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classmate

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Ch-3 Exercise 3.7

Q.1

Let the no. be x and y

ATQ,

$$x + y = 8 \quad \text{--- (1)}$$

$$x + y = 4(x - y)$$

$$x + y = 4x - 4y$$

$$8 = 4x - 4y \quad (\text{From (1)})$$

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

Add (1) & (2),

$$x + y = 8$$

$$+) x - y = 2$$

$$2x = 10$$

$$x = 5$$

Putting value of x in (1)

$$x + y = 8$$

$$y = 8 - 5$$

$$y = 3$$

Q.2

Let the digit in the unit's and tens be x and y .

ATQ,

$$x + y = 13 \quad \text{--- (1)}$$

$$(10y + x) - (10x + y) = 45$$

$$10y + x - 10x - y = 45$$

$$9y - 9x = 45$$

$$9x - 9y = -45$$

$$x - y = -5 \quad \text{--- (2)}$$

Add ① & ②,

$$\begin{array}{r}
 x+y = 13 \\
 (+) \quad x-y = -5 \\
 \hline
 2x = 8 \\
 \boxed{x = 4}
 \end{array}$$

Putting value of x in ①

$$\begin{array}{r}
 x+y = 13 \\
 y = 13 - 4 \\
 \boxed{y = 9}
 \end{array}$$

$$\begin{aligned}
 \therefore \text{Number} &= 10x + y \\
 &= (4 \times 10) + 9 \\
 &= \boxed{49}
 \end{aligned}$$

Let the digit in the units and tens place be x and y

ATQ,

$$x + y = 15 \quad \text{--- ①}$$

$$(10y + x) - (10x + y) = 9$$

$$10y + x - 10x - y = 9$$

$$9y - 9x = 9$$

$$9x - 9y = -9$$

$$x - y = -1 \quad \text{--- ②}$$

Add ① & ②,

$$\begin{array}{r}
 x+y = 15 \\
 (+) \quad x-y = -1 \\
 \hline
 2x = 14 \\
 \boxed{x = 7}
 \end{array}$$

Putting value of x in ①

$$\begin{array}{r}
 x+y = 15 \\
 y = 15 - 7 \\
 \boxed{y = 8}
 \end{array}$$

$$\begin{aligned}
 \therefore \text{Number} &= 10x + y = (7 \times 10) + 8 \\
 &= \boxed{78}
 \end{aligned}$$

Q. 6 Let the no. be x and y
If $x > y$

ATQ, $x + y = 1000$ ——— ①

$$x^2 - y^2 = 256000$$

$$(x+y)(x-y) = 256000$$

$$x - y = \frac{256000}{x+y}$$

$$x - y = \frac{256000}{1000} \quad (\text{From ①})$$

$$x - y = 256 \quad \text{————— ②}$$

Add ① & ②,

$$\begin{array}{r} x + y = 1000 \\ (+) \quad x - y = 256 \\ \hline 2x = 1256 \\ \boxed{x = 628} \end{array}$$

Putting value of x in ①

$$\begin{array}{r} x + y = 1000 \\ x = 1000 - 628 \\ \boxed{y = 372} \end{array}$$

Q. 7 Let the digit in the units and tens place be x and y

ATQ,

$$(10x + y) + (10y + x) = 99$$

$$10x + y + 10y + x = 99$$

$$11x + 11y = 99$$

$$x + y = 9 \quad \text{————— ①}$$

$$\text{If } x > y$$

$$x - y = 3 \quad \text{————— ②}$$

Add ① & ②,

$$\begin{array}{r}
 x+y=9 \\
 (+) \quad x+y=3 \\
 \hline
 2x=12 \\
 \boxed{x=6}
 \end{array}$$

Putting value of x in ①,

$$\begin{array}{r}
 x+y=9 \\
 y=9-6 \\
 \boxed{y=3}
 \end{array}$$

If $x > y$

$$\begin{aligned}
 \text{Number} &= 10x+y \\
 &= (6 \times 10) + 3 = \boxed{63}
 \end{aligned}$$

~~If $y > x$~~

~~$$\begin{aligned}
 \text{Number} &= 10y+x \\
 &= (10 \times 3) + 6 = \boxed{36}
 \end{aligned}$$~~

Let the digits in the units and tens place be x and y .

ATQ,

$$\begin{aligned}
 10x+y &= 4(x+y) \\
 10x+y &= 4x+4y \\
 (10x+y) - (4x+4y) &= 0 \\
 10x-4x+y-4y &= 0 \\
 6x-3y &= 0 \quad \text{--- ①}
 \end{aligned}$$

$$\begin{aligned}
 10x+y+18 &= 10y+x \\
 10x-x+y-10y &= -18 \\
 9x-9y &= -18 \\
 x-y &= -2 \quad \text{--- ②}
 \end{aligned}$$

Multiply ② by 3,

$$3x-3y = -6 \quad \text{--- ③}$$

Subtract ③ from ①

$$\begin{array}{r}
 6x - 3y = 0 \\
 3x - 3y = -6 \\
 \hline
 (-) \quad (+) \quad (+) \\
 3x = 6 \\
 \boxed{x = 2}
 \end{array}$$

Putting value of x in ②,

$$x - y = -2$$

$$-y = -2 - 2$$

$$-y = -4$$

$$\boxed{y = 4}$$

$$\begin{aligned}
 \therefore \text{Number} &= 10x + y \\
 &= (10 \times 2) + 4 \\
 &= \boxed{24}
 \end{aligned}$$

Q. 9 Let the digit in the units and tens place be x and y .

ATQ,

$$4(x+y) + 3 = 10x + y$$

$$4x + 4y + 3 = 10x + y$$

$$4x - 10x + 4y - y = -3$$

$$-6x + 3y = -3$$

$$-2x + y = -1$$

$$2x - y = 1 \quad \text{--- ①}$$

$$(10x + y) + 18 = 10y + x$$

$$10x - x + y - 10y = -18$$

$$9x - 9y = -18$$

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

Subtract (2) from (1),

$$\begin{array}{r} 2x - y = 1 \\ x - y = -2 \\ \hline (-) \quad (+) \quad (+) \\ \hline x = 3 \end{array}$$

Putting value of x in (2),

$$\begin{array}{r} x - y = -2 \\ 3 - y = -2 \\ 3 + 2 = y \\ \hline y = 5 \end{array}$$

$$\therefore \text{Number} = 10x + y$$

$$= (10 \times 3) + 5 = \boxed{35}$$

10 Let the digit in the tens and units place be x and y .

ATQ,

$$6(x + y) + 4 = 10x + y$$

$$6x + 6y + 4 = 10x + y$$

$$6x - 10x + 6y - y = -4$$

$$-4x + 5y = -4$$

$$4x - 5y = 4 \quad \text{--- (1)}$$

$$(10x + y) - 18 = 10y + x$$

$$10x - x + y - 10y = 18$$

$$9x - 9y = 18$$

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

Multiply (2) by 5.

$$5x - 5y = 10 \quad \text{--- (3)}$$

Subtract ① from ③,

$$\begin{array}{r} 5x - 5y = 10 \\ 4x - 5y = 4 \\ \hline (-) \quad (+) \quad (-) \\ \hline x = 6 \end{array}$$

Putting value of x in ②,

$$\begin{array}{r} x - y = 2 \\ 6 - y = 2 \\ \hline y = 4 \end{array}$$

$$\begin{aligned} \therefore \text{Number} &= 10x + y \\ &= (10 \times 6) + 4 = \boxed{64} \end{aligned}$$

Q.11

Let the digit in the tens and ones place be x and y .

ATQ,

$$4(x+y) = 10x+y$$

$$4x + 4y = 10x + y$$

$$4x - 10x + 4y - y = 0$$

$$-6x + 3y = 0$$

$$6x - 3y = 0$$

$$2x - y = 0$$

$$2x = y$$

①

$$2xy = 10x + y$$

$$10x + y = 2$$

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

$$\frac{10}{y} + \frac{1}{x} = 2$$

$$10x + y = 2xy$$

$$10x + 2x = 2x(2x) \quad (\text{from ①})$$

$$12x = 4x^2$$

$$4x^2 - 12x = 0 \quad (1)$$

$$4x(x - 3) = 0$$

$$4x = 0$$

$$x = \frac{0}{4}$$

$$x = 0 \text{ (Neglected)}$$

$$x - 3 = 0$$

$$\boxed{x = 3}$$

Putting value of x in (1)

$$2x = y$$

$$2 \times 3 = y$$

$$\boxed{y = 6}$$

$$\therefore \text{Number} = 10x + y$$

$$= (10 \times 3) + 6 = \boxed{36}$$

Let the digit in the tens and ones place be x and y

ATQ,

$$xy = 20 \quad \text{--- (1)}$$

$$10x + y + 9 = 10y + x$$

$$10x - x + y - 10y = -9$$

$$9x - 9y = -9$$

$$x - y = -1$$

$$y = x + 1 \quad \text{--- (2)}$$

Putting (2) in (1)

$$xy = 20$$

$$x(x+1) = 20$$

$$x^2 + x = 20$$

$$\cancel{x(x+1)} = 20$$

$$x^2 + x - 20 = 0$$

$$x^2 + 5x - 4x - 20 = 0$$

$$x(x+5) - 4(x+5) = 0$$

$$(x+5)(x-4) = 0$$

$$x+5 = 0$$

$$x = -5 \text{ (Neglected)}$$

$$x - 4 = 0$$

$$\boxed{x = 4}$$

Putting value of x in ②

$$y = x + 1$$

$$y = 4 + 1$$

$$\boxed{y = 5}$$

$$\therefore \text{Number} = 10x + y$$

$$= (10 \times 4) + 5 = \boxed{45}$$

Ch-3

Exercise 3.7

Q-13 Let the digit in the tens and ones place be x and y .

ATQ,

$$7(10x + y) = 4(10y + x)$$

$$70x + 7y = 40y + 4x$$

$$70x - 4x + 7y - 40y = 0$$

$$66x - 33y = 0$$

$$2x - y = 0 \quad \text{————— (1)}$$

$$\text{If } x > y$$

$$x - y = 3$$

$$y = x - 3 \quad \text{————— (2)}$$

Putting value of y in (1)

$$2x - y = 0$$

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

$$2x - x + 3 = 0$$

$$\boxed{x = -3}$$

Putting value of x in (2)

$$y = x - 3$$

$$y = -3 - 3$$

$$\boxed{y = -6}$$

$$\therefore \text{Number } (x > y) = [10 \times (-3)] + (-6)$$

$$= -30 - 6 = \boxed{-36}$$

Q-14 Let the no. be x and y .

ATQ,

$$\frac{x}{y} = \frac{5}{6}$$

$$y = \frac{6x}{5} \quad \text{————— (1)}$$

$$y = \frac{6x}{5}$$

$$\frac{x-8}{y-8} = \frac{4}{5}$$

$$5x - 40 = 4y - 32$$

$$5x - 4y = -32 + 40$$

$$5x - 4y = 8$$

$$5x - 4\left(\frac{6x}{5}\right) = 8$$

$$\frac{5x - 24x}{5} = 8$$

$$25x - 24x = 8 \times 5$$

$$\boxed{x = 40}$$

Putting value of x in ①

$$y = \frac{6x}{5}$$

$$y = \frac{6 \times 40}{5}$$

$$\boxed{y = 48}$$

Q. 17

Let the digit in the tens and ones place be x and y

ATQ,

$$8(x+y) - 5 = 10x + y$$

$$8x + 8y - 5 = 10x + y$$

$$8x - 10x + 8y - y = 5$$

$$-2x + 7y = 5$$

$$2x - 7y = -5 \quad \text{--- ①}$$

$$16(x-y) + 3 = 10x + y$$

$$16x - 16y + 3 = 10x + y$$

$$\begin{aligned} 16x - 10x - 16y - y &= -3 \\ 6x - 17y &= -3 \quad \text{--- (1)} \end{aligned}$$

Multiplying (1) by 6 & (2) by 2.

$$\begin{aligned} 12x - 42y &= -30 \quad \text{--- (3)} \\ 12x - 34y &= -6 \quad \text{--- (4)} \end{aligned}$$

Subtract (4) from (3),

$$\begin{array}{r} 12x - 42y = -30 \\ 12x - 34y = -6 \\ \hline (-) \quad (+) \quad (+) \\ \hline +8y = -24 \\ y = \frac{-24}{8} \\ \hline \boxed{y = 3} \end{array}$$

Putting value of y in (1),

$$\begin{aligned} 2x - 7y &= -5 \\ 2x - 7(3) &= -5 \\ 2x &= -5 + 21 \\ x &= \frac{16}{2} \\ \hline \boxed{x = 8} \end{aligned}$$

$$\begin{aligned} \therefore \text{Number} &= 10x + y \\ &= (10 \times 8) + 3 \\ &= \boxed{83} \end{aligned}$$