EXERCISE 6.2 PAGE: 98

1. Find the square of the following numbers.

i. 32
ii. 35
iii. 86
iv. 93
v. 71
vi. 46

Solution:

i. $(32)^2$
$= (30 +2)^2$
$= (30)^2 + (2)^2 + 2\times30\times2$ [Since, $(a+b)^2 = a^2+b^2 +2ab$]
$= 900 + 4 + 120$
$= 1024$

ii. $(35)^2$
$= (30+5)^2$
$= (30)^2 + (5)^2 + 2\times30\times5$ [Since, $(a+b)^2 = a^2+b^2 +2ab$]
$= 900 + 25 + 300$
$= 1225$

iii. $(86)^2$
$= (90 - 4)^2$
$= (90)^2 + (4)^2 - 2\times90\times4$ [Since, $(a+b)^2 = a^2+b^2 +2ab$]
$= 8100 + 16 – 720$
$= 8116 – 720$
$= 7396$

iv. $(93)^2$
$= (90+3)^2$
$= (90)^2 + (3)^2 + 2\times90\times3$ [Since, $(a+b)^2 = a^2+b^2 +2ab$]
$= 8100 + 9 + 540$
$= 8649$

v. $(71)^2$
$= (70+1)^2$
$= (70)^2 + (1)^2 +2\times70\times1$ [Since, $(a+b)^2 = a^2+b^2 +2ab$]
$= 4900 + 1 + 140$
$= 5041$

vi. $(46)^2$
$= (50 -4)^2$
$= (50)^2 + (4)^2 - 2\times50\times4$ [Since, $(a+b)^2 = a^2+b^2 +2ab$]
$= 2500 + 16 – 400$
$= 2116$

2. Write a Pythagorean triplet whose one member is.
i. 6
ii. 14
iii. 16
iv. 18

Solution:

For any natural number m, we know that 2m, m^2-1, m^2+1 is a Pythagorean triplet.

i. $2m = 6$
$\Rightarrow m = 6/2 = 3$
$m^2-1 = 3^2 - 1 = 9-1 = 8$
$m^2+1 = 3^2+1 = 9+1 = 10$
$\therefore$ (6, 8, 10) is a Pythagorean triplet.

ii. $2m = 14$
$\Rightarrow m = 14/2 = 7$
$m^2-1 = 7^2-1 = 49-1 = 48$
$m^2+1 = 7^2+1 = 49+1 = 50$
$\therefore$ (14, 48, 50) is not a Pythagorean triplet.

iii. $2m = 16$
$\Rightarrow m = 16/2 = 8$
$m^2-1 = 8^2-1 = 64-1 = 63$
$m^2+1 = 8^2+1 = 64+1 = 65$
$\therefore$ (16, 63, 65) is a Pythagorean triplet.

iv. $2m = 18$
$\Rightarrow m = 18/2 = 9$
$m^2-1 = 9^2-1 = 81-1 = 80$
$m^2+1 = 9^2+1 = 81+1 = 82$
$\therefore$ (18, 80, 82) is a Pythagorean triplet.