Exercise 10D

Question 50:
Let the shorter side of triangle be x meter
Then, its hypotenuse = (2x - 1)meter
And let the altitude = (x + 1) meter

$$\text{Then, } (2x-1)^2 = x^2 + (x+1)^2$$

$$\Rightarrow 4x^2 + 1 - 4x = x^2 + x^2 + 1 + 2x$$

$$\Rightarrow 2x^2 - 6x = 0$$

$$\Rightarrow 2x(x-3) = 0$$

$$\Rightarrow (x-3) = 0 \text{ or } 2x = 0$$

$$x = 3 \text{ or } x = 0$$

$$x = 3 \ [\because \text{Base cannot be zero}]$$

$$\text{thus, Base} = 3m$$

$$\text{hypotenuse} = (2 \times 3 - 1)m = 5\ m$$

$$\text{Altitude} = (3+1)m = 4m$$

Question 51:
Let x and y be the lengths of the two square fields.
$\therefore$ $x^2 + y^2 = 640$ ------(1)
4x - 4y = 64
x - y = 16 ------(2)
From (2),
x = y + 16,
Putting value of x in (1)

$$(y+16)^2+y^2=640$$

or $y^2+32y+256+y^2=640$

$\Rightarrow 2y^2+32y+256-640=0$

$\Rightarrow 2y^2+32y-384=0$

or $y^2+16y-192=0$

or $y^2+24y-8y-192=0$

$\Rightarrow y(y+24)-8(y+24)=0$ or $(y+24)(y-8)=0$

$\therefore y+24=0$ or $y=-24$

$\therefore y-8=0$ or $y=8$

Putting $y=8$ in (2)

$x-8=16 \quad \therefore x=16+8=24$

Sides of two squares are 24m and 8m respectively.

Question 52:
Let the two numbers be x and y
Difference of the squares of the numbers

$$x^2-y^2=88 \quad ----(1)$$

also, $x=2y-5 \quad ----(2)$

Putting value of x in (1)

$$(2y-5)^2-y^2=88$$

$\Rightarrow 4y^2-20y+25-y^2=88$ or $3y^2-20y-63=0$

$\Rightarrow 3y^2-27y+7y-63=0$ or $3y(y-9)+7(y-9)=0$

$\Rightarrow (y-9)(3y+7)=0 \Rightarrow y=9$ or $\frac{-7}{3}$

But $y\neq\frac{-7}{3} \quad \therefore y=9$

$\therefore$ from(1), $x=2\times 9-5=18-5=13$

So the required numbers are 13 and 9.

Question 53:
Let the three consecutive numbers be x, x + 1, x + 2
Sum of square of first and product of the other two

$$=x^2+(x+1)(x+2)=46$$

$\Rightarrow x^2+(x^2+3x+2)=46$ or $2x^2+3x-44=0$

$\Rightarrow 2x^2+11x-8x-44=0$ or $x(2x+11)-4(2x+11)=0$

$\Rightarrow (x-4)(2x+11)=0 \quad \therefore x=4$ or $\frac{-11}{2}$

But $x\neq\frac{-11}{2} \quad \therefore x=4$

$\therefore$ Required numbers are 4, 5 and 6

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********** END **********