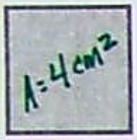
~~ Unit 6, Page 21 ~~

Objectives: I can find irrational lengths of segments.

Finding the Length of Segments

Given the area of the following squares, find the length of each side.



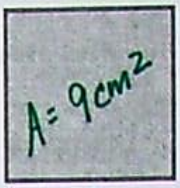
s = 2 cm

Area: 4 cm²

Side: $\sqrt{4} = 2cm$

s = 2 cm $s = \sqrt{4}$

s = 3cm



Area: 9 cm²

Side: 3 cm

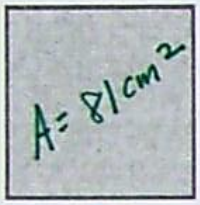
$s = \sqrt{9}$

s = 3cm

Perfect Squares

$1 \cdot 1$	1
$2 \cdot 2$	4
$3 \cdot 3$	9
$4 \cdot 4$	16
$5 \cdot 5$	25
6^2	36
7^2	49
8^2	64
9^2	81
10^2	100
11^2	121
12^2	144
13^2	169
14^2	196
15^2	225
16^2	256
17^2	289
18^2	324
19^2	361
20^2	400

s = 9cm



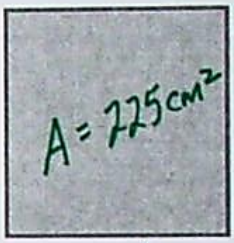
Area: 81 cm²

Side: 9 cm

$s = \sqrt{81}$

s = 9cm

s = 15cm



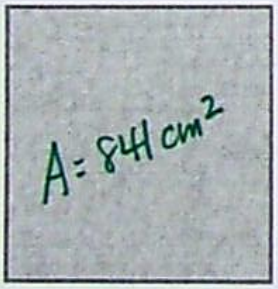
Area: 225 cm²

Side: 15cm

$s = \sqrt{225}$

s = 15cm

s = 29cm



Area: 841 cm²

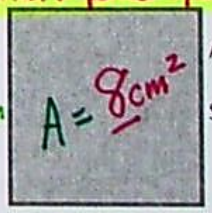
Side: 29cm

$s = \sqrt{841}$

s = 29cm

* Not a "perfect square"

$s \approx 2.8cm$



Area: 8 cm²

Side: $\approx 2.8cm$

$s = \sqrt{8}$

$s \approx 2.8cm$

$\sqrt{4}$ 2 $\sqrt{9}$ 3

$8 = 5$

$2\frac{4}{5}$

2.8

* Must estimate the length of one side!

When you know the area of a square, you can take the square root of the area to get the side length of the square.

Given a square's area, $\sqrt{area} = side\ length$

Ex. If $A = 25$, then $\sqrt{25} = 5$, the length of a side

Perfect Squares have areas such as:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, ... units²

Finding Lengths of Segments with Irrational Measurements

Notes:

Draw a Square. Find the area of the square. Use the area to find the length of the side. Estimate your answer by measuring with a ruler and using your calculator.

1)

m=1
⊥m=-1

Area of square = $2u^2$

Length of the segment = $\sqrt{2u^2}$

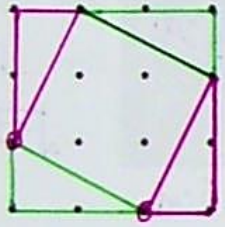
Length with a ruler ≈ 1.4cm

Estimate the length with a calculator ≈ 1.4u

s=2
$A = 4u^2$
$-2u^2$
$2u^2$

$\sqrt{1}$ $\sqrt{2}$ $\sqrt{4}$ (1, 2)
$\approx 1\frac{1}{3} \approx 1.\overline{3}$

2)



$m = -\frac{1}{2}$
$\perp m = 2$
$(\frac{-2}{1})$

Area of square = $5u^2$

Length of the segment = $\sqrt{5u^2}$

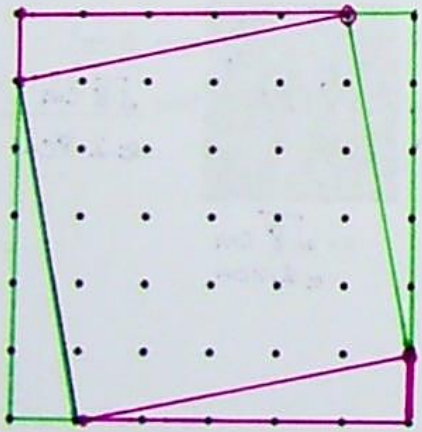
Length with a ruler ≈ 2.2cm

Estimate the length with a calculator ≈ 2.2u

s=3
$A = 9u^2$
$-4u^2$
$5u^2$

$\sqrt{4}$ $\sqrt{5}$ $\sqrt{9}$ (2, 3)
$\approx 2\frac{1}{5} = 2.2$

3)



m=-5
$\perp m = \frac{1}{5}$

Area of square = $26u^2$

Length of the segment = $\sqrt{26u^2}$

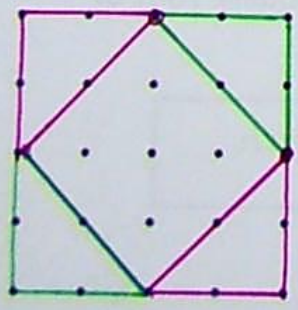
Length with a ruler ≈ 5.1cm

Estimate the length with a calculator ≈ 5.1u

s=6
$A = 36u^2$
$-10u^2$
$26u^2$

$\sqrt{25}$ $\sqrt{26}$ $\sqrt{36}$ (5, 6)
$\approx 5\frac{1}{11} \approx 5.\overline{1}$

4)



$m = -\frac{2}{2}$
$\perp m = \frac{2}{2}$

Area of square = $8u^2$

Length of the segment = $\sqrt{8u^2}$

Length with a ruler ≈ 2.8cm

Estimate the length with a calculator ≈ 2.8u

s=4
$A = 16u^2$
$-8u^2$
$8u^2$

$\sqrt{4}$ $\sqrt{8}$ $\sqrt{9}$ (2, 3)
$\approx 2\frac{4}{5} = 2.8$