Exercise 6.2

Question 1:

Find the squares of the following numbers:

(i) 32

(ii) 35

(iii) 86

(iv) 93

(v) 71

(vi) 46

Answer 1:

(i) $(32)^2 = (30+2)^2 = (30)^2 + 2\times 30\times 2 + (2)^2 \quad \left[\because (a+b)^2 = a^2 + 2ab + b^2\right]$

$= 900 + 120 + 4 = 1024$

(ii) $(35)^2 = (30+5)^2 = (30)^2 + 2\times 30\times 5 + (5)^2 \quad \left[\because (a+b)^2 = a^2 + 2ab + b^2\right]$

$= 900 + 300 + 25 = 1225$

(iii) $(86)^2 = (80+6)^2 = (80)^2 + 2\times 80\times 6 + (6)^2 \quad \left[\because (a+b)^2 = a^2 + 2ab + b^2\right]$

$= 6400 + 960 + 36 = 7386$

(iv) $(93)^2 = (90+3)^2 = (90)^2 + 2\times 90\times 3 + (3)^2 \quad \left[\because (a+b)^2 = a^2 + 2ab + b^2\right]$

$= 8100 + 540 + 9 = 8649$

(v) $(71)^2 = (70+1)^2 = (70)^2 + 2\times 70\times 1 + (1)^2 \quad \left[\because (a+b)^2 = a^2 + 2ab + b^2\right]$

$= 4900 + 140 + 1 = 5041$

(vi) $(46)^2 = (40+6)^2 = (40)^2 + 2\times 40\times 6 + (6)^2 \quad \left[\because (a+b)^2 = a^2 + 2ab + b^2\right]$

$= 1600 + 480 + 36 = 2116$

Question 2:

Write a Pythagoras triplet whose one member is:

(i) 6
(ii) 14
(iii) 16
(iv) 18

Answer 2:

(i) There are three numbers $2m, m^2-1$ and m^2+1 in a Pythagorean Triplet.

Here, $2m = 6 \quad \Rightarrow \quad m = \frac{6}{2} = 3$

Therefore,

Second number $\left(m^2-1\right) = (3)^2 - 1 = 9 - 1 = 8$

Third number $m^2+1 = (3)^2 + 1 = 9 + 1 = 10$

Hence, Pythagorean triplet is (6, 8, 10).

(ii) There are three numbers $2m, m^2-1$ and m^2+1 in a Pythagorean Triplet.

Here, $2m = 14 \quad \Rightarrow \quad m = \frac{14}{2} = 7$

Therefore,

Second number $\left(m^2-1\right) = (7)^2 - 1 = 49 - 1 = 48$

Third number $m^2+1 = (7)^2 + 1 = 49 + 1 = 50$

Hence, Pythagorean triplet is (14, 48, 50).

(iii) There are three numbers $2m, m^2-1$ and m^2+1 in a Pythagorean Triplet.

Here, $2m = 16 \quad \Rightarrow \quad m = \frac{16}{2} = 8$

Therefore,

Second number $\left(m^2-1\right) = (8)^2 - 1 = 64 - 1 = 63$

Third number $m^2+1 \leq (8)^2 + 1 = 64 + 1 = 65$

Hence, Pythagorean triplet is (16, 63, 65).

(iv) There are three numbers $2m, m^2-1$ and m^2+1 in a Pythagorean Triplet.

Here, $2m = 18 \quad \Rightarrow \quad m = \frac{18}{2} = 9$

Therefore,

Second number $\left(m^2-1\right) = (9)^2 - 1 = 81 - 1 = 80$

Third number $m^2+1 = (9)^2 + 1 = 81 + 1 = 82$

Hence, Pythagorean triplet is (18, 80, 82).