3) Find two numbers whose sum is 27 and product is 182.

Soln :- Let the 1st number be x.

The 2nd number $= (27-x)$

According to the Question,

$x(27-x) = 182$

$\Rightarrow 27x - x^2 = 182$

$\Rightarrow -x^2 + 27x - 182 = 0$

$\Rightarrow x^2 - 27x + 182 = 0$

$\Rightarrow x^2 - 14x - 13x + 182 = 0$

$\Rightarrow x(x-14) - 13(x-14) = 0$

$\Rightarrow (x-14)(x-13) = 0$

If $x-14=0$ If $x-13=0$

$x=14$ $x=13$

4) Find two consecutive positive intergers, sum of whose squares is 365.

Sol^n:- Let the two consecutive positive integers be x and $x+1$

According to question,

$$x^2+(x+1)^2 = 365$$
$$\Rightarrow x^2+x^2+2x+1 = 365$$
$$\Rightarrow 2x^2+2x+1 = 365$$
$$\Rightarrow 2x^2+2x-364 = 0$$
$$\Rightarrow x^2+x-182 = 0$$
$$\Rightarrow x^2+14x-13x-182 = 0$$
$$\Rightarrow x(x+14)-13(x+14) = 0$$
$$\Rightarrow (x+14)(x-13) = 0$$

$2 \mid 182$
$7 \mid 91$
13

If $x+14=0$, $x=-14$ NOT POSSIBLE

If $x-13=0$, $x=13$

$\therefore x=13$ and $x+1=14$

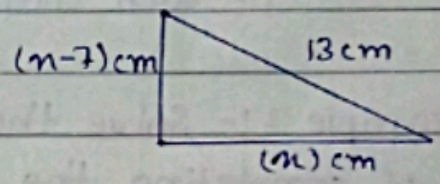
$\therefore$ Two consecutive positive integers are 13 & 14.

5) The altitude of a right triangle is 7cm less than its base. If the hypotenuse is 13cm, find the other two sides.

Sol^n:- Let the base of the triangle be (x) cm

The altitude of the triangle $= (x-7)$ cm

The hypotenuse of the triangle $= 13$cm



According to phythagorus Theorem,

$$h^2 = b^2+p^2$$
$$\Rightarrow (13)^2 = x^2+(x-7)^2$$
$$\Rightarrow 169 = x^2+x^2-14x+49$$
$$\Rightarrow 2x^2-14x+49-169 = 0$$
$$\Rightarrow 2x^2-14x-120 = 0$$
$$\Rightarrow x^2-7x-60 = 0$$
$$\Rightarrow x^2+5x-12x-60 = 0$$
$$\Rightarrow x(x+5)-12(x+5) = 0$$
$$\Rightarrow (x-12)(x+5) = 0$$

If $x-12=0$, $x=12$

If $x+5=0$, $x=-5$

But length cannot be negative

$\therefore$ Base $= x = 12$cm

Altitude $= x-7 = 12-7 = 5$cm

6) A cottage industry produces a certain no. of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was ₹90, find the number of articles produced and the cost of each article.

Soln :- Let x be the no. of articles produced per day.

Cost of production of each toy = $(2x+3)$ in a day.

Total cost of production on a particular day = ₹90.

According to the Question

$x(2x+3) = 90$

$\Rightarrow 2x^2 + 3x - 90 = 0$

$\Rightarrow 2x^2 + 15x - 12x - 90 = 0$

$\Rightarrow x(2x+15) - 6(2x+15) = 0$

$\Rightarrow (2x+15)(x-6) = 0$

If $2x+15 = 0$

$x = \frac{-15}{2}$

NOT POSSIBLE

If $x-6 = 0$

$x = 6$

Cost of each article :-

$2x+3 = 2\times6+3 = 12+3 = ₹15$

∴ The number of articles produced is 6 and the cost of each article is ₹15.