Learning Outcome: To understand part-whole ratio and express it in the simplest form.

CCSS.MATH.CONTENT.6.EE.A.1

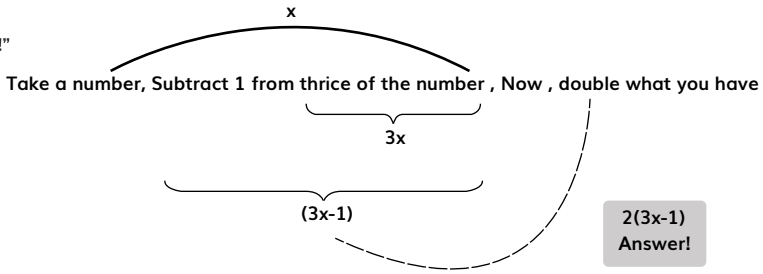
Q:01

SOLUTION

Choose the correct expression for the given statement.

"Take a number. Subtract 1 from thrice of the number. Now, double what you have!!"

- [x] 2(3x - 1)
- [ ] 3x - 2
- [ ] 2x - 1 + 3
- [ ] 2(x + 3 - 1)

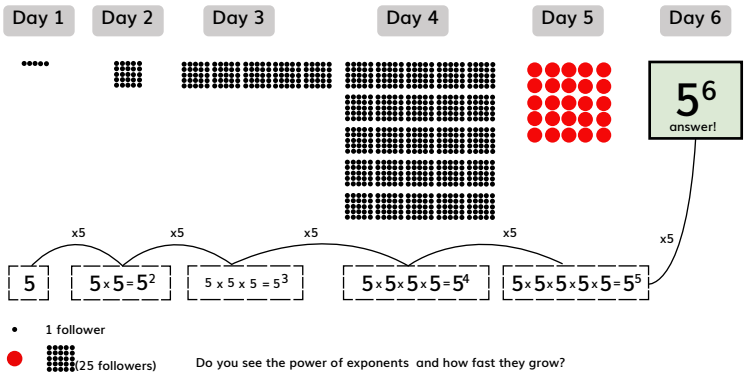


Q:02

SOLUTION

If XLabs' team's followers count increases five times every day.
If there were 5 followers on the first day,
what is the followers count at the end of the 6th day?

- [ ] 5 x 6
- [x] 5^6
- [ ] 5.
- [ ] 5 x 5 x 6



Q:03

SOLUTION

Match the values using laws of exponents

$(27)^4$	
$5^2 5^3$	
$4^7 4^5$	
$2^4 3^4$	

Options: 4^2 6^4 2^{28} 5^5

Question	Formula Used	Ans
$(2^7)^4$	$(a^m)^n$ $a^{(m+n)}$	2^{28}
$5^2 \times 5^3$	$a^m \times a^n$ $a^{(m+n)}$	5^5
$4^7/4^5$	$a^m / a^n = a^{(m-n)}$	4^2
$2^4 \times 3^4$	$a^m \times b^n = (axb)^m$	6^4

Q:04

SOLUTION

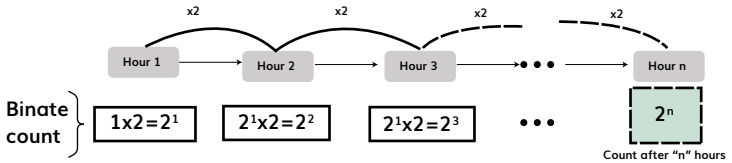
Place true and false in front of the statements.

$3^2+3^3=3^5$	$3^2+3^3= 3^2(1 + 3) = 9(4) = 36 \neq 3^5$	(False)
$2^6>6^2$	$2^6 = 64$, whereas $6^2 = 36$. As $64 > 36$, $2^6 > 6^2$	(True)
$2(3^2)=(2^3)^2$	$2^3{}^2 = 2^9$, but $(2^3)^2 = 2^{(3\times2)} = 2^6$ => As $2^9 \neq 2^6$	(False)
$7^2 7^3=7^5$	$7^2 \times 7^3 = 7^{(2+3)} = 7^5$	(True)

Q:05

SOLUTION

Binate cells double every hour. Drag the numbers to the right if they represent the count of Binates after each hour. (Consider only whole numbers as hours) 8, 20, 32, 40, 64, 84, 120, 256



After the n^{th} hour, the number of cells = 2^n

From the given options, check which of the following can be written as 2^n.

64 = 2^6; 256 = 2^8 ; 32 = 2^5 ; 8 = 2^3 can be represented in the 2^n form!

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Q:06

The growth of some bacterial cells speed up with an increase in temperature. Initially, the population was 210 cells. After an hour, it grew to 211. How many new cells were populated in the last one hour?

a. $2^{(11+10)}$ b. 2^{10}
c. 2^5 d. $2^{(11-10)}$

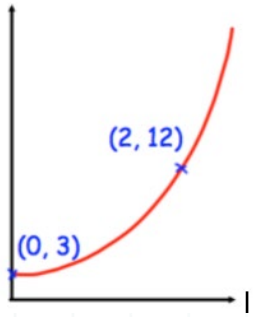
SOLUTION

Initial population of the cells = 2^{10}
Population after 1 hour = 2^{11}
Growth of new cells in the last 1 hour = (Population after 1 hr) - (Initial population)

Growth of new cells in the last 1 hour =
$2^{11} - 2^{10} = 2 \times 2^{10} - 2^{10} = 2^{10}(2 - 1) = 2^{10}$ cells

Q:07

Here is a graph plotted by XLabs's team about the growth of a type of microbes. It's equation is given as $y=ab^x$ (where a and b are constants, and b > 0).



The values of a and b are _____. (Choose the appropriate box)

a = 1, b = 3

a = 3, b = 2

a = 2, b = 3

a = 2, b = 2

SOLUTION

(0,3) and (2,12) satisfy the equation y=abx
Therefore, for x = 0, y = 3 => 3 = a.b0 => 3 = a
Next, for x = 2, y = 12 => 12 = a.b2 => 12 =
(3).b2 => 4 = b2
Since we know that 22 = 4, we get that b = 2

Q:08

Exponentiation is repeated _____.

a. Addition

b. Subtraction

c. Multiplication

d. Division

SOLUTION

c. Multiplication

Q:09

If we represent 343 in exponential form then the _____ is 7 and the _____ is 3.

a. exponent, index

b. base, exponent

c. index, power

d. exponent, base

SOLUTION

b. base, exponent

Q:10

Which of the following statements is incorrect?

a. To divide the power with the same base, subtract the exponents.

b. To multiply the power with the same base, multiply the exponents.

c. To find the power of power, multiply the exponents.

d. To multiply the power with the same base, add the exponents.

SOLUTION

b. To multiply the power with the same base, multiply the exponents.

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Q:11

Which powers of 2 can you use to get a sum equal to 100?
a.2^6 b. 2^5 c. 2^2 d. 2^4

SOLUTION

$2^6 = 64$; $2^5 = 32$; $2^2 = 4$; $2^4 = 16$
To get a sum of 100, let's add 64 and 32 first => 64 + 32 = 96
We need to add 4 more to 96, to make it 100.
The remaining values are 4 and 16, so we need to select 4.
Hence, the powers of 2 used are 2^6, 2^5, and 2^2.

Q:12

Arrange the following numbers in ascending order.

a. $3^2 \times 3^3$ c. 9^3
b. $3^9/3^2$ d. $3^3 + 2 \times 3^3$

$3^2 \times 3^3 = 3^{(2+3)} = 3^5 = 243$
$3^9/3^2 = 19683/3^2 = 2187$
$9^3 = (3^2)^3 = 3^{(2 \times 3)} = 3^6 = 729$
$3^3 + 2 \times 3^3 = 3^3(1 + 2) = 3^4 = 81$
Ascending order: $(3^3 + 2 \times 3^3) < (3^2 \times 3^3) < (3^9/32) < (9^3)$

Q:13

Magnitudes of earthquakes are measured in the Richter scale. A magnitude of 3.0 means that it is 100 times stronger than that of magnitude 1.0 on this scale. Similarly, an earthquake of magnitude 5.0 is 10000 times stronger than a 1.0. How many times is an earthquake of magnitude 8.0 stronger than that of magnitude 3.0?

a. 100 b. 1000000
c. 1000 d. 100000

SOLUTION

Magnitude of 3.0 is 100 times stronger than that of 1.0
=> (Magnitude of 3) = 10^2
Magnitude of 5.0 is 10000 times stronger than that of 1.0
=>(Magnitude of 5.0) = 10^4
The pattern followed here is: Magnitude of "N" is $10^{(N-1)}$ times stronger than that of 1.0
Magnitude of 8.0 = $10^{(8-1)} = 10^7$
Magnitude of 8.0 = $10^5 \times 10^3 = 100000$ (Magnitude of 3.0)
Magnitude of 8.0 is 100000 times stronger than the magnitude of 3.0.

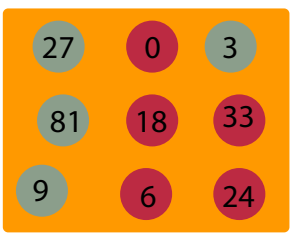
Q:14

SOLUTION

4. Drag the values and complete the table for $y = 3^x$.

x	1	2	3	4

$y=3^x$



The relationship between x and y is represented by $y=3^x$

When x = 1; $y=3^1$ => y=3

When x = 2; $y=3^2$ => y=9

When x = 3; $y=3^3$ => y=27

When x = 4; $y=3^4$ => y=81

x	1	2	3	4
$y=3^x$	3	9	27	81

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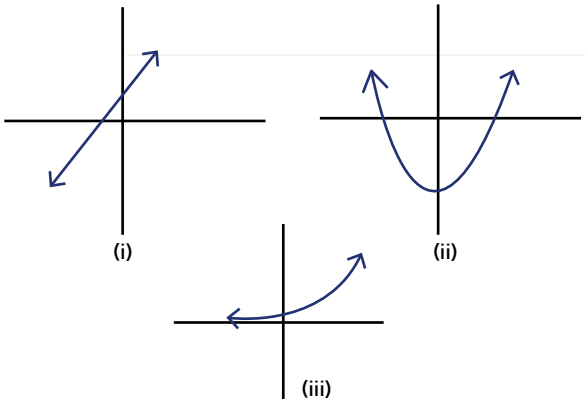
Q:15

XLabs's research team published some of its research outcomes in a paper. It also included the following table, specifying the x and y coordinates of a graph.

x	3	5	7	9
y	8	12	16	20

a) Which equation below represents the data in the table?
$y = 2^x$
$y = 2x + 2$
$y = 5x - 1$
$y = x^3$

b) which of the following graphs correctly represents the given equation?



SOLUTION

a) Let's substitute the value of (x,y) in the given options.

Substitute the coordinates:

i) $y = 2^x \Rightarrow y = 2^3 = 8$ (True) (3,8)

$y = 2^5 = 32$ (False) (5,12)

ii) $y = 2x + 2 \Rightarrow y = 2(3) + 2 = 8$ (True) (3,8)

$y = 2(5) + 2 = 12$ (True) (5,12)

$y = 2(7) + 2 = 16$ (True) (7,16)

$y = 2(9) + 2 = 20$ (True) (9,20)

iii) $y = 5x - 1 \Rightarrow y = 5(3) - 1 = 14 \Rightarrow y = 14$ (False) (3,8)

iv) $y = x^3 \Rightarrow y = 3^3 = 27 \Rightarrow y = 27$ (False) (3,8)

Hence, the given coordinates satisfy the equation $y = 2x + 2$

b) $y = 2x + 2$ is a straight line.

When $x = 0 \Rightarrow y = 2(0) + 2 \Rightarrow y = 2$

So, the straight line will intercept the y-axis at 2.

From the given graphs, only one is a straight line.

Hence, the 1st option.