(i) $2x - 3y = 7$ ---(i)

$5x + y = 9$ ---(ii)

Now, $5x + y = 9$

$-5x + 9 = y$

~~$y = 5x - 9$ ---(iii)~~

$y = 9 - 5x$ ---(iii)

~~from~~ substitute (iii) in (i), we get

$2x - 3y = 7$

$2x - 3(-5x + 9) = 7$

$2x + 15x - 27 = 7$

~~$-13x = 7 - 27 = 20$~~

~~$x = \frac{20}{13}$~~

$17x = 27 + 7 = 34$

$x = 2$

from (iii), putting $x = 2$, we get

$y = 9 - 5 \times 2 = 9 - 10$

$y = -1$.

The value of $x = 2$, $y = -1$.

(ii) $1.5x + 0.1y = 6.2$

$15x + y = 62$ (both side multiple by 10)

$15x + y = 62$ ---(i)

$3x - 0.4y = 11.2$

$30x - 4y = 112$ (both side multiple by 10)

$30x - 4y = 112$ ---(ii)

now, from (i),

$$15x + y = 62$$

$$y = 62 - 15x \quad \text{--- (iii)}$$

substitute (iii) in (ii), we get

$$30x - 4y = 112$$

$$30x - 4(62 - 15x) = 112$$

$$30x - 248 + 60x = 112$$

$$90x = 112 + 248$$

$$90x = 360$$

$$x = \frac{360}{90} = 4$$

$$\therefore x = 4$$

from (iii) putting $x = 4$, we get

$$y = 62 - 15 \times 4$$

$$y = 62 - 60 = 2$$

Thus, the value of $x = 4, y = 2$.

(iii) 10% of x + 20% of y = 24

$$\frac{10}{100}x + \frac{20}{100}y = 24$$

$$\frac{x}{10} + \frac{2y}{10} = 24$$

$$x + 2y = 240 \quad \text{--- (i)}$$

$$3x - y = 20 \quad \text{--- (ii)}$$

from (ii), $3x - y = 20$

$$-y = 20 - 3x$$

$$y = 3x - 20 \quad \text{--- (iii)}$$

substitute (iii) in (i), we get

$$x + 2y = 240$$

$$x + 2(3x - 20) = 240$$

$$x + 6x - 40 = 240$$

$$7x = 240 + 40$$

$$7x = 280$$

$$x = 40$$

from (iii) putting $x = 40$, we get

$$y = 3x - 20$$

$$y = 3 \times 40 - 20$$

$$y = 120 - 20$$

$$y = 100$$

Thus, the value of $x = 40$ and $y = 100$.

(iv) $\sqrt{2}x - \sqrt{3}y = 1$ - - - (i)

$\sqrt{3}x - \sqrt{8}y = 0$ - - (ii)

from (ii), $\sqrt{3}x - \sqrt{8}y = 0$

$$\sqrt{3}x = \sqrt{8}y$$

$$y = \frac{\sqrt{3}x}{\sqrt{8}} \quad - - - \text{(iii)}$$

Substitute (iii) in (i), we get

$$\sqrt{2}x - \sqrt{3}y = 1$$

$$\sqrt{2}x - \sqrt{3}\left(\frac{\sqrt{3}x}{\sqrt{8}}\right) = 1$$

$$\sqrt{2}x - \frac{3x}{\sqrt{8}} = 1$$

$$\frac{\sqrt{16}x - 3x}{\sqrt{8}} = 1$$

$$4x - 3x = \sqrt{8}$$

$$x = \sqrt{8}$$

from (iii) putting $x = \sqrt{8}$, we get

$$y = \frac{\sqrt{3} \times \sqrt{8}}{\sqrt{8}} = \sqrt{3}.$$

Thus, the value of $x = \sqrt{8}$, $y = \sqrt{3}$.

(2) Raman's age is three times the sum of the ages of his two sons. After 5 years his age will be twice the sum of the ages of his two sons. Find the age of Raman.

⇒ Let Raman age is x years
and Raman's two sons age is y years

now, first condition,

$$x = 3y \quad \cdots (i)$$

2nd condition,

$$x + 5 = 2(y + 10)$$

$$x + 5 = 2y + 20$$

$$x - 2y = 15 \quad \cdots (ii)$$

substitute (i) in (ii), we get,

$$x - 2y = 15$$

$$3y - 2y = 15$$

$$y = 15$$

from (i) $y = 15$ putting, we get,

$$x = 3y$$

$$x = 3 \times 15$$

$$x = 45$$

Thus, the age of Raman is 45 years

(3) The middle digit of a number between 100 and 1000 is zero and the sum of the other digit is 13 If the digits are reversed, the number so formed exceeds the original number by 495. Find the number.

⇒ Let the unit digit is y
and 100 digit is x.

Now, This number is $= 100x + y$
$= xoy$

first condition,

$$x + y = 13 \quad \text{---(i)}$$

or, $x + y = 13$

$$y = 13 - x \quad \text{---(ii)}$$

2nd condition,

$$100y + x = 100x + y + 495$$
$$100y - y + x - 100x = 495$$
$$-99x + 99y = 495$$
$$-x + y = 5 \quad \text{---(iii)}$$

Substitute (ii) in (iii), we get

$$-x + y = 5$$
$$-x + 13 - x = 5$$
$$-2x = 5 - 13 = -8$$
$$x = 4$$

from (ii) putting $x = 4$, we get

$$y = 13 - x$$
$$y = 13 - 4$$
$$y = 9$$

∴ Thus, the number is $= 100x + y$
$= 100 \times 4 + 9$
$= 409$