Exercise 3E

Question 9:
Let the required numbers be x and y respectively.
Then,

$$\frac{x+2}{y+2}=\frac{1}{2}\Rightarrow 2x+4=y+2\Rightarrow 2x-y=-2$$

$$\frac{x-4}{y-4}=\frac{5}{11}\Rightarrow 11x-44=5y-20\Rightarrow 11x-5y=24$$

Therefore,
2x - y = -2 ---(1)
11x - 5y = 24 ---(2)
Multiplying (1) by 5 and (2) by 1
10x - 5y = -10 ---(3)
11x - 5y = 24 ---(4)
Subtracting (3) and (4) we get
x = 34
putting x = 34 in (1), we get
2 × 34 - y = -2
68 - y = -2
-y = -2 - 68
y = 70
Hence, the required numbers are 34 and 70.

Question 10:
Let the numbers be x and y respectively.
According to the question:
$x^2 - y^2 = 448$ -----(2)
x - y = 14 ---(1)
From (1), we get
x = 14 + y ---(3)
putting x = 14 + y in (2), we get

$$(14+y)^2-y^2=448$$

$$196+y^2+28y-y^2=448$$

$$196+28y=448$$

$$28y=448-196$$

$$y=\frac{252}{28}=9$$

Putting y = 9 in (1), we get
x - 9 = 14
x = 14 + 9 = 23
Hence the required numbers are 23 and 9

Question 11:
Let the ten's digit be x and units digit be y respectively.
Then,
x + y = 12 ---(1)
Let the ten's digit of required number be x and its unit's digit be y respectively
Required number = 10x + y

10x + y = 7(x + y)
10x + y = 7x + 7y
3x - 6y = 0 ---(1)
Number found on reversing the digits = 10y + x
(10x + y) - 27 = 10y + x
10x - x + y - 10y = 27
9x - 9y = 27
(x - y) = 27
x - y = 3 ---(2)
Multiplying (1) by 1 and (2) by 6
3x - 6y = 0 ---(3)
6x - 6y = 18 ---(4)
Subtracting (3) from (4), we get
3x=18
x = 18/3 = 6
Putting x = 6 in (1), we get
3 × 6 - 6y = 0
18 - 6y = 0
-6y = -18
y = 3
Number = 10x + y
= 10 × 6 + 3
= 60 + 3
= 63
Hence the number is 63.

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