topic 3 guided practice
Apr 21, 8:00am - Apr 24, 2020, 4:00pm
Given by Pat Ours for Mathematics 8
complete pages 1-14

3. Laws of exponents and scientific notation
Practice > Guided practice 1 2 3 4 5 6 7 8 9 10 11 12 13 14

FIB 3. Laws of exponents and scientific notation > Practice > Guided practice (page 1)

Complete the table by entering the correct value in each blank. (Enter fractional answers like $\frac{1}{5}$ as 1/5.)

Expression	Value
5^0	A
9^{-1}	B
$(-3)^{-2}$	C
$(-16)^0$	D

MCSA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 2)

Which of the following is equivalent to 3^{-3} ?

A. -9

B. $-\frac{1}{27}$

C. -27

D. $\frac{1}{27}$

MCMA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 3)

Which of the following expressions are equivalent to 4^{-5} ? Select all that apply.

A. $4^0 \cdot 4^{-5}$

B. $4^{-3} \cdot 4^{-2}$

C. $\frac{1}{4^5}$

D. -20

E. $\frac{1}{1024}$

F. $-\frac{1}{1024}$

DND 3. Laws of exponents and scientific notation > Practice > Guided practice (page 4)

Write each of these products using a single base and exponent.

$4^{-5} \cdot 4^{5}$	A
$\left(\frac{2}{3}\right)^{3} \cdot \left(\frac{2}{3}\right)^{5}$	B
$5^{2} \cdot 5^{4} \cdot 5^{-2}$	C

Tiles:

Tile1 4^{0}

Tile2 $\left(\frac{2}{3}\right)^{8}$

Tile3 5^{4}

Tile4 4^{-25}

Tile5 $\left(\frac{2}{3}\right)^{15}$

Tile6 5^{-16}

DND 3. Laws of exponents and scientific notation > Practice > Guided practice (page 5)

Simplify each of these expressions using the laws of exponents you have learned.

$(4^{2} \cdot 5^{3}) \cdot (4^{3} \cdot 5^{4})$	A
$\left(\left(\frac{1}{3}\right)^{6}\right)^{3}$	B
$\left(6^{-2} \cdot 7^{7}\right)^{2} \cdot \left(6^{5} \cdot 7^{3}\right)$	C
$\frac{4^{5} \cdot 9^{8} \cdot 4^{5}}{4^{2} \cdot 9^{4}}$	D

Tiles:

Tile1 $4^{5} \cdot 5^{7}$

Tile2 $\left(\frac{1}{3}\right)^{18}$

Tile3 $6 \cdot 7^{17}$

Tile4 $4^{8} \cdot 9^{4}$

Tile5 $4^{6} \cdot 5^{12}$

Tile6 $\left(\frac{1}{3}\right)^{9}$

Tile7 $-6^{-10} \cdot 7^{42}$

Tile8 $4^{5} \cdot 9^{2}$

MCMA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 6)

Which of the following expressions will simplify to $4^2 \cdot 13^4$? Select all that apply.

A. $\left(4^{-4} \cdot 13^8\right)^2 \cdot \left(4^5 \cdot 13^{-6}\right)^2$

B. 52^6

C. $\dfrac{4^2 \cdot 13^8}{4^4 \cdot 13^4}$

D. $\dfrac{2^2 \cdot 2^2 \cdot 13^6}{13^2}$

E. $\left(13^2 \cdot 2^2\right)^2$

FIB 3. Laws of exponents and scientific notation > Practice > Guided practice (page 7)

Simplify the expression. Fill in the blanks with the correct exponents.

$$\frac{(3^2 \cdot 4^3)^4 \cdot (-5)^4}{3^5 \cdot (-5)^8} =$$

$3^{\underline{\quad A \quad}} \cdot 4^{\underline{\quad B \quad}} \cdot (-5)^{\underline{\quad C \quad}}$

DND 3. Laws of exponents and scientific notation > Practice > Guided practice (page 8)

Some of the students in the algebra class are still having trouble noticing the pattern for writing numbers in scientific notation. One of the students suggests creating a table to show similarities and differences.

Decide whether each number is in scientific notation.

Number	Expressed in scientific notation?
212,000,000	A
95	B
2.3×10^2	C
145×10^5	D
-7.53×10^6	E
4.2×10^0	F

Tiles:

Tile1 Is in scientific notation

Tile2 Is not in scientific notation

DND 3. Laws of exponents and scientific notation > Practice > Guided practice (page 9)

Maggie is trying to solve another homework problem. She has to think about arranging numbers that are expressed in standard form and exponential form.

Apply the laws of exponents and place the number in order from least to greatest.

A < B < C < D < E < F

Tiles:

Tile1 -10^1

Tile2 0.00001

Tile3 0

Tile4 10^{-3}

Tile5 10^2

Tile6 10^0

DND 3. Laws of exponents and scientific notation > Practice > Guided practice (page 10)

Look at different representations in the table. Apply your knowledge of exponents and look for patterns to fill in the slots with the equivalent expressions. Some tiles may be used more than once or not at all.

Standard form	Factored form	Scientific notation
A	$3 \times \frac{1}{10{,}000}$	B
-6 million	C	-6×10^6
9	9×1	D
114.8	E	F

Tiles:

Tile1 0.0003

Tile2 3×10^{-4}

Tile3 1.148×100

Tile4 $-6 \times 1{,}000{,}000$

Tile5 9×10^0

Tile6 1.148×10^2

MCSA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 11)

José has an old MP3 player that can hold only 512 megabytes of music. A megabyte is a measure of memory, and is equal to 2^{20} bytes.

Use your calculator to show which is the best representation for 512 megabytes (512 MB) written in scientific notation.

A. $536{,}870{,}912$

B. 5.369×10^8

C. 512×2^{20}

D. $5{,}000{,}000$

E. $512{,}000{,}000$

MCSA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 12)

José wonders how many songs 512 MB can save. If the average song contains about 3.5 MB, about how many songs can be saved onto this device?

A. 200 songs

B. 100 songs

C. 146 songs

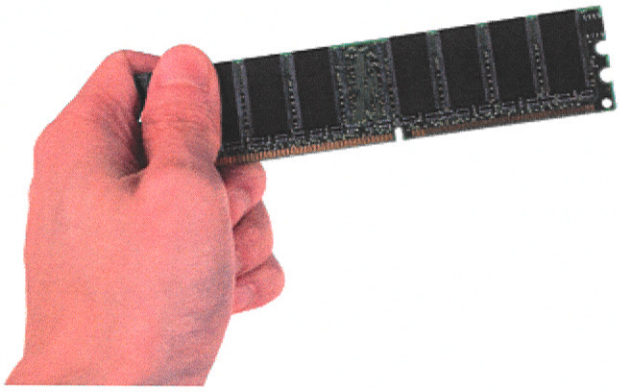
D. 1792 songs

MCSA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 13)

A gigabyte is a larger unit of computer memory that can store about 1 billion bytes of information. This amount is exactly equal to 2^{30} bytes.

One of the computers in Maggie's and José's classroom has 40 gigabytes of memory. How many bytes are there?

Use your calculator to show which choice is **closest** to 40 gigabytes expressed in scientific notation.



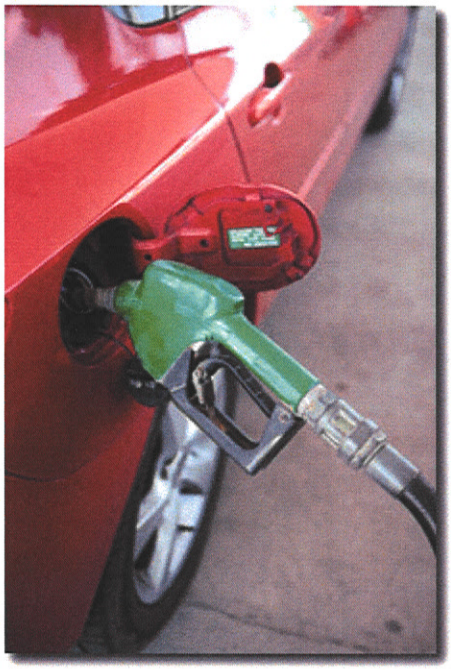
A. 4.29×10^{12}

B. 4.29×10^{6}

C. 4.29×10^{10}

MCSA 3. Laws of exponents and scientific notation > Practice > Guided practice (page 14)

In a particular year, there were 1.6×10^8 registered vehicles in the United States and 1.12×10^{11} gallons of fuel were consumed. How many gallons of fuel were consumed per vehicle, on average?



A. 1.792×10^{19} gallons

B. 1.792×10^{88} gallons

C. 700 gallons

D. $7{,}000$ gallons

topic 3 more practice
Apr 21, 8:00am - Apr 24, 2020, 4:00pm
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3. Laws of exponents and scientific notation
Practice > More practice 1 2 3 4 5 6 7 8 9 10

MCSA 3. Laws of exponents and scientific notation > Practice > More practice (page 1)

$(3 \cdot 8^2 \cdot 6^3)(9 \cdot 8 \cdot 6^4) =$

A. $27 \cdot 8^3 \cdot 6^7$

B. $27 \cdot 8^2 \cdot 6^3$

C. $27 \cdot 8^3 \cdot 6^3$

D. $27 \cdot 8^2 \cdot 6^7$

DND 3. Laws of exponents and scientific notation > Practice > More practice (page 2)

Place the given numbers in the correct locations to solve the following problem. You may use a number more than once or not at all.

$(5 \cdot 2 \cdot 7^2)(4 \cdot 2^8 \cdot 7^5) =$ [A] $\cdot 2$ [B] $\cdot 7$ [C]

Tiles:

Tile1 20
Tile2 8
Tile3 9
Tile4 7

DND 3. Laws of exponents and scientific notation > Practice > More practice (page 3)

In the following expression, expanding $(3(4)^2)^4$ means

$(3(4)^2) \cdot (3(4)^2) \cdot$ [A] $\cdot$ [B] .

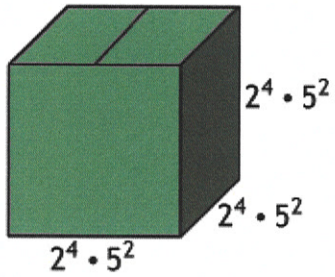
Another way to write $(3(4)^2)^4$ is 3 [C] 4 [D] .

This results in [E] $\cdot 4$ [F] .

Tiles:

Tile1 $(3(4)^2)$
Tile2 4
Tile3 8
Tile4 81
Tile5 6
Tile6 12

MCSA 3. Laws of exponents and scientific notation > Practice > More practice (page 4)



Find the volume of this cube.

A. $3 \cdot (2^4 \cdot 5^2)$

B. $2^4 \cdot 5^6$

C. $2^{12} \cdot 5^6$

D. $2^{12} \cdot 5^2$

DND 3. Laws of exponents and scientific notation > Practice > More practice (page 5)

Fill in the value row of the table.

Problem	Value
$7^3 \cdot 7^4$	A
$(3 \cdot 6 \cdot 9^4)(-2 \cdot 6^2)$	B
$(-2 \cdot 10^2)^5$	C
$\dfrac{225 \cdot 7^5 \cdot 3}{5 \cdot 7^3 \cdot 3^3}$	D

Tiles:

Tile1 $-6 \cdot 6^3 \cdot 9^4$

Tile2 7^{12}

Tile3 $-32 \cdot 10^{10}$

Tile4 $\dfrac{45 \cdot 7^2}{3^2}$

Tile5 $\dfrac{45 \cdot 3^2}{7^2}$

Tile6 7^7

Tile7 $-6 \cdot 6 \cdot 9^4$

Tile8 7

Tile9 $3 \cdot 10^7$

Tile10 $32 \cdot 10^{10}$

MCMA 3. Laws of exponents and scientific notation > Practice > More practice (page 6)

Determine which expressions have been simplified correctly. Select all that apply.

A. $\dfrac{\left(\frac{3}{4}\right)^{10} \cdot \left(\frac{1}{2}\right)^{6} \cdot \left(\frac{3}{4}\right)^{3}}{\left(\frac{3}{4}\right)^{5} \cdot \left(\frac{1}{2}\right)^{2}} = \left(\dfrac{3}{4}\right)^{8} \cdot \left(\dfrac{1}{2}\right)^{4}$

B. $\dfrac{20^{12}}{2^{4}} = 10^{8}$

C. $\dfrac{5^{2}}{5^{8}} = 5^{-6}$

D. $\dfrac{(-3)^{6} \cdot 10^{9}}{(-3)^{2} \cdot 2^{4}} = (-3)^{4} \cdot 5^{5}$

E. $\dfrac{6^{6} \cdot 4^{8}}{6^{3} \cdot 4^{12}} = 6^{3} \cdot 4^{-4}$

MCMA 3. Laws of exponents and scientific notation > Practice > More practice (page 7)

Which of the following are correct simplifications of $\dfrac{3^{9} \cdot (-4)^{6}}{3^{3} \cdot (-4)^{3}}$? Select all that apply.

A. $3^{6} \cdot (-4)^{3}$

B. $-\left(3^{6} \cdot (4)^{3}\right)$

C. $\dfrac{-12^{15}}{-12^{6}}$

D. -12^{11}

E. $3^{3} \cdot (-4)^{2}$

F. $-46{,}656$

MCSA 3. Laws of exponents and scientific notation > Practice > More practice (page 8)

One of Allison's homework problems was marked wrong. Her teacher will give Allison credit back if she can identify her mistake. Allison's steps are shown in the table. Where did she go wrong?

Original problem	$\dfrac{\left(4^{9} \cdot 3^{2}\right)^{4}}{\left(4^{6} \cdot 3^{2}\right)^{5}}$
Step 1	$\dfrac{4^{36} \cdot 3^{8}}{4^{30} \cdot 3^{10}}$
Step 2	

	$\frac{4^6}{3^{-2}}$
Step 3	$4^6 \cdot 3^2$

A. Step 1 — Allison should not have multiplied the exponents together.

B. Step 2 — When Allison divided the expressions with like bases, she didn't correctly subtract the exponents.

C. Step 3 — Allison incorrectly applied the properties of negative exponents.

D. All of Allison's steps are correct.

MCSA 3. Laws of exponents and scientific notation > Practice > More practice (page 9)

Suppose you try to feed 4.8×10^9 people with 4.5×10^{11} kilograms of food. On average, how many kilograms of food will each person receive?

A. 93.75

B. 937.5

C. 2.16×10^{20}

D. 21.6×10^{20}

T/F 3. Laws of exponents and scientific notation > Practice > More practice (page 10)

When lightning strikes, the lightning travels through the air at approximately half the speed of light, or about $\frac{300{,}000{,}000}{2} = 150{,}000{,}000$ meters per second (m/s). To find the approximate distance traveled after 1.38 seconds you would divide $\frac{1.50 \times 10^8}{1.38}$ meters/second^2.

True

False

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3. Laws of exponents and scientific notation
Assessment > Constructed response 1

Constructed 3. Laws of exponents and scientific notation > Assessment > Constructed response (page 1)

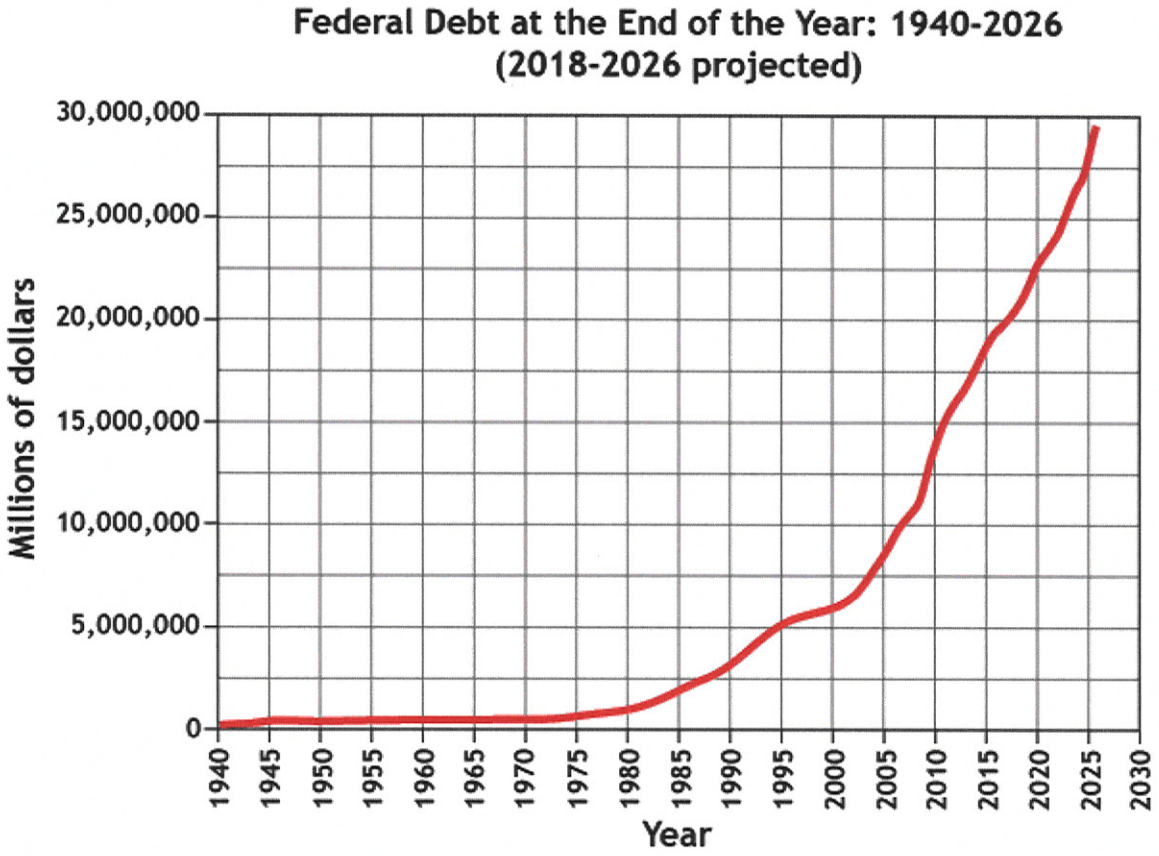
a. Gordon finds data on the national debt since 1791 for a report he is writing for his social studies class. To speed up his note taking, he writes the amounts in scientific notation in the table shown. When he writes his report, he translates the amounts into standard form. Complete the table for Gordon.

Year	National debt ($)	National debt in standard form ($)
1791	7.5×10^7	
1916	3.6×10^9	
1919	2.7×10^{10}	
1946	2.79×10^{11}	
1992	4.0×10^{12}	
1998	5.5×10^{12}	
2006	8.5×10^{12}	
2016	1.9×10^{13}	

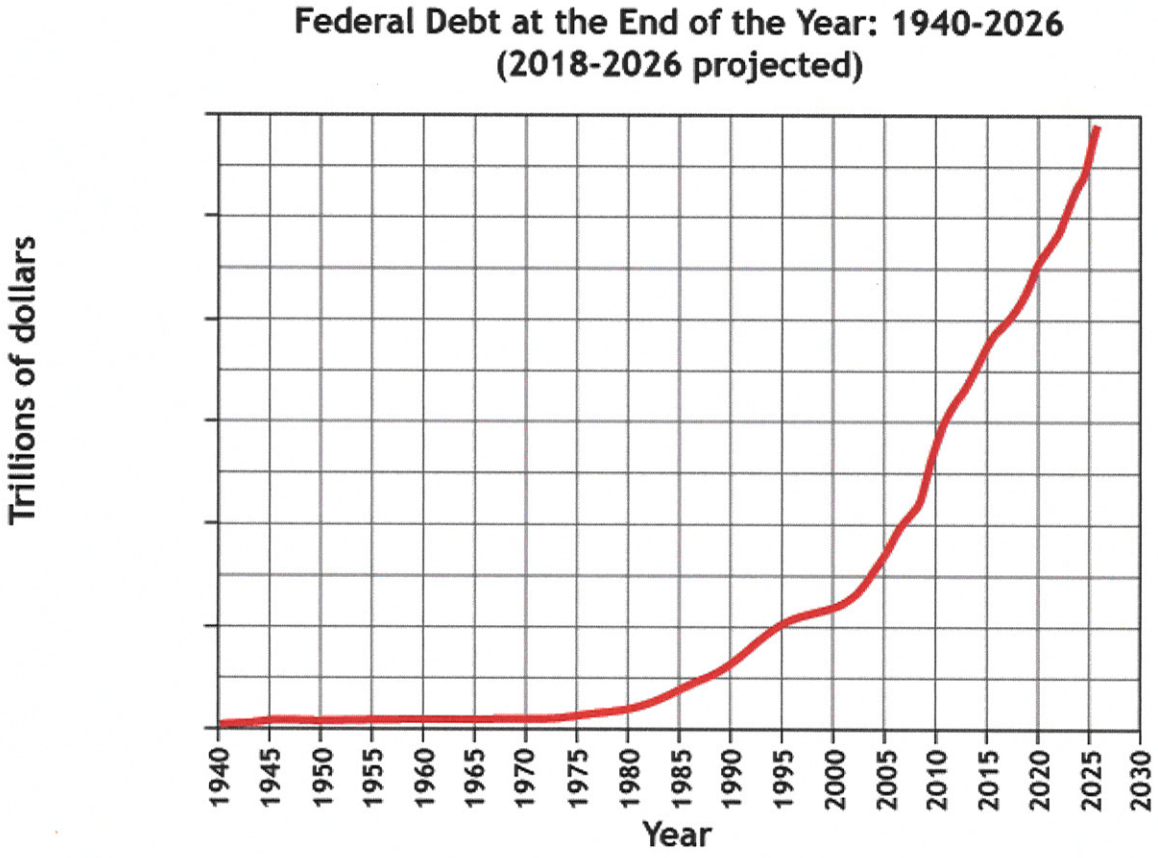
b. Gordon left out the national debt amount for 1981, which was $997,855,000,000. What would Gordon have recorded in the table for the scientific notation notation form of the number?

c. Gordon decides to compare the 1791 national debt to the 2016 national debt. He sets up a ratio using the values in standard form and inputs the ratio as a fraction into his calculator. He uses his calculator to calculate the decimal value of 3.947 E-6. What was the ratio Gordon set up? What will this decimal value be in scientific notation and in standard form? What does this number mean in this situation?

d. Gordon finds a graph of the national debt from the year 1940 until the projected year 2026 on the Internet. When he compares his values to the graph's values, he realizes that his values are greater than what the y-axis shows. He studies the graph and the description under the graph's title. The description stated that the y-values represent millions of dollars. How could Gordon transform the y-values to be the real values?



e. Gordon knows that one trillion is equal to 1×10^{12}. Label the tick marks on the y-axis on the graph below.


Federal Debt at the End of the Year: 1940-2026
(2018-2026 projected)
Trillions of dollars
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
Year