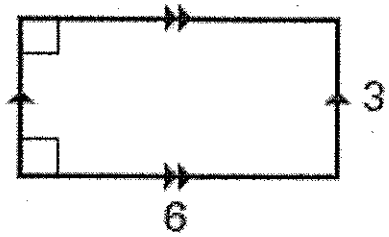
Geometry Notes Name Key

8.4 Properties of Rectangles Day 2

A Rectangle is a parallelogram with four right angles.

Because it is a parallelogram we know:



1. Opposite sides are parallel.
2. Opposite sides are $\cong$.
3. Opposite angles are $\cong$.
4. Consecutive angles are supp.
5. the diagonals bisect each other

Because it is a SPECIAL parallelogram it has another additional property.

6. the diagonals are $\cong$.

PRACTICE

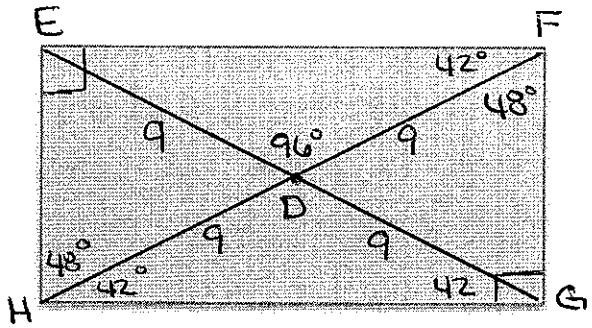
1. Draw rectangle EFGH with the diagonals intersecting at point D. If $\angle HFG = 48^\circ$ and $EG = 18$ find the following.

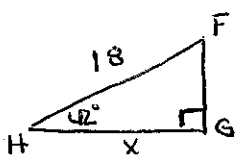
a) EF = 13.4

b) $m\angle FHG$ = 42°

c) DE = 9

d) $m\angle HDG$ = 96°



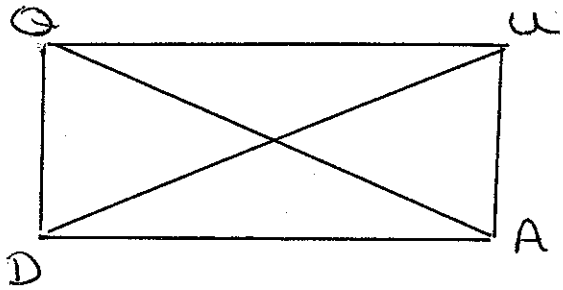


$\cos 42^\circ = \frac{x}{18}$

$18\cos 42^\circ = x$

$* \; 13.3766\ldots = x$

2. **Draw rectangle QUAD and its diagonals. If $QA = x^2 - 2x + 4$ and $DU = 12$ find x.**



$QA = DU$

$x^2 - 2x + 4 = 12$

$x^2 - 2x - 8 = 0$

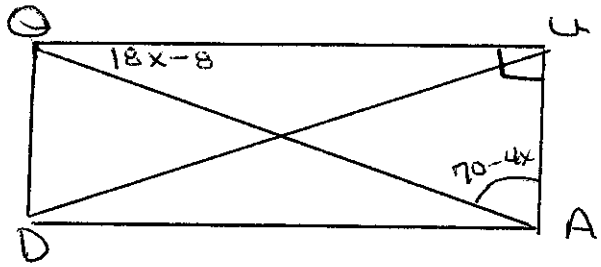
$(x-4)(x+2) = 0$

$x - 4 = 0 \quad x + 2 = 0$

$* \; x = 4 \quad * \; x = -2$

$x = -2$ or $x = 4$

3. **Draw rectangle QUAD and its diagonals. If $\angle QAU = 70 - 4x$ and $\angle AQU = 18x - 8$ find $m\angle QAU$.**



$18x - 8 + 70 - 4x = 90$

$14x + 62 = 90$

$14x = 28$

$x = 2$

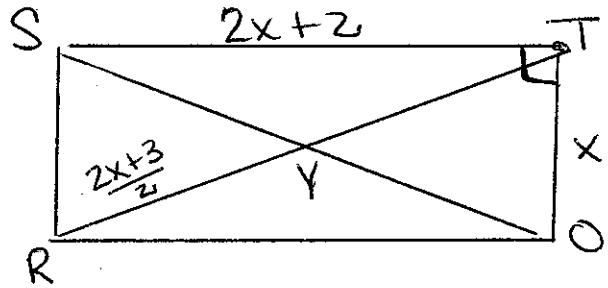
$\Delta QAU = 70 - 4(2)$

$= 70 - 8$

$= 62°$

$\Delta QAU = 62°$

4. **Draw rectangle STOR with diagonals intersecting at Y. $ST = 2x + 2$, $OT = x$, $SO = 3x - 2$, and $YR = \frac{2x+3}{2}$. Find the perimeter of STOR.**



$ST^2 + TO^2 = SO^2$

$(2x+2)^2 + (x)^2 = (3x-2)^2$

$(2x+2)(2x+2) + x^2 = (3x-2)(3x-2)$

$4x^2 + 8x + 4 + x^2 = 9x^2 - 12x + 4$

$0 = 4x^2 - 20x$

$0 = 4x(x-5)$

$4x = 0 \quad x - 5 = 0$

$x = 0 \quad x = 5$

↑ extraneous!

$* ST = 2(5) + 2 = 12$

$* TO = 5$

Perim $= 2(12) + 2(5)$

$= 24 + 10$

$= 34$

Perim STOR = 34

$* OR \quad \frac{(2x+3)}{2} \cdot 2 = 3x - 2 \rightarrow 2x + 3 = 3x - 2$

$5 = x$