terms that are unknown or changing in an equation, often represented by letters.

When a sequence of numbers increases by a fixed multiple.

Fixed multiple that each number is multiplied by in a geometric sequence.

common differen

+2 +2 +2

common ratio

x2 x2 x2

equation

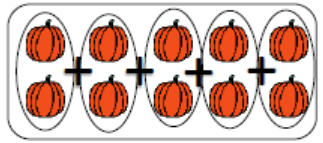
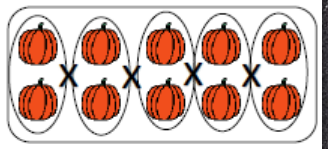
=

variables

x,y

Either draw or use the picture on the next page to draw each equation. The first one is done as an example.

Optional: have students use a calculator to figure total and circle the one with the most.

2 X 5	2^5
	
2 + 2 + 2 + 2 + 2	2 x 2 x 2 x 2 x 2
3 x 3	3^3

Match equivalent expressions

Circle or shade in the equivalent expression

1. 7^2

2+2+2+2+2+2+2	7 x 7	7 + 7

2. 4^3

4 x 4 x 4	4 x 3	3 + 3 + 3 + 3

3. 6^4

6 x 4	6 + 6 + 6 + 6	6 x 6 x 6 x 6

4. 2^2

2 + 2	2 x 2	2 x 2 x 2 x 2 x 2

5. 1^8

1x1x1x1x1x1x1x1	1+1+1+1+1+1+1+1	1 x 8

Draw a line to the equivalent expression.

10^2	3x3x3x3x3x3x3
7^3	7 x 7 x 7
4^4	10
9^5	4 x 4
8^6	9 x 9 x
3^7	8x8x8

Find the equivalent expression.

10^2	
2^4	
6^6	
8^3	
12^3	

Repeated addition and multiplication with models

8 x 8 x 8	12 x 12 x 12
2 x 2 x 2 x 2	10 x 10
1 x 1	6x6x6x6x6x6

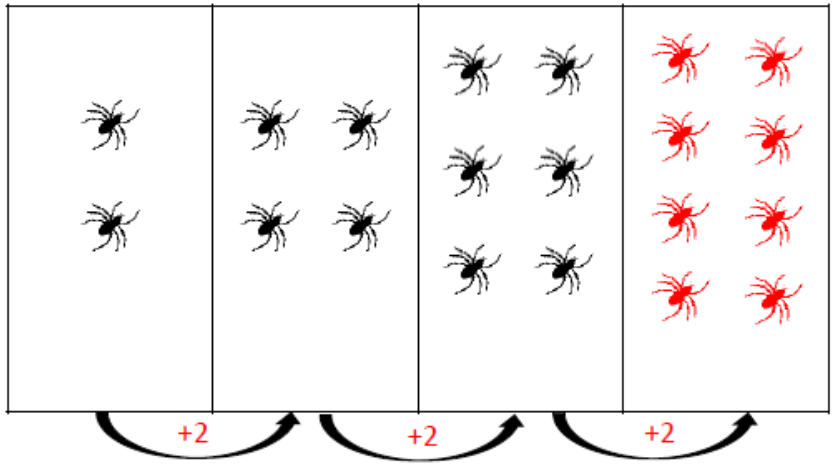
Different formats

Arithmetic & Geometric sequences

Sequences with pictures

Draw or use the pictures to complete each arithmetic sequence.

Sample Common difference ☐



Differentiated

Finding the common difference in the arithmetic sequence. The first one is done as an example.

2, 4, 6, 8, 10 Common difference +2

(+2 +2 +2 +2)

3, 4, 5, 6, 7 Common difference ☐

10, 20, 30, 40, 50 Common difference ☐

3, 6, 9, 12, 15 Common difference ☐

0, 5, 10, 15, 20 Common difference ☐

Finding the common difference in the arithmetic sequence. The first one is done as an example.

2, 4, 6, 8, 10 Common difference +2

(+2 +2 +2 +2)

3, 4, 5, 6, 7 Common difference ☐

(+1 +1 +1 +1)

10, 20, 30, 40, 50 Common difference ☐

(+10 +10 +10 +10)

3, 6, 9, 12, 15 Common difference ☐

(+3 +3 +3 +3)

0, 5, 10, 15, 20 Common difference ☐

(+5 +5 +5 +5)

Look at the following geometric sequence and predict what comes next. The first one is done for you.
Students may need a calculator.

1	3	9	27	81
x3	x3	x3	x3	

1	5	25		

2	4	8		

3	9	27		

1	10	100		

Arithmetic & Geometric sequences

Look at the following geometric sequence and predict what comes next. The first one is done for you.
Students may need a calculator.

1	3	9	27	81
x3	x3	x3	x3	

1	5	25		
x5	x5	x5	x5	

2	4	8		
x2	x2	x2	x2	

3	9	27		
x3	x3	x3	x3	

1	10	100		
x10	x10	x10	x10	

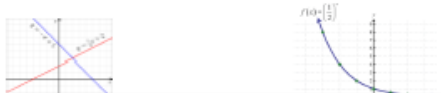
Differentiated

Circle the correct graph.

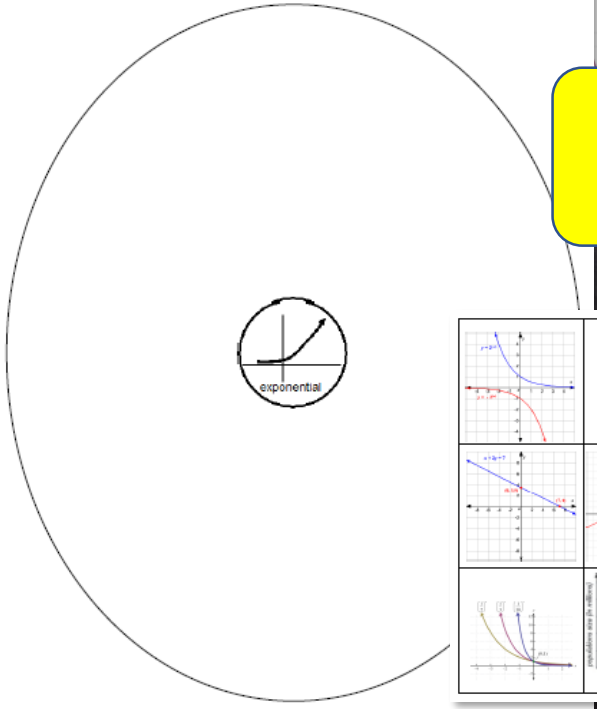
1. linear

2. exponential

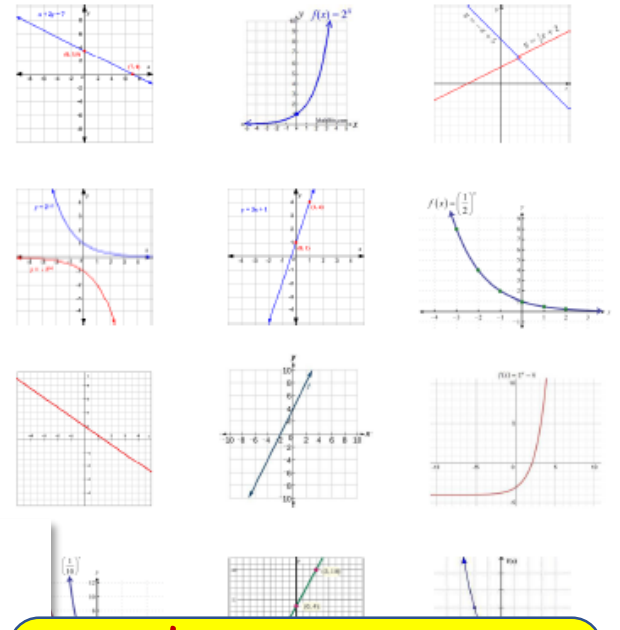
3. linear



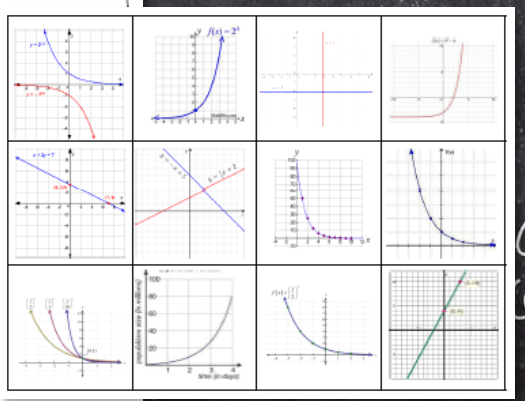
4.



Circle or shade in all the graphs showing a linear function or equation.



Id graphs: 3 formats



Exponents

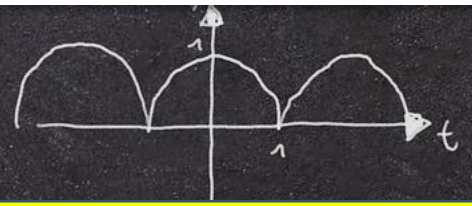
1. Exponents are an example of ____ multiplication.

2. Exponents are written in a special way. The ____ is the large number.

3. The ____ number is the exponent.

4. The exponent tells you how many time the base is ____.

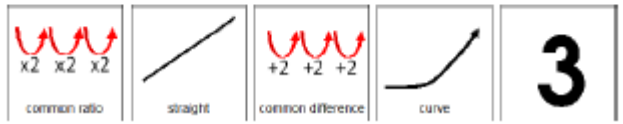
5. The exponent of ____ is also called squared.



Close worksheets

Exponents (page 1)

Exponents (page 2)



Exponents

6. A cubed exponent is represented by the number ____.

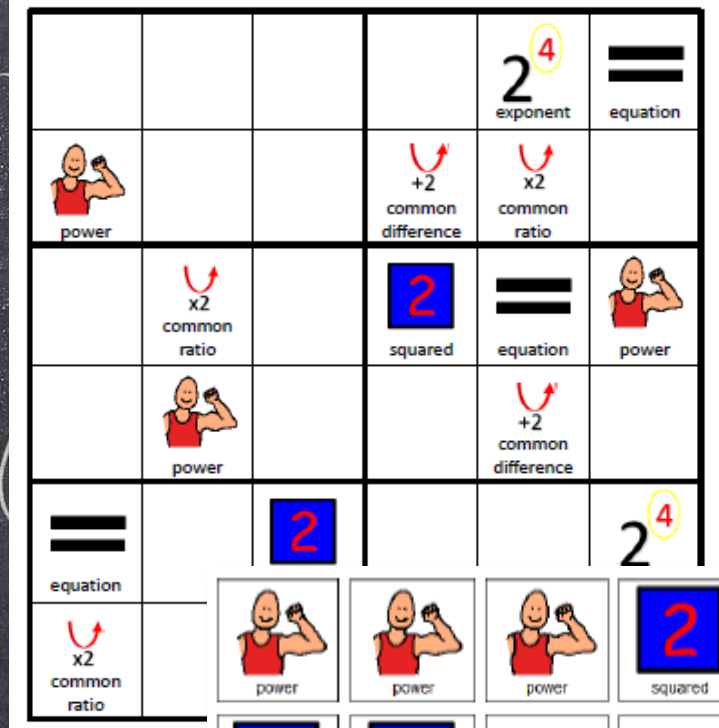
7. Geometric sequences increase by a ____.

8. Arithmetic sequences increase by a ____.

9. A linear graph will have a ____ line.

10. An exponential graph has a line that ____ due to such a rapid rate of change.

Exponents



Sudoku 4x4 also included

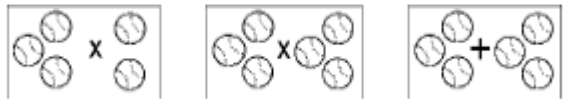
1. Circle the model that shows 3^2

2. Circle the expression that is the same as 7^3

7x7x7	7x3	7+7+7

3. Which of the following shows the exponent base circled?

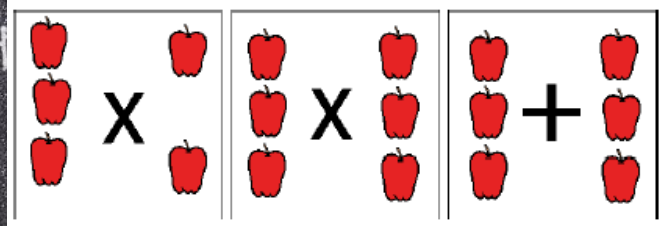
4. Which model shows a number that is squared?



5. How do you write four raised to the fifth power?

4^5	45	5^4

Q 1



Q 2

x3	7+7

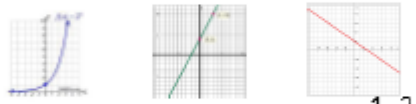
6. A common difference is how much is _____ from one number to the next in a sequence.

x multiplied	+ added	x2 doubled

7. A common ratio is how much is _____ from one number to the next in a sequence.

− subtracted from	+ added	x multiplied

8. Circle the graph that shows an exponential function.



9. What is the common ratio in this sequence: 1, 3, 9, 27 (x3 x3 x3)

x3	+3	-3

10. What is the common difference in this sequence: 3, 4, 5, 6, 7 (+1 +1 +1 +1)

x1	+1	-1

7. A common ratio is how much is _____ to one number and to the next in a sequence.
   A. subtracted from
   B. added
   C. multiplied

8. Circle the graph that shows an exponential function.

9. What is the common ratio in this sequence: 1, 3, 9, 27 (x3 x3 x3)
   A. x3
   B. +3
   C. -3

10. What is the common difference in this sequence: 3, 4, 5, 6, 7 (+1 +1 +1 +1)
   A. x1
   B. +1
   C. -1

Assessments : 3 versions