Exercise 4D

Question 1:
For a given triangle to be a right angled, the sum of the squares of the two sides must be equal to the square of the largest side.

(i) Let a = 9cm, b = 16 cm and c = 18 cm. Then

$$\left(a^2+b^2\right)=\left[9^2+(16)^2\right]=(81+256)\,cm^2=337\,cm^2$$

and $\quad c^2=(18)^2\,cm^2=324cm^2$

$\therefore\quad \left(a^2+b^2\right)\neq c^2$

Hence the given triangle is not right angled.

(ii) Let a = 7cm, b = 24 cm and c = 25 cm, Then

$$\left(a^2+b^2\right)=\left[7^2+(24)^2\right]cm^2=(49+576)\,cm^2$$

$$=625\ cm^2$$

$$c^2=(25cm)^2=625\ cm^2$$

$\therefore\ \left(a^2+b^2\right)=c^2$

Hence, the given triangle is a right triangle.

(iii) Let a = 1.4 cm, b = 4.8 cm, and c = 5 cm

$$\left(a^2+b^2\right)=\left[(1.4)^2+(4.8)^2\right]cm^2=$$

$$=(1.96+23.04)\,cm^2=25\ cm^2$$

$$c^2=(5\,cm)^2=25\ cm^2$$

$\therefore\ \left(a^2+b^2\right)=c^2$

Hence, the given triangle is a right triangle

(iv) Let a = 1.6 cm, b = 3.8 cm and c = 4 cm

$$\left(a^2 + b^2\right) = \left[(1.6)^2 + (3.8)^2\right]cm^2 =$$

$$= (2.56 + 14.44)cm^2 = 17\ cm^2$$

$$c^2 = (4)^2 = 16\ cm^2$$

$$\therefore \left(a^2 + b^2\right) \neq c^2$$

Hence, the given triangle is not a right triangle

(v) Let p = (a − 1) cm, q = $2\sqrt{a}$cm and r = (a + 1)cm^2

$$p^2 + q^2 = \left[(a-1)^2 + \left(2\sqrt{a}\right)^2\right]cm^2$$

$$= \left(a^2 + 1 - 2a + 4a\right)cm^2$$

$$= \left(a^2 + 1 + 2a\right)cm^2 = (a+1)^2\ cm^2$$

$$r^2 = (a+1)^2\ cm^2$$

$$\therefore\ p^2 + q^2 = r^2$$

Hence, the given triangle is a right triangle

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