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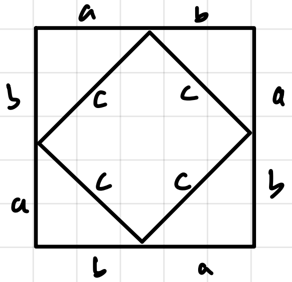
640:437:01
Homework 5

(1)

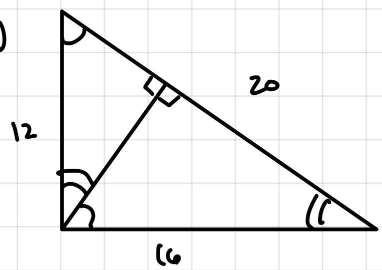


$(a+b)^2 = 4\left(\frac{1}{2}ab\right) + c^2$

$a^2+\cancel{2ab}+b^2 = \cancel{2ab} + c^2$

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

(2)



(3) $a = 2mn$, $b = m^2 - n^2$ $c = m^2+n^2$

$120 = 2mn$

$m = 30$	$b = 900 - 4$	$c = 900 + 4$
$n = 2$	$b = 896$	$c = 904$

$120 = 2mn$

$m = 20$	$b = 400 - 9$	$c = 400+9$
$n = 3$	$b = 391$	$c = 409$

$60 = mn$	$b = 144 - 25$	$c = 144+25$
$m = 12$	$b = 119$	$c = 169$
$n = 5$		

$60 = mn$

$m = 10$	$b = 100 - 36$	$c = 100+36$
$n = 6$	$b = 64$	$c = 136$

$60 = mn$

$m = 15$	$b = 15^2 - 4^2$	$c = 15^2 + 4^2$
$n = 4$	$b = 209$	$c = 241$

(4) $a^2+b^2=c^2$

There exist a primitive triple $a^2+b^2=c^2$ with $a=3$, $b=4$, $c=5$

If we were to construct an equation $na^2+nb^2=nc^2$ for $\forall n \in \mathbb{N}$.

As the natural numbers are infinite, we can say there are an infinite number of positive integers a, b, c generated simply from $a=3$, $b=4$, $c=5$.