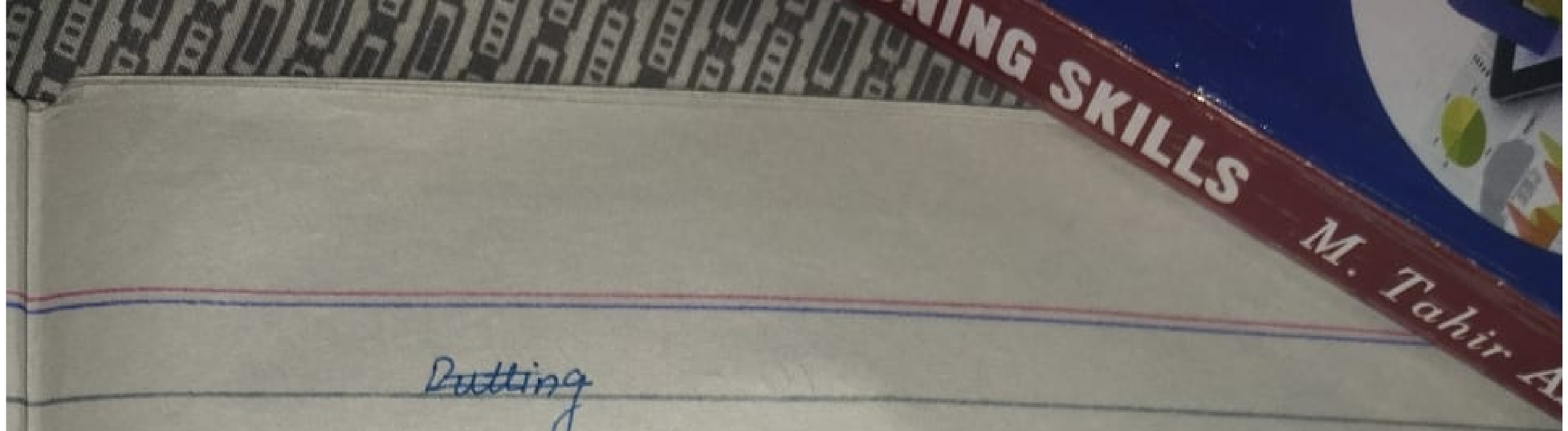


~~Putting~~

when " $x=5$ " putting in eq ①

$$5+y=15$$

$$y=15-5$$

$$\boxed{y=10}$$

if " $x=10$ "

So, $10+y=15$

$$y=15-10$$

$$\boxed{y=5}$$

$$S.S=\{5,10\}.$$

⑤- The sum of two numbers is 15. If sum of their reciprocals is $\frac{3}{10}$, find the two numbers.

let, one number = x

other numbers = y

$x + y = 15 \rightarrow ①$

So, $y = 15 - x$.

Sum of their reciprocals = $\frac{3}{10}$

So, $\frac{1}{x} + \frac{1}{15-x} = \frac{3}{10}$

$\frac{15 - x + x}{x(15-x)} = \frac{3}{10}$

$\frac{15}{15x - x^2} = \frac{3}{10}$

$15 \times 10 = 3(15x - x^2)$

$150 = 45x - 3x^2$

$3x^2 - 45x + 150 = 0$

$3x^2 - 30x - 15x + 150 = 0$

$3x(x-10) - 15(x-10) = 0$

$(3x - 15)(x - 10) = 0$

$3x - 15 = 0$, $x - 10 = 0$

$x = \frac{+15}{3}$ $\quad x = 10$

$x = 5$

160
2 | 80
2 | 40
2 | 20
2 | 10
5

④

④- The digit at ten's place of a two digit number is 2 more than twice the digit at unit's place. If product of digits is 24, find the two digit number.

Let, Unit's place = x

2 more than twice the digit = $2x+2 \rightarrow (1)$

Given, $(2x+2)(x) = 24$

~~$2x^2+x^2$~~

$2x^2+2x = 24$

$2x^2+2x-24 = 0$

$2x^2+8x-6x-24 = 0$

$2x(x+4) - 6(x+4) = 0$

$2x-6 = 0 \quad , \quad x+4 = 0$

$2x = 6 \qquad \boxed{x = -4}$

$x = 6/2$

$\boxed{x = 3}$

Putting the value of 'x' in eq (1).

$2x+2$

$2(3)+2$

$6+2 = 8$

$\boxed{83}$ Ans.

~~$x = -4$~~

~~$2(-4)+2 = -8+2 = -6-4 = +0$~~

$169 + b^2 - 2(13)(b) + b^2 = 89$

$169 + b^2 - 26b + b^2 = 89$

$2b^2 - 26b = 89 - 169$

$2b^2 - 26b = -80$

$2b^2 - 26b + 80 = 0$

$2b^2 - 16b - 10b + 80 = 0$

$2b(b-8) - 10(b-8) = 0$

$2b - 10 = 0$, $b - 8 = 0$

$2b = 10$, $\boxed{b = 8}$ → (4)

$b = 10/2$

$\boxed{b = 5}$ — (5)

Putting equ (4) in (1).

$a + 8 = 13$

$a = 13 - 8$

$\boxed{a = 5}$

Putting 5 in (1)

$a + 5 = 13$

$a = 13 - 5$

$\boxed{a = 8}$

So the number is

$\boxed{85, 58}$ Ans.

(4) - The
more
of

4

$$= \frac{-7 \pm \sqrt{625}}{2}$$

$$x = \frac{-7 \pm 25}{2}$$

$$x = \frac{-7+25}{2} \qquad x = \frac{-7-25}{2}$$

$$x = \frac{18}{2}^{9} \qquad x = \frac{-32}{2}^{16}$$

$$\boxed{x = 9} \qquad \boxed{x = -16}$$

Breadth cannot be negative so

$x = 9$

$\boxed{\text{Breadth} = 9\text{m}.}$

$\text{Length} = 9 + 7$

$\boxed{\text{Length} = 16\text{m}}$

(3) - The sum of digits of a two digit number is 13. If sum of their squares is 89, find the number.

144
2 72

Given $\Rightarrow$ $a + b = 13 \rightarrow (1)$

$a^2 + b^2 = 89 \rightarrow (2)$

From eq (1), we get

$a = 13 - b \rightarrow (3)$

Putting eq (3) in (2)

$(13-b)^2 + b^2 = 89$

Second no. = 10

② - The length of a rectangular garden is 7m more than its breadth. If area of the garden is $144m^2$, find the length and breadth of the garden

Let Breadth = x

Length = $x + 7m$

Area = $144m^2$

∴ Area = $L \times B$

$144 = (x + 7) \times x$

$144 = x^2 + 7x$

~~$x^2 + 7x$~~

~~$144 = 8x^2$~~

$\frac{144}{8} = x^2$

~~$18 = x^2$~~

~~$\sqrt{18} = \sqrt{x^2} = \sqrt{18}$~~

~~$x =$~~

$x^2 + 7x - 144 = 0$

$= \frac{-7 \pm \sqrt{7^2 - 4(1)(-144)}}{2(1)}$

$= \frac{-7 \pm \sqrt{49 + 576}}{2}$

144
2 | 72

③ -

is

① - The sum of the squares of two consecutive even natural numbers is 164. Find the numbers.

Let, if one num = x

and the other = $x+2$

Given, $x^2 + (x+2)^2 = 164$

$x^2 + x^2 + 4 + 4x = 164$

$2x^2 + 4x = 164 - 4$

$2x^2 + 4x = 160$

$2x^2 + 4x - 160 = 0$

$x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-160)}}{2(2)}$

$x = \frac{-4 \pm \sqrt{16 + 1280}}{4}$

$x = \frac{-4 \pm \sqrt{1296}}{4}$

$x = \frac{-4 \pm 36}{4}$

$x = \frac{-4-36}{4}$, $x = -4+36$

$x = \frac{-40}{4}$, $x = \frac{32}{4}$

$\boxed{x = -10}$ $\boxed{x = 8}$

natural number cannot be negative

so $\boxed{x = 8}$

second number = $x + 2$

$= 8 + 2$

-326

2 | 160
4 | 80
5 | 64
8 | 40
10 | 32

- Ex 5.10 -

① - Rahim's father is three times as old as Rahim. If s
of their ages is 56 years, find their ages.

Let, Rahim age = x

Rahim's father's age = $3x$

$$x + 3x = 56$$

$$4x = 56$$

$$x = {}^{14}\cancel{56}/\cancel{4}$$

$$\boxed{x = 14}$$

Rahim's age = $\boxed{14 \text{ years}}$

$3(14)$

$\therefore$ Rahim's father = $\boxed{42 \text{ years.}}$

② - Rita has 18m of cloth. She cut it into tw
pieces in such a way that one piece is
longer than the other. What is the lengh
of shorter piece.

total cloth = 18 m

one

She cuts in two pieces.

As one piece = ~~4m~~ x ~~+ 4m~~.

$\therefore$ other piece = $x + 4m$

~~$x + 4m = 18m$~~

~~$x = 18m - 4m$~~

~~$x = 14m$~~

The other piece of

$$x + (x + 4m) = 18m$$

$$2x + 4m = 18m$$

$$2x = 18 - 4$$

$$2x = 14$$

$$x = \frac{14}{2}$$

$$\boxed{x = 7}$$

one piece = 7m.

~~other = ~~.

(3) - A total of Rs. 50000 is to be distributed among 2 persons as prices. A price is either Rs. 500 or Rs. 100. Find the number of each type of prices.

Total amount = Rs. 50,000

People = 200

Let, $x + y = 200 \rightarrow (1)$

Also

$500x + 100y = 50,000 \rightarrow (2)$

Multiplying eq (1) by 100

$100x + 100y = 20,000$

Subtracting eq (1) and (2):

$$\begin{array}{r} 500x + 100y = 50,000 \\ 100x + 100y = 20,000 \\ \hline \end{array}$$

$$400x = 30,000$$

$$x = \frac{30,000}{400}$$

$$\boxed{x = 75}$$

Putting value of x in equ (1), we get

$75 + y = 200$

$y = 200 - 75$

$\boxed{y = 125}$.

75 prizes of Rs 500 and 125 prizes of Rs 100 each.

50
16
240
50x
800

(4) -

let, 50 rupees notes = x

and 100 rupees notes = x+1

$50x + 100(x+1) = 2500 \rightarrow (1)$

Given $50x + 100(x+1) = 2500$

$50x + 100x + 100 = 2500$

$150x = 2500 - 100$

$150x = 2400$

$x = \frac{2400}{150}$

$\boxed{x = 16}$

So, $\boxed{50 \text{ rupees notes} = 16}$

And 100 rupees notes = 16+1

$= \boxed{17}$

Verification:

Putting the value of "x" in equ (1).

$50(16) + 100(16+1) = 2500$

$800 + 100(17) = 2500$

$800 + 1700 = 2500$

$2500 = 2500$

So, $\boxed{\begin{array}{l}\text{50 rupees notes} = 16 \\ \text{100 rupees notes} = 17\end{array}}$ ✓

Example 13: Let U be the universal set and A its subset where

$U = \{ x : x \in N \text{ and } x \leq 10 \}$

$A = \{ y : y \text{ is a prime number less than } 10 \}$

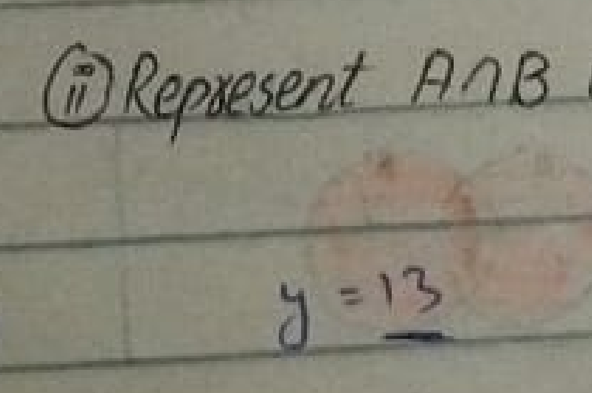
(i). Find A^c (ii). Represent A^c in venn diagram.

Sol, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{2, 3, 5, 7\}$

(i) - $A^c = U - A = \{1, 4, 6, 8, 9, 10\}$

(ii) -



Example 14: Given that

$A = \{ x : x \text{ is a king out of 52 playing cards} \}$

and $B = \{ y : y \text{ is a spade out of 52 playing cards} \}$

Find (i). $A \cap B$ (ii) Represent $A \cap B$ using venn diagram

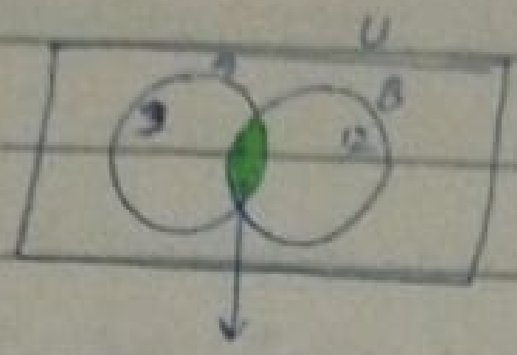
$x = 4$ $y = 13$

$A \cap B$ = 1 king

A: King = 4, B: Spade = 13

There is only one King in 13 spade cards

so $A \cap B = \{13\}$



A∩B

Example: $A = \{x : x \in Z^+ \text{ and } x \leq 5\}$

$B = \{y : y \text{ is a prime number less than } 10\}$

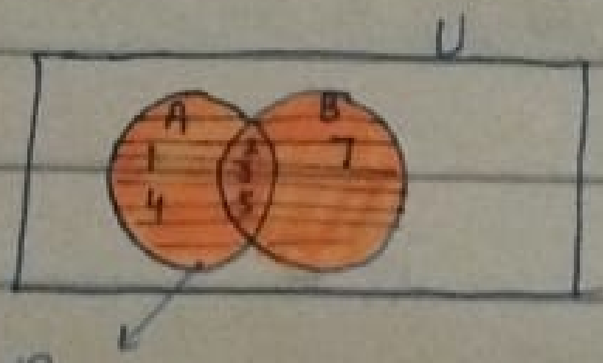
Find (i) - A∪B (ii) - represent A∪B using venn diagram

$A = \{1, 2, 3, 4, 5\}$

$B = \{2, 3, 5, 7\}$

$A \cup B = \{1, 2, 3, 4, 5, 7\}$

(ii) -



A∪B