Assignment

Exercise 4.2

1. Find two numbers where sum is 27 and product is 182.

Let the first number be n, then another number will be $27-n$.

According to the questions, we have:

$$n(27-n) = 182$$

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

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

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

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

$\Rightarrow$ $n = 14$ or $n = 13$.

Hence the required numbers are 13 and 14.

2. Find two consecutive positive integers, the sum of whose squares is 365.

Let the first number $= n$

And the second number $= n+1$

A/q

$$n^2 + (n+1)^2 = 365$$

$$2n^2 + 2n + 8$$

$\Rightarrow$ $n^2 + n^2 + 2n + 1 = 365$

$\Rightarrow$ $n^2 + n - 182 = 0$

$\Rightarrow$ $n(n-13) + 14(n-13) = 0$

$\Rightarrow$ $(n-13) = 0$ or $(n+14) = 0$

$\Rightarrow$ $2n^2 + 2n - 364 = 0$

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

$\Rightarrow$ $(n-13)(n+14) = 0$

$\Rightarrow$ either $n = 13$ or $n = 14$

Hence, the two consecutive positive integers are 13 and 14.

Q5) The altitude of a right triangle is 7cm less than its base. If the hypotenuse is 13cm, find the other two sides.

Sol) Let the base of right triangle be n cm.
Then, altitude of right triangle will be $(n-7)$ cm
Hypotenuse = 13 cm

By pythagoras theorem, we have:

$$(13)^2 = n^2 + (n-7)^2$$
$$\Rightarrow 169 = n^2 + n^2 - 14n + 49$$
$$\Rightarrow 2n^2 - 14n - 120 = 0$$
$$\Rightarrow n^2 - 7n - 60 = 0$$
$$\Rightarrow n^2 - 12n + 5n - 60 = 0$$
$$\Rightarrow (n-12)(n+5) = 0$$
$$\Rightarrow n = 12 \quad \text{and} \quad n = -5.$$

Hence, the base of the right triangle is 12cm and its altitude is $12 - 7 = 5$ cm.

Q6 Sol) Let total number of pottery articles produced in a day = n
Cost of products of each article = $\dfrac{90}{n}$

According to equations

$$2n + 3 = \frac{90}{n}$$

$$\Rightarrow n(2n+3) = 90 \qquad\qquad \Rightarrow 2n^2 + 3n = 90$$
$$\Rightarrow 2n^2 + 3n - 90 = 0 \qquad \Rightarrow 2n^2 + 15n - 12n - 90 = 0$$
$$\Rightarrow n(2n+15) - 6(2n+15) = 0 \qquad \Rightarrow (2n+15)(n-6) = 0$$

$$2n = -15 \quad \text{and} \quad n - 6 = 0$$
$$n = \frac{15}{-2} \quad \text{and} \quad n = 6 \quad \left(\frac{-15}{2} \text{ is rejected}\right)$$

$\therefore$ No. of articles produced in a day = 6
Cost of production of each article = $\dfrac{90}{6} = 15$