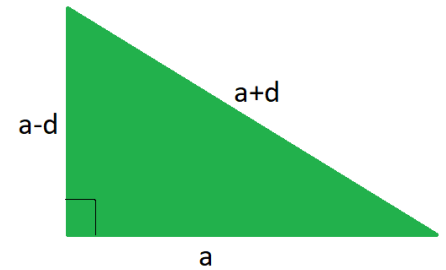# Integer Answer Type Question :

The sides of a right-angled triangle are in arithmetic progression. If the triangle has area 24, then what is the length of its smallest side?   **(2017 Adv.)**

Solution :

Let's assume the sides to be ***a-d , a , a+d***   (Here the largest side will be "a+d" which will be hypotenuse (opposite to the right-angled vertex) and since they form AP, therefore, the base will be "*a*" and the altitude will be "a-d" which is the smallest side)

now they form a right-angled triangle

$(a-d)^2 + a^2 = (a+d)^2$

$a^2 + d^2 - 2ad + a^2 = a^2 + d^2 + 2ad$

$a^2 - 4ad = 0$

$(a)(a-4d) = 0$

$a = 4d$ [because a is non zero]

and **area = 24**

area$=(a-d)(a)\frac{1}{2}=24$ **[because area of triangle =** $\frac{1}{2}$ **(*base*) (*height*)]**

$(4d) (3d) = 48$

$d^2 = 4$

$d = 2$ **[because d>0]**

there fore smallest side "a-d" =4d-d [a=4d]

$=3d$

$=6$

{appearingly it looks like a tough problem but if you solve it by drawing the rough figure then it's very easy to find out the answer 😊}