

Warm Up

Date Nov 10

Grade 8

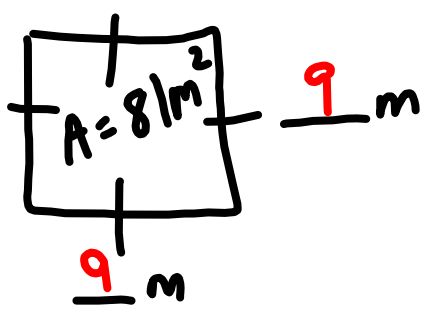
Area = (Side)^2

Side = $\sqrt{\text{Area}}$

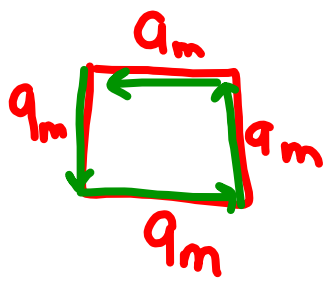
A square room has area of 81 m^2

a) Find the length of a side of the room

Side = 9m



b) How much base board is needed to go around the whole room?



P = Side + Side + Side + Side

or

4 x Side

= 4 x 9m ⇒ 36m



c) Each piece of baseboard is 1.5 m long. How many pieces of baseboard are needed

36m ÷ 1.5 = 24 pieces

We will need 24 pieces.



Solution

Warm Up

Grade 8

A square room has area of 81 m^2

a) Find the length of a side of the room

Area= 81 m^2

= 9 x 9

Side = 9m

b) How much base board is needed to go around the whole room?

P= 9 m + 9 m + 9 m + 9 m

= 36 m



c) Each piece of baseboard is 1.5 m long. How many pieces of baseboard are needed

pieces

1.5 m x 10 = 15 m (up by 15)

1.5 m x 20 = 30 m (up by 10)

1.5 m x 30 = 45 m

1.5m x 24 = 36 (up by 9's)

1.5m x 25 = 37.5

1.5m x 26 = 39

or long division

$$1.5\overline{)36} = 24$$

.3

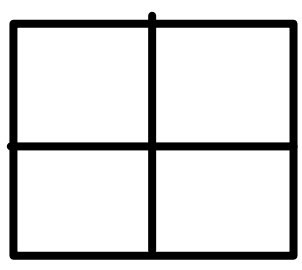
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6

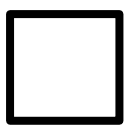
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Need 24 pieces

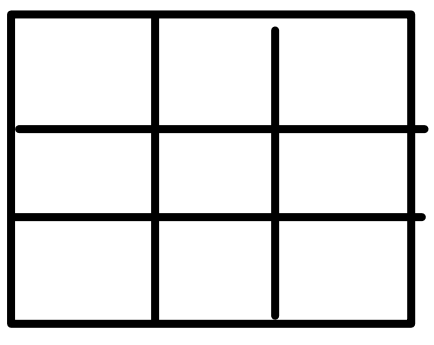
Pg 8

4 a) 

$2 \times 2 = 4$ square units

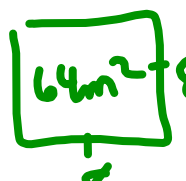
b) 

$1 \times 1 = 1$ square unit

c) 

$3 \times 3 = 9$ square units

5 a) $A = l \times w$
$= 8 \times 8$
$= 64$ units^2

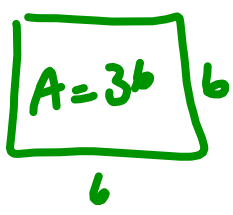


b) $A = l \times w$
$= 10 \times 10$
$= 100$ unit^2

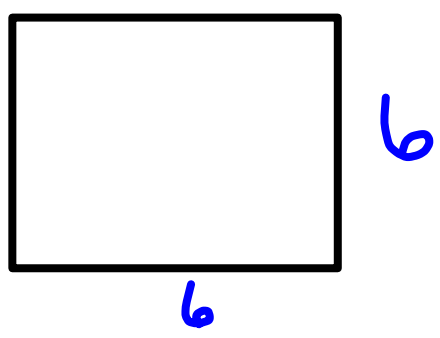
c) $A = l \times w$
$= 3 \times 3$
$= 9$ unit^2

6.

Area	Length	Width	
36	1	36	Rec
	2	18	Rec
	3	12	Rec
	4	9	Rec
	6	6	Sq



Yes, 36 is a perfect square
$6 \times 6 = 36$

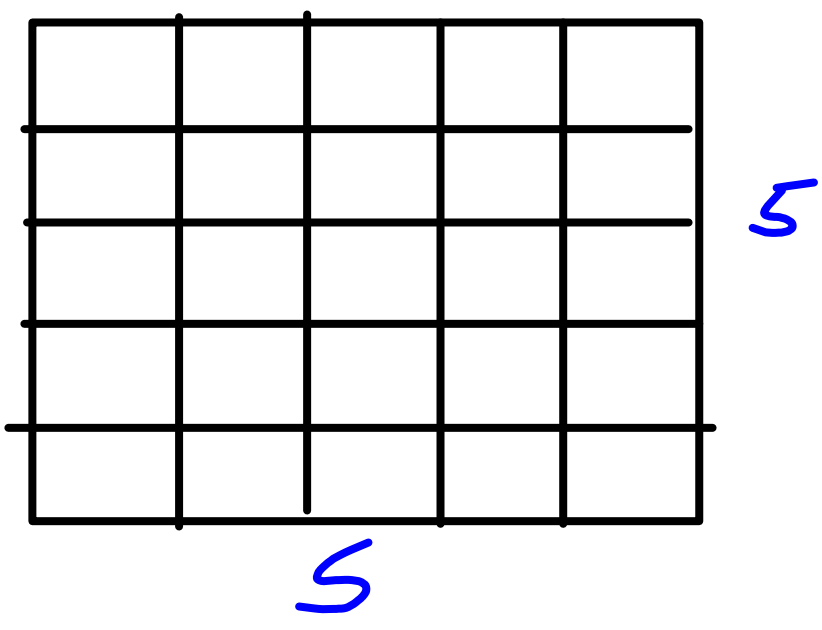


7. Area
28

Length	Width	
1	28	Rec
2	14	Rec
4	7	Rec

No 28 is not a perfect square, there is no number that you can multiply twice (by itself) to get 28.

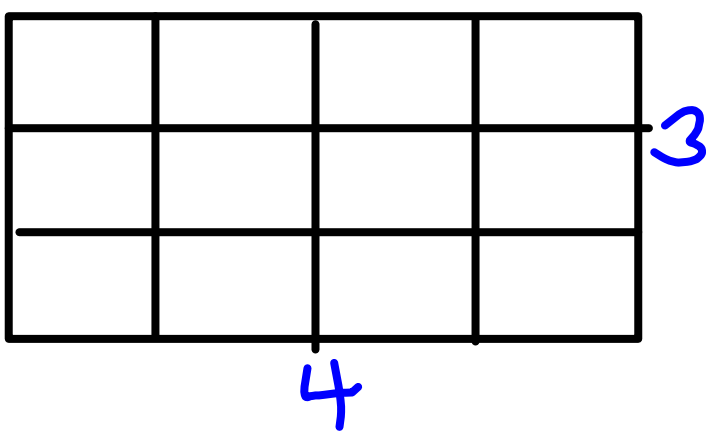
8. 25 - Perfect Square



$5 \times 5 = 25$

25 is a perfect square that has a side length of 5.

9.



Not a square, the sides are not the same.

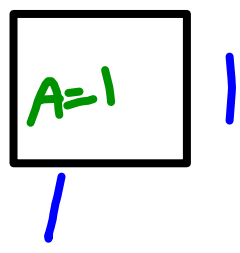
No factors the same

1x12	Rec
2x6	Rec
3x4	Rec

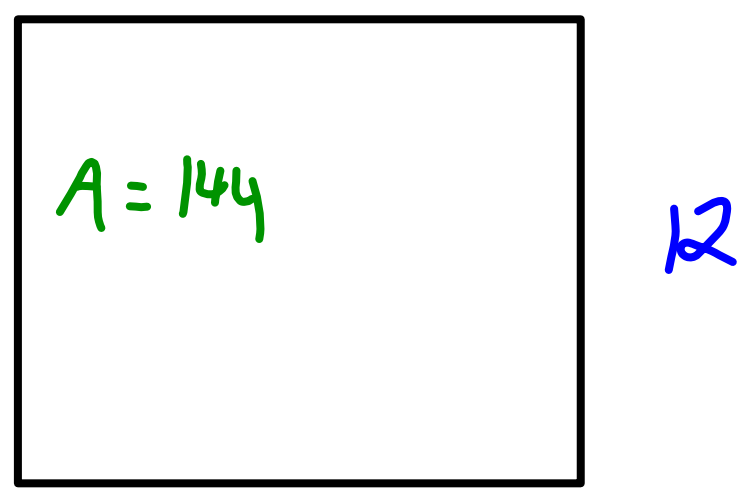
$3 \times 3 = 9$
$4 \times 4 = 16$

No whole numbers that multiply by itself will give 12.

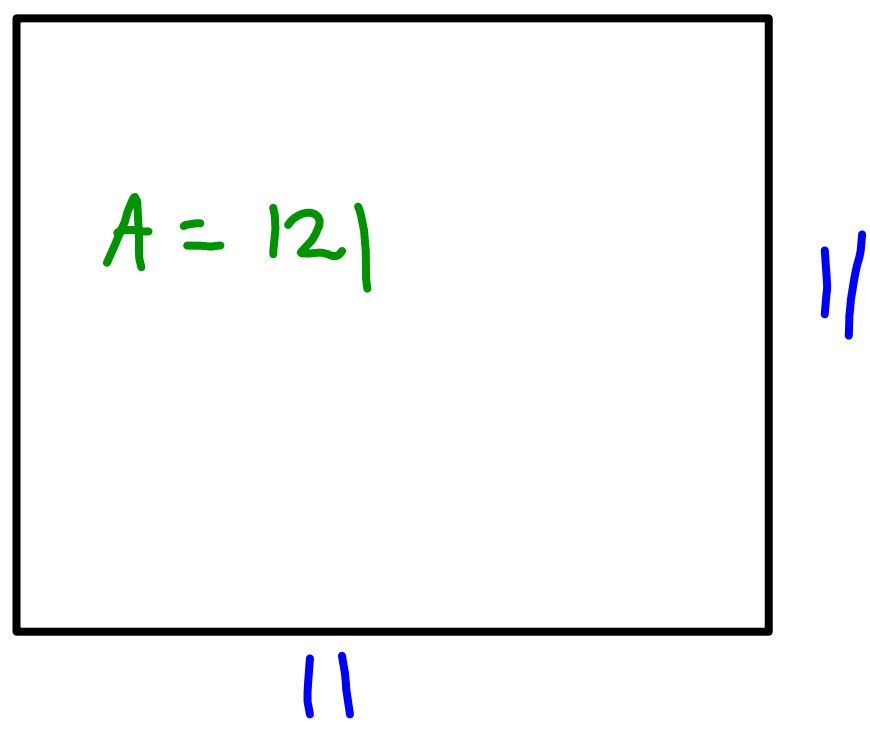
10. a) 1



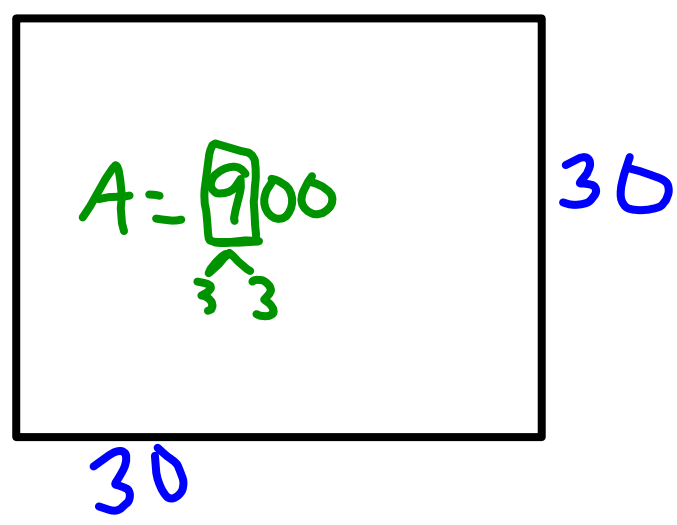
b) 144



c) 121



d) 900
30×30



11 Area $= 100\,m^2$



$10 \times 10 = 100$

so side length $= 10m$

b) Area $= 64\,cm^2$

$8 \times 8 = 64$

so side length $= 8cm$

c) Area $= 81\,m^2$

$9 \times 9 = 81$

so side length $= 9m$

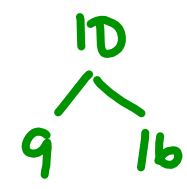
d) Area $= 400\,cm^2$

$20 \times 20 = 400$

so side length $= 20cm$.

12a) 10 → not perfect square

$3 \times 3 = 9$, $4 \times 4 = 16$



b) 50 → not perfect square

there is no number that you can multiply by itself to get 50.

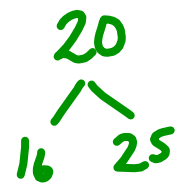


c) 81 - Perfect Square

$9 \times 9 = 81$

d) 20 - not a perfect square

$4 \times 4 = 16$ $5 \times 5 = 25$



15. These numbers are not square numbers.
Which two consecutive square numbers is each number between?
Describe the strategy you used.

a) 12 → 9 16

b) 40 → 36 49

c) 75 → 64 81

d) 200 → 196 225

15.

	Perfect Square Before	Number	Perfect Square After
a)	9	12	16
b)	36	40	49
c)	64	75	81
d)	196	200	225

16. The floor of a large square room has area 144 m².

a) Find the length of a side of the room. $5 \cdot 6 = 12$ m

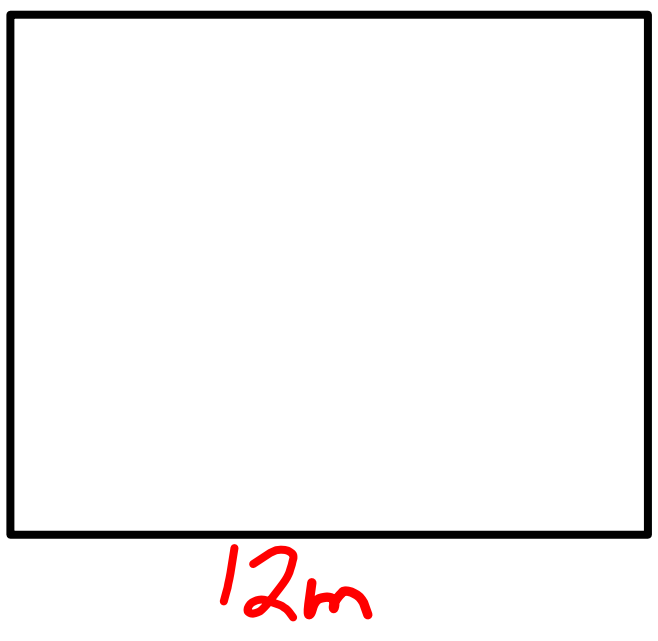
b) How much baseboard is needed to go around the room? $P = 4 \times 12 = 48$ m

c) Each piece of baseboard is 2.5 m long. How many pieces of baseboard are needed? $48 \div 2.5 =$

What assumptions do you make?



16. Area = $144 m^2$



$12 \times 12 = 144$ so each side is 12m

b) Baseboard needed
$4 \times 12 = 48$m

c) $2.5 \times 10 = 25$
$2.5 \times 20 = 50$
$2.5 \times 19 = 47.5$

You need 20 boards

$48 \div 2.5$

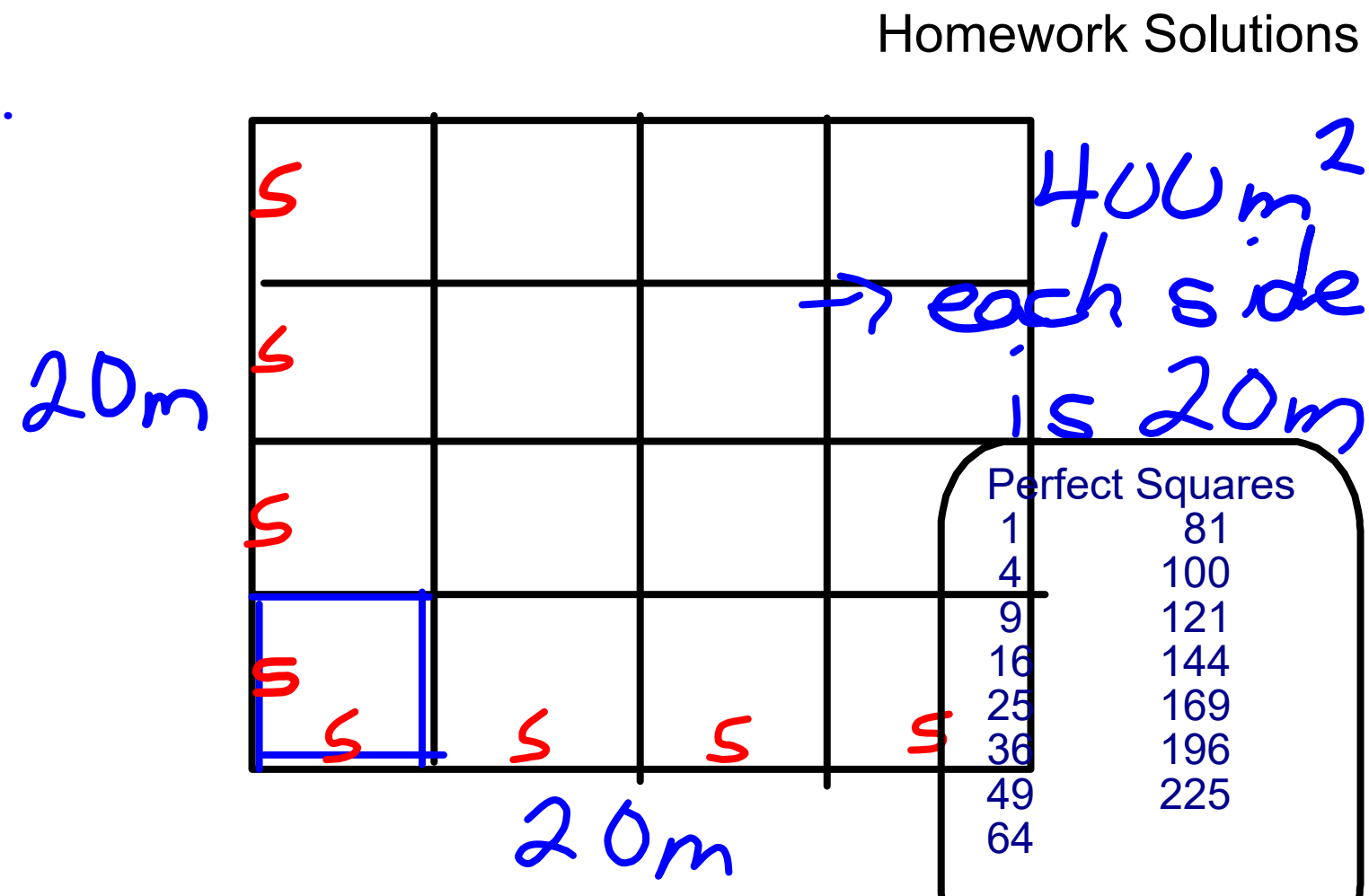
$$\begin{array}{r} 19.2 \\ 25\overline{)480.0} \\ 25 \\ \hline 230 \\ 225 \\ \hline 50 \end{array}$$

You will need 20 board

17. A garden has area 400 m^2.
The garden is divided into
16 congruent square plots.
Sketch a diagram of the garden.
What is the side length of each plot?

17.

Homework Solutions



18. **Assessment Focus** Which whole numbers between 50 and 200 are perfect squares? Explain how you know.

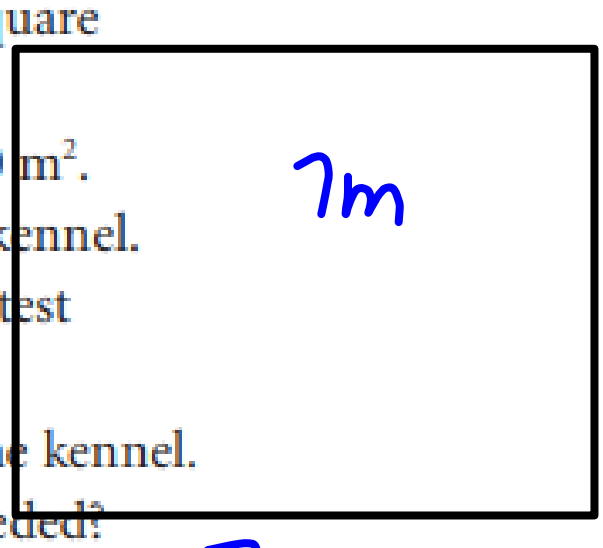
18. The perfect squares between 50 and 200 are:

64, 81, 100, 121, 144, 169, 196

9. Area $< 60m^2$. It is a square

19. Lee is planning to fence a square kennel for her dog.
Its area must be less than 60 m^2.

a) Sketch a diagram of the kennel.



b) What is the kennel's greatest possible area?

c) Find the side length of the kennel.

d) How much fencing is needed?

e) One metre of fencing costs $10.00. What is the cost of the fencing?

What assumptions do you make?

b) Greatest poss
Area = l x w
= 7 x 7
= 49m²

c) Side Length 7m

d) Per = 4 x 7
= 28m

e) Cost = 28 x 10
= $280

for largest possible square kennel

20. **Take It Further** Devon has a piece of poster board 45 cm by 20 cm.
His teacher challenges him to cut the board into parts, then rearrange the parts to form a square.

a) What is the side length of the square?

b) What are the fewest cuts Devon could have made? Explain.

20 A = l x w
= 45 x 20
= 900 cm^2

If the area is 900 cm^2, the larget possible square is 30m by 30m.

(b) —

21. **Take It Further** The digital root of a number is the result of adding the digits of the number until a single-digit number is reached. For example, to find the digital root of 147:

$1 + 4 + 7 = 12$ and $1 + 2 = 3$

a) Find the digital roots of the first 15 square numbers. What do you notice?

b) What can you say about the digital root of a square number?

Homework Solutions

21 Perfect Sq. Digital Square root

1 → 1

4 → 4

9 → 9

16 → 7

25 → 7

36 → 9

49 → 4

64 → 1

81 → 9

100 → 1

121 → 4

144 → 9

169 → 7

196 → 7

225 → 9

(13)

c) Use your results in part b. Which of these numbers might be square numbers?

i) 440 **ii)** 2809 **iii)** 3008

iv) 4225 **v)** 625

Write out the factors for each number below

1	1							
2	1	2						
3	1	3						
4	1	2	4					
5	1	5						
6	1	2	3	6				
7	1	7						
8	1	2	4	8				
9	1	3	9					
10	1	10	2	5				
11	1	11						
12	1	12	3	4	2	6		
13	1	13						
14	1	14	2	7				
15	1	15	3	5				
16	1	16	4	8	2			
17	1	17						
18	1	18	2	9	3	6		
19	1	19						
20	1	20	2	10	4	5		
21	1	21	3	7				
22	1	22	2	11				
23	1	23						
24	1	24	2	12	3	8	4	6
25	1	25	5					
26	1	26	2	13				
27	1	27	3	9				
28	1	28	2	14	4	7		
29	1	29						
30	1	30	2	15	3	10	5	6

1 factor
2 factor
2 factor
3 factors
2 factors
4 factors
2
4
3
4
0
6 factors
2 factors
4 factors
1
15

4
1x4
2x2

5
1x5

6
1x6
2x3

7
1x7

9
1x9
3x3

8
1x8
2x4

Discuss Factors, have students complete factor sheet 1- 30

1	1							
2	1	2						
3	1	3						
4	1	2	4					
5	1	5						
6	1	2	3	6				
7	1	7						
8	1	2	4	8				
9	1	3	9					
10	1	2	5	10				
11	1	11						
12	1	2	3	4	6	12		
13	1	13						
14	1	2	7	14				
15	1	3	5	15				
16	1	2	4	8	16			
17	1	17						
18	1	2	3	6	9	18		
19	1	19						
20	1	2	4	5	10	20		
21	1	3	7	21				
22	1	2	11	22				
23	1	23						
24	1	2	3	4	6	8	12	24
25	1	5	25					
26	1	2	13	26				
27	1	3	9	27				
28	1	2	4	7	14	28		
29	1	29						
30	1	2	3	5	6	10	15	30

Discuss a number having an odd number of factors.

Any number with an odd number of factors will be a perfect square.

Section 1.2
Squares and Square Roots



Discuss a number having an odd number of factors.

Any number with an odd number of factors will be a perfect square.

Ex) The factors of 136 are listed below:

1, 2, 4, 8, 17, 34, 68, 136

136 has 8 factors
↓even # of factors

even # of factors means the # is not perfect Square.

Is 136 a square number? How do you know?

136

(Perfect square) (answer to multiply)

Square number: a PRODUCT of a number multiplied by itself

25 is a square number since 5x5 =25

area of the square

Square root: a number that when it is multiplied by itself produces a perfect square

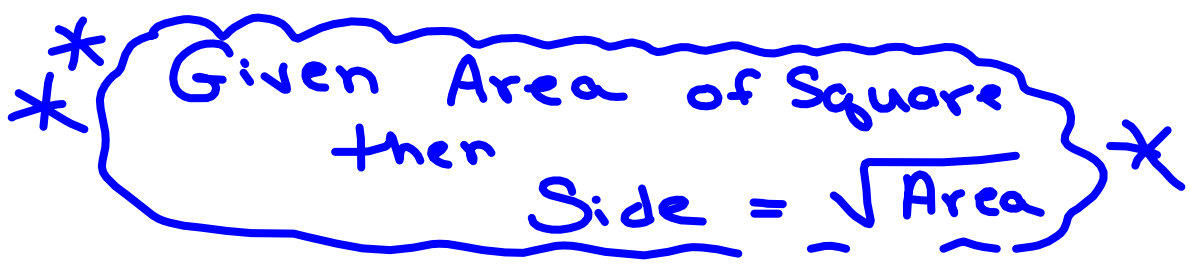
$\sqrt{}$ - This is the symbol for square root.

6 is the square root of 36

$\sqrt{36} = 6$

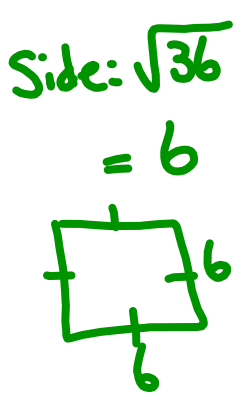
side length

Square Roots - $\sqrt{}$

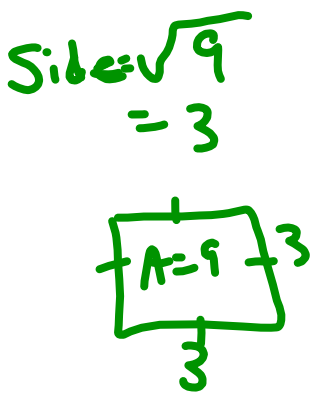


Draw a square with the following little squares inside it:

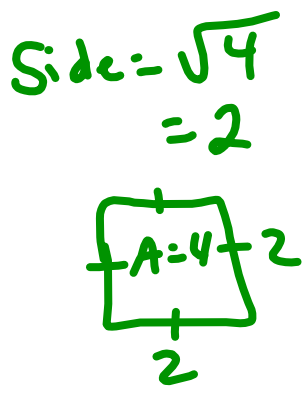
(a) 36 ⇒ Area



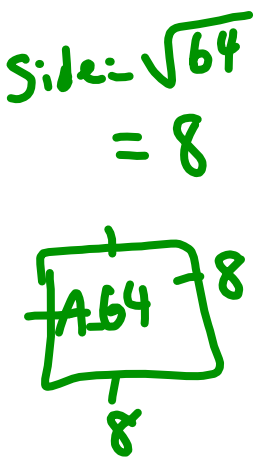
(b) 9



(c) 4



(d)



Add to notes

$\sqrt{x^2} = x$ or $(\sqrt{x})^2 = x$

Evaluate

ex) $\sqrt{7^2}$

$\sqrt{49}$

$= 7$

ex) $(\sqrt{11}\,)^2 = 11$

$\sqrt{11} \times \sqrt{11}$

$\sqrt{121}$

ex) $(\sqrt{6024}\,)^2$

$= 6024$

ex) $\sqrt{924^2} \Rightarrow \sqrt{61^2}$

$= 924$ $= 61$

Class/Homework



page. 15

6 ω

$8^2 = 64$

8 [x²]

8 [△] 2

6(a,b,c,d),
7(a,b,c,d),
8(a,) i,ii,iii,iv
~~10(a),~~
11(a,b),
12(i),
14, bcd
15 bcd

odd or even # factors

(96 write factors)

14a) $\sqrt{3^2} = 3$

15a) $(\sqrt{4})^2 = 4$

7) a) $\sqrt{25} = 5$

8a) i Square

i) $1^2 = 1$

Then Finish Page 8 from last day

Page 8 11ad, 12ad, 15ad, 16abc

5. Find the square of each number.

a) 4 **b)** 6 **c)** 2 **d)** 9

6. Find.

a) 8^2 **b)** 3^2 **c)** 1^2 **d)** 7^2

7. Find a square root of each number.

a) 25 **b)** 81 **c)** 64 **d)** 169

8. **a)** Find the square of each number.

i) 1 **ii)** 10 **iii)** 100 **iv)** 1000

10. List the factors of each number in ascending order.
Find a square root of each number.

a) 256 **b)** 625 **c)** 121

11. The factors of each number are listed in ascending order.
Which numbers are square numbers?
How do you know?

a) 225: 1, 3, 5, 9, 15, 25, 45, 75, 225

b) 500: 1, 2, 4, 5, 10, 20, 25, 50, 100, 125, 250, 500

c) 324: 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 81, 108, 162, 324

d) 160: 1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 80, 160

12. a) List the factors of each number in ascending order.

i) 96 **ii)** 484

iii) 240 **iv)** 152

v) 441 **vi)** 54

12:)

96

1 x 96
2 x 48
3 x 32
4 x 24
6 x 16
8 x 12

Factor of 96

1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96

12 factor

⇓

even # of factors

↳ Not perfect ☹

13. Find each square root.

a) $\sqrt{1}$ **b)** $\sqrt{49}$

c) $\sqrt{144}$ **d)** $\sqrt{9}$

e) $\sqrt{16}$ **f)** $\sqrt{100}$

g) $\sqrt{625}$ **h)** $\sqrt{225}$

14. Find a square root of each number.

a) 3^2 **b)** 6^2

c) 10^2 **d)** 117^2

15. Find the square of each number.

a) $\sqrt{4}$ **b)** $\sqrt{121}$

c) $\sqrt{225}$ **d)** $\sqrt{676}$

Pg 15 Square each number

5a) $4^2 = 4 \times 4 = 16$

b a) $8^2 = 8 \times 8$
$= 64$

7. Find square root

a) $\sqrt{25} = 5$

8 Square

a) 1^2_2

b) 10

c) 160^2

d) 1000^2

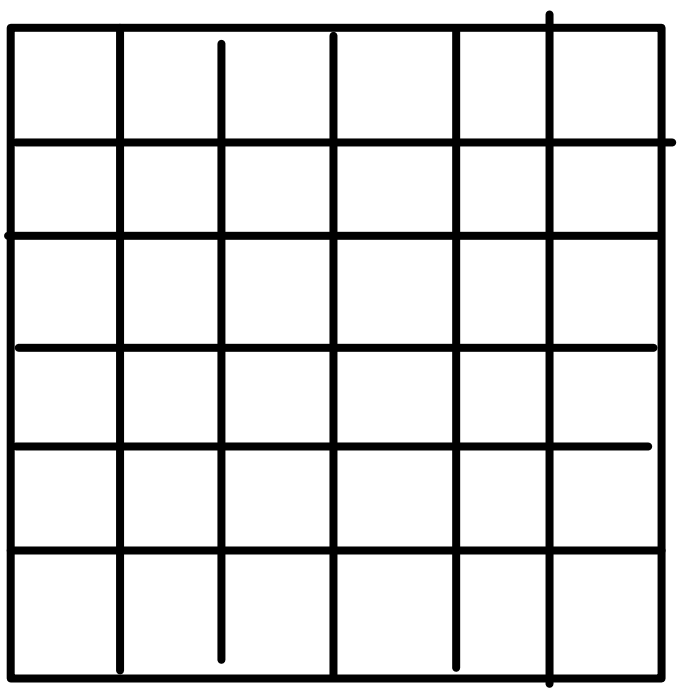
9 a) 50

1×50

2×25

5×10

1, 2, 5, 10, 25, 50



400

1 x 400

2 x 200

4 x 100

5 x 80

8 x 50

10 x 40

20 x 20

256

1x256

2x128

4x64

8x32

16x16

1, 2, 4, 8, 16, 32, 64, 128, 256