Warm Up
Grade 8

Oct. ____, 2019

1) Find the missing number (Show your work)

$14^{\boxed{4}} = 38\,416$

$14^1 = 14$
$14^2 = 196$
$14^3 = 2744$
$14^4 = 38\,416$

2) Find the missing number

$\underline{5}^{6} = 15\,625$

$1^6 = 1$
$2^6 = 64$
$3^6 = 729$
$4^6 = 4096$
$5^6 = 15625$

3) Place a <,> or = in the blank between (Can use a calculator BUT show your work.)

a) $5^7 \_\_ 4^8$

$5^7 = 78125$ $4^8 = 65536$

b) $3^3 \_\_ 5^2$

$3^3 = 27$ $5^2 = 25$

7^4

Base is 7
exponent is 3

$7^4 = 7 \times 7 \times 7 \times 7$

expanded form

Quiz Time

Homework

Solutions

1. Identify the base of each power.
   a) 6^3 6 b) 2^7 2 c) $(-5)^4$ -5 d) 7^0 7

2. Use repeated multiplication to show why 3^5 is not the same as 5^3.

$3^5 = 3 \times 3 \times 3 \times 3 \times 3$
$= 243$

$5^3 = 5 \times 5 \times 5$
$= 125$

Complete this table.

Power	Base	Exponent	Repeated Multiplication	Standard Form
4^4	4	4	4x4x4x4	256
10^3	10	3	10x10x10	1000
14^2	14	2	14x14	196
1^5	1	5	1 × 1 × 1 × 1 × 1	1
9^6	9	6	9x9x9x9x9x9	531 441
5^3	5	3	5x5x5x5x5x5x5	78 125

4. Write each product as a power, then evaluate (standard form).
   a) 6×6 $6^2 = 36$ b) $3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6 = 729$
   c) $10 \times 10 \times 10 \times 10 = 10^4 = 10\,000$ d) $8 \times 8 \times 8 = 8^3 = 512$

5. Find the missing exponent. (Show work)
   a) $7^5 = 16\,807$ b) $2^5 = 32$ c) $2^7 = 128$ d) $3^4 = 81$ e) $9^2 = 81$

a) 7x7= 49
7x 7x 7 = 343
7x7x7x7 =2401
7x7x7x7x7 = 16807

b) 2 x 2 = 4
2 x2 x2 = 8
2 x2 x2 x2 = 16
2 x 2 x 2 x2 x 2 = 32

c) 2 x 2 = 4
2 x2 x2 = 8
2 x2 x2 x2 = 16
2 x 2 x 2 x2 x 2 = 32
2 x 2 x 2 x2 x 2x 2 = 64
2 x 2 x 2 x2 x 2x 2x2 = 128

d) 3 x 3 = 9
3 x 3 x 3 = 27
3x3x3 = 81

e)9x9=81

6. Find the missing base.
   a) $\_4\_^3 = 64$ b) $\_7\_^2 = 49$ c) $\_1\_^5 = 1$ d) $\_9\_^3 = 729$

7. Evaluate each of the following. What do you notice?
   a) 10^2 b) 10^3 c) 10^5 d) 10^6
   100 1000 100 000 1 000 000

The exponent on the 10 is the number of zeros that appear in standard form

8. Place a <, > or = in the box. (Show your calculations)

a) $2^7 < 6^3$ b) $4^3 = 2^6$ c) $9^3 > 3^5$ d) $7^3 < 6^5$
128 216 64 64 729 243 343 7776

What do we notice?

$3^1 = 3$

$10^1 = 10$

$12^1 = 12$

$17^1 = 17$

$27^1 = 27$

$99^1 = 99$

$10^0 = 1$

$2^0 = 1$

$81^0 = 1$

$21^0 = 1$

$13^0 = 1$

$5^0 = 1$

3

$5^0 = 1$

$5^1 = 5$ (×5, ÷5)

$5^2 = 25$ (×5, ÷5)

$5^3 = 125$ (×5, ÷5)

$5^4 = 625$

Exponents

Whenever you have an exponent of 2, it is said to be squared. 3^2 might be read as 3 squared.

Whenever you have an exponent of 3, it is said to be cubed. 5^3 might be read as 5 cubed.

If the base is raised to the exponent 1, then the answer will always be the base itself.

examples: $15^1 = 15$ $24^1 = 24$ $6\,893^1 = 6\,893$

If the base is raised to the exponent 0, then the answer will always be 1.

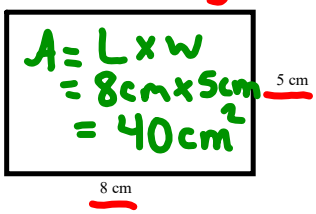
examples: $26^0 = 1$ $147^0 = 1$ $945^0 = 1$

Squares and Perfect Squares

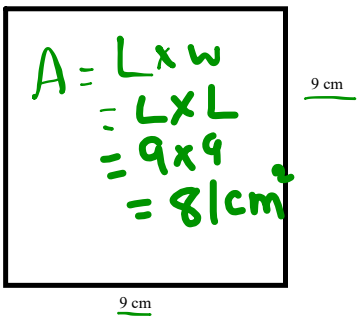
Ex. 1)

What is the area of each below?
Are they squares? Why or why not?

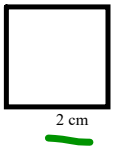
Rectangle



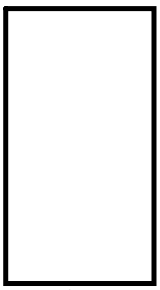
Square



Square



A = L x w
= L x L
= 2 x 2
= 4cm²



Rectangle

A = L x w
= 8cm x 4cm
= 32cm

Ex 2) Can you form squares with the following areas? (Factors)

(a) 18 cm²

1 x 18 Rec
2 x 9 Rec
3 x 6 Rec

(b) 25 cm²

1 x 25 Rec
5 x 5 sqr

(c) 100 cm²

1 x 100
2 x 50
4 x 25
5 x 20
sq 10 x 10

(d) 60 cm²

1 x 60
2 x 30
3 x 20 Rec
4 x 15
5 x 12
6 x 10

How do you know if a given area will make a square?

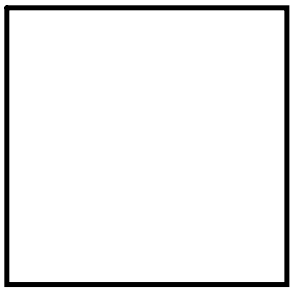
You will form a square if 2 of the factors are the same, for example an area of 25 cm² forms a square because 25 = 5 x 5

Squares and Perfect Squares

What is the area of each below?
Are they squares? Why or why not?

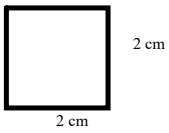
A= L x W
=8x5
= 40cm^2

Not a square,
sides are not equal



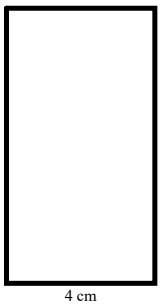
A= Lx W
=9x9
=81om^2

Square, all sides are equal



A= L x W
= 2cm x 2cm
= 4 cm^2

Square all sides equal



A = L x W
= 8cm x 4cm
= 32 cm^2

Not a square, sides are not equal

Ex 2) Can you form squares with the following areas?

(a) 18 cm^2 (b) 25 cm^2 (c) 100 cm^2 (d) 60 cm^2

a) No, there is no number you can multiply by itself to get 18

b) Yes, forms a square, 5 x 5=25

C) Yes because 10 x 10 =100

d) No, can not form a square, there is no number you multiply by itself to get 60

How do you know if a given area will make a square?

You will form a square if 2 of the factors are the same, for example an area of 25 cm^2 forms a square because 25 = 5 x 5

Notes

"To Square a number" - Multiplying a number by itself

Example: "The square of 5" is 5 x 5 = 25

Thus

$5^2 = 25$

$5^2 = 5x5 = 25$

25 is a square number

or Perfect Square

Attachments

WS 2.3 Powers (Sept. 6 Homework).pdf

WS 2.3 Powers Soultions pdf.pdf