Correct order of steps:

g) $a+b+c=12$
c) $a+b=12-c$
f) By Pythagoras' Theorem: $a^2+b^2=c^2$
a) Squaring both sides: $a^2+2ab+b^2=144-24c+c^2$
d) So $2ab=144-24c$
h) Dividing by 2: $ab=72-12c$
e) Area of the triangle $=ab/2$
b) So Area of the triangle $=36-6c$

Can you adapt your method, or the method above, to prove that when the perimeter is 30 units, the area is $225-15c$ square units?

Perimeter is $a+b+c=30$
So rearranging gives $a+b=30-c$
Using Pythagoras' Theorem : $a^2+b^2=c^2$
Squaring both sides gives : $a^2+2ab+b^2=900-60c+c^2$
Therefore $2ab=900-60c$
Dividing by 2 results in : $ab=450-30c$
Area of triangle$=ab/2$
So area $= 450-30c$ all divided by 2
$= 225-15c$

Extension
Can you find a general expression for the area of a right angled triangle with hypotenuse c and perimeter p?

Given : $p=a+b+c$; $c^2=a^2+b^2$; $A=ab/2$
$(a+b)^2=a^2+2ab+b^2$
$=(a^2+b^2)+2ab$
Implementing Pythagoras' Theorem : $a^2+b^2=c^2$, (a^2+b^2) can be substituted as c^2 therefore giving : $(a+b)^2=c^2+2ab$
Area of a triangle $=ab/2$, so $2ab=4A$ wherein A stands for the area of the triangle
Substituting $2ab=4a$ into $(a+b)^2=c^2+2ab$ leaves $(a+b)^2=c^2+4A$
$p=a+b+c$ and when c is subtracted from both sides gives $p-c=a+b$
Squaring both sides leaves: $(a+b)^2=(p-c)^2$
$(a+b)^2=p^2-2pc+c^2$
Using the two equations: (a) $(a+b)^2=c^2+4A$
and (b) $(a+b)^2=p^2-2pc+c^2$
The terms $(a+b)^2$ and c^2 can be cancelled from both sides resulting in $p^2-2pc=4A$
To find A on its own, divide by 4 to give : $A=(p^2-2pc)/4$
Further simplification gives $A=p(p-2c)/4$