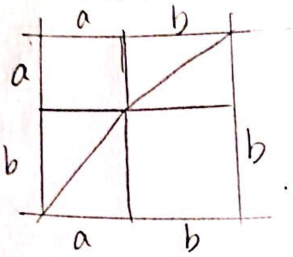
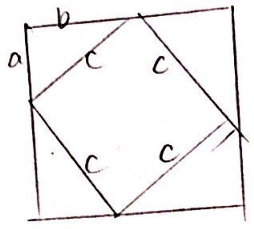
Homework 5

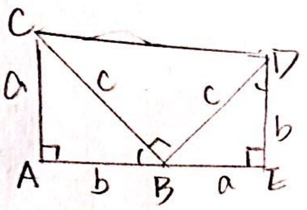
1.





$a^2+b^2+4\cdot(ab/2) = c^2+4\cdot(ab/2)$

2.



$\angle CBA+\angle DBE=90°$

$\angle CBA=\angle BDE$

Similarly, $\angle ABC+\angle BCA=90°$

$\angle DBE=\angle ACB$

$DE=CE$

$Rt\triangle EAD \cong Rt\triangle CBE$

$\text{Area}=\frac{(a+b)\cdot(b+a)}{2}$ $\quad$ $\text{Area}=(\frac{a\cdot b}{2})2+\frac{c^2}{2}$

$=\frac{a^2+b^2}{2}$ $\quad$ $=\frac{c^2}{2}$

$\Rightarrow a^2+b^2=c^2$

3. $a=2mn$ $b=m^2-n^2$ $c=m^2+n^2$

(1, 60) $a=120$ $b=3599$ $c=3601$

(2, 30) $a=120$ $b=896$ $c=904$

(3, 20) $a=120$ $b=381$ $c=409$

(4, 15) $a=120$ $b=209$ $c=241$

(5, 12) $a=120$ $b=119$ $c=169$

(6, 10) $a=120$ $b=64$ $c=136$ (primitive)

4. If $a=2mn$ $b=m^2-n^2$ $c=m^2+n^2$ for any ^positive^ integer m, n

there exist $a^2+b^2=c^2$

Thus, for any integer m, n, there exist a, b, c make $a^2+b^2=c^2$

Therefor, there are infinitely triples of a, b, c make it happened

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5. Fermat $a^2+b^2=c^2$

6. Euler

7. Fermat

8. Euler

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