1.3 Measuring line segments

Monday, January 4, 2016 8:47 AM

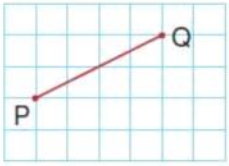
Unit 1: Square Roots & The Pythagorean Theorem Math 8

1.3 Measuring Line Segments

We learned in the previous section that: $A = s^2$ or $s = \sqrt{A}$

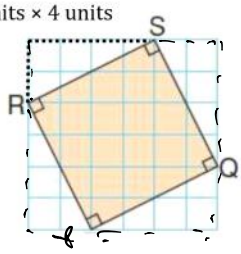
This is true for all squares. We can use this knowledge to find the length of any line segment on a grid by thinking of it as the side length of a square.

Find the length of line segment PQ.

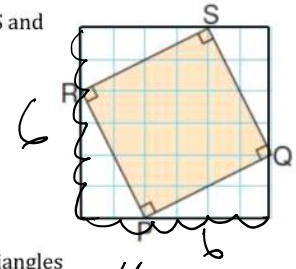


2 units × 4 units

Step 1: Draw a square on line segment PQ. Use the height and length to help you draw the square.



Step 2: Draw a large square around PQRS and find the area of this large square.



6 units × 6 units

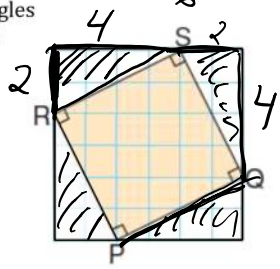
$A = s^2$

$A = 6^2$

$A = 36\ units^2$

BIG SQUARE

Step 3: Find the area of one of the four triangles and then multiply by 4 to find the area of all four triangles.



$A = \frac{b \times h}{2}$ one triangle

$A = \frac{2 \times 4}{2}$ $4units^2 \times 4 = 16units^2$

$A = 4$

$A = 4\ units^2$

2 units × 4 units

Step 4: Subtract the four triangles from the large square to find the area of PQRS.

$36\ units^2 - 16 units^2 = 20 units^2$

↑ area of the middle square

Step 5: Find the square root of the area of PQRS to find the length of line segment PQ.

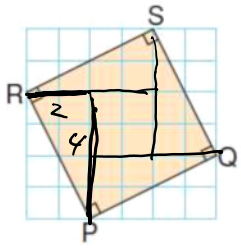
$s = \sqrt{A}$

$s = \sqrt{20 units^2}$

$s = 4.47\ units$

Method 2

Step 1: cut the square into 4 smaller triangles and a Smaller square.



Step 2: Find the area of each triangle and the square

Using $A = \frac{bh}{2}$ the area of each triangle is:

$A = \frac{2 \times 4}{2}$

$= 4 units^2 \times 4 triangles = 16 units^2$

area of all the triangles

Using $l \times w$ the area of the square is

$2 \times 2 = 4 units^2$

Add all the areas up together : $16 + 4 = 20 units^2$

Find the square root of the area of PQRS to find the length of line segment PQ.

$s = \sqrt{A}$

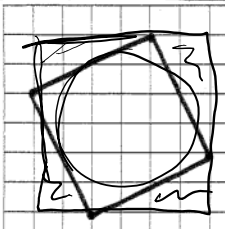
$s = \sqrt{20 units^2}$

$s = 4.47\ units$

1.3 Practice

Q: Find the area and side length. Name: _____ Class ___/___

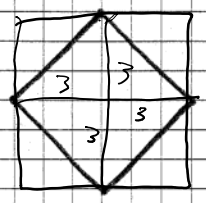
1.



Area: 20

Side: $\sqrt{20} = 4.47$

2.



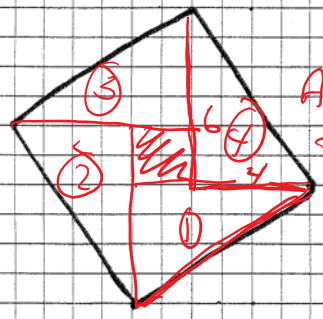
$\left(\frac{b\,h}{2}\right)4$

$\frac{3 \times 3}{2} \times 4 = 18$

Area: 18 units^2

Side: $\sqrt{18} = 4.24$ units

3.



Area of triangles.

$\frac{6 \times 4}{2} = \frac{24}{2} = 12$

$4 \times 12 = 48$

$2 \times 2 = 4$

$48 + 4 = 52$ units^2

Area: 52 units^2

Side: $\sqrt{52} = 7.2$ units

Please put your answers to two decimal places when possible

HW

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