



Warm Up
Grade 8



1) Find the missing number (Show your work)

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

$14^1 = 14$
 $14^2 = 196$
 $14^3 = 2744$
 $14^4 = 38416$

2) Find the missing number

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

16
 2^4
 \dots

3) Place a <, > or = in the blank between (Show your work)

a) $5^7 > 4^8$
 ↓ ↓
 78125 65536
 Big

b) $3^3 > 5^2$
 27 25
 Big

Quiz Time

What do we notice?

$$3^1 = 3$$

$$10^1 = 10$$

$$12^1 = 12$$

$$17^1 = 17$$

$$27^1 = 27$$

$$99^1 = 99$$

$$x^1 = x$$

$$10^0 = 1$$

$$2^0 = 1$$

$$81^0 = 1$$

$$21^0 = 1$$

$$13^0 = 1$$

$$5^0 = 1$$

$$x^0 = 1$$



$$\begin{array}{r}
 3^3 = 27 \\
 3^2 = 9 \\
 3^1 = 3 \\
 3^0 = 1
 \end{array}
 \begin{array}{l}
 \downarrow \div 3 \\
 \downarrow \div 3 \\
 \downarrow \div 3 \\
 \downarrow \div 3
 \end{array}$$

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: $26^0 = 1$

$147^0 = 1$

$945^0 = 1$

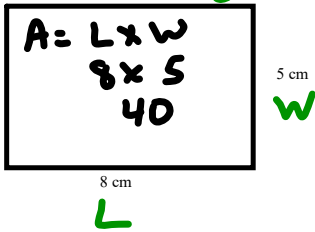
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Squares and Perfect Squares

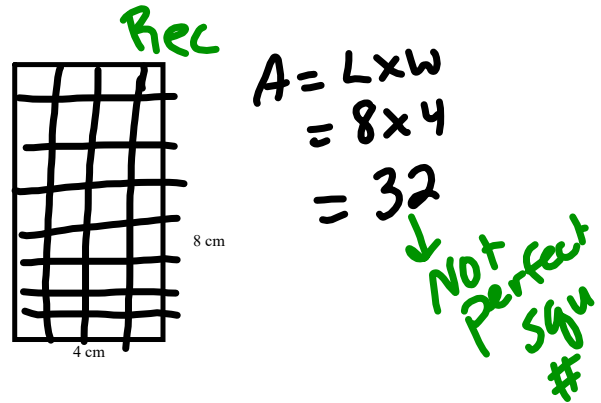
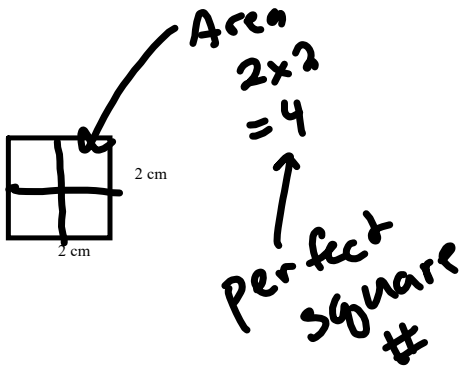
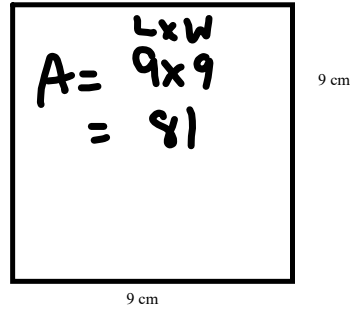
Ex. 1)

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

Rectangle



Square



Ex 2) Can you form squares with the following areas? (Show work → factors)

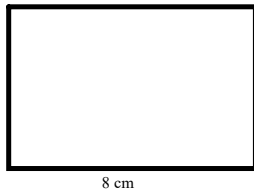
- (a) **Not Perfect** 18 cm²
 - 1x18 Rec
 - 2x9 Rec
 - 3x6 Rec
 - L W
 - (b) **Perfect** 25 cm²
 - 1x25 Rec
 - 5x5 Squ**
 - (c) **Perfect** 100 cm²
 - 1x100
 - 2x50
 - 4x25
 - 5x20
 - 10x10 Squ**
 - (d) **Not Perfect** 60 cm²
 - 1x60
 - 2x30
 - 3x20
 - 4x15
 - 5x12
 - 6x10
- All Rectangles

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

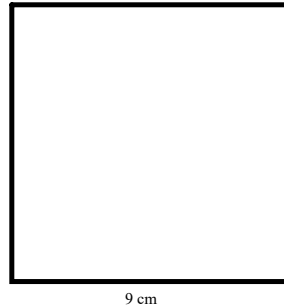
Squares and Perfect Squares

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



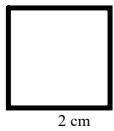
$$\begin{aligned} A &= L \times W \\ &= 8 \times 5 \\ &= 40 \text{ cm}^2 \end{aligned}$$

Not a square,
sides are not equal



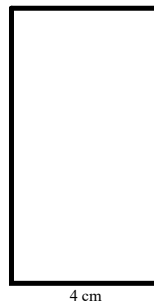
$$\begin{aligned} A &= L \times W \\ &= 9 \times 9 \\ &= 81 \text{ cm}^2 \end{aligned}$$

Square, all
sides are
equal



$$\begin{aligned} A &= L \times W \\ &= 2 \text{ cm} \times 2 \text{ cm} \\ &= 4 \text{ cm}^2 \end{aligned}$$

Square all sides
equal



$$\begin{aligned} A &= L \times W \\ &= 8 \text{ cm} \times 4 \text{ cm} \\ &= 32 \text{ cm}^2 \end{aligned}$$

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, $5 \times 5 = 25$

c) Yes because $10 \times 10 = 100$

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 $25 = 5 \times 5$

Notes

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

Example: "The square of 5" is $5 \times 5 = 25$

Thus

$$5^2 = 25$$

$$5^2 = 5 \times 5 = 25$$



25 is a square number
or Perfect Square

use graph paper

Example 4:

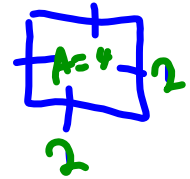
Show that 36 is a square number. Use a diagram, symbols and words.

- 1 x 36 Rec
- 2 x 18 Rec
- 3 x 12 Rec
- 4 x 9 Rec
- 6 x 6 Sq

Solution:
 Draw a square with area 36 square units
 Side length = units
 Then, $36 = \underline{\quad} \times \underline{\quad} = \underline{\quad}^2$
 Words: Thirty-six is squared

NOTES:

How can you find all of the perfect squares of the numbers between 1 and 250?
 Multiply the same numbers to get a perfect square.

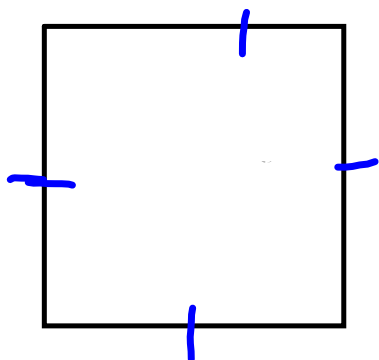


Side length	L x W	Perfect Square (Area)
1	1 x 1 =	1
2	2 x 2 =	4
3	3 x 3 =	9
4	4 x 4 =	16
5	5 x 5 =	25
6	6 x 6 =	36
7	7 x 7 =	49
8	8 x 8 =	64
9	9 x 9 =	81
10	10 x 10 =	100
11	11 x 11 =	121
12	12 x 12 =	144
13	13 x 13 =	169
14	14 x 14 =	196
15	15 x 15 =	225

Perfect Squares

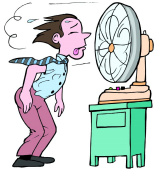
Ex. 5) A square has area of 144 cm^2 . Find the perimeter of the square.

(Always include a diagram...doesn't have to be on graph paper if it doesn't ask for graph paper....so sketch)



$$\text{Side} = \underline{12} \text{ cm}$$

$$\begin{aligned} \text{Perimeter} &= \text{Side} + \text{Side} + \text{Side} + \text{Side} \\ &= 12 \text{ cm} + 12 \text{ cm} + 12 \text{ cm} + 12 \text{ cm} \\ &= 48 \text{ cm} \end{aligned}$$



Warm Up
grade 8



1) If the area of a square is 9 m^2 , what is the side length?

Side = 3m

A hand-drawn diagram of a square with a blue border. Inside the square, the text "A=9" is written in red. To the right of the square, the number "3" is written in red and underlined. Below the square, the number "3" is also written in red and underlined. To the right of the diagram, the text "Side = 3m" is written in blue.

2) 91 is not a perfect square number but which two consecutive square numbers is it between?

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

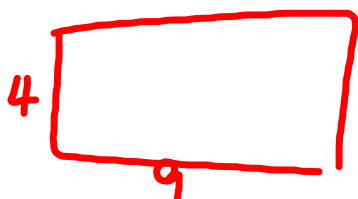
↓
91

81, 91, 100

How can you find all of the perfect squares of the numbers between 1 and 250?

6) 36 square units

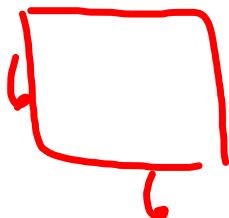
4 x 9



2 x 18



6 x 6



Class/homework

Page 8 # 4, 5, 11ad, 12ab, 15ad, 16abc

Attachments

WS 2.3 Powers (Sept. 6 Homework).pdf

WS 2.3 Powers Soutions pdf.pdf