24 Game

Q:

Cards = [4, 1, 8, 7]

O/P = True

$\{(8, 4), 7, 1\}$

$\{(7)(1), \overset{34}{4}\}$

cards = [1, 2, 1, 2]

$\{6, 4\}$

O/P = False

$\{6 \times 4 = 24\}$

True

Thought Process

keep point :-

$\{8, 1, 4, 7\}$ → Any order :-

$\{(8, 4), 1, 7\}$ option to pick two number

$\{1, 7, 12\}$ at a time

→ option a, b

a+b, a-b, a×b, a/b

a+b	b+a
a-b	b-a
a×b	b×a
a/b	b/a

func 1/p

Constraint :- $\{8,7,4,4\}$

cards. length $= 2y$

$O(u)$

// list all solns //

exploring all possible selection of 2 nums
$[a, b]$

```
for (i = 0;   i < cards.size(); i++) {
    for (j = 0;  j < cards.size(); j++) {
        if (i == j);
            continue;
    }
}
```

$\Rightarrow \{1, 7\}$

$a = 8;$
$b = 4;$

Possible = $\{a+b, a-b, b-a, a*b, a/b, b/a\}$

$\{1, 7, \cancel{12}\}$ $\{1, 7, 8-4\}$ [Back tracking]

Recursing   False   (Recursion) $\{1, 7\}$ Do

Do explore undo

24 ✗   [Options $\Rightarrow$ Recursion]

$\{1, 7, 4\}$
$\{1, 7\}$ undo
$\{b, 7\}$
$\{1, 7, 4\}$
$\{4\}$
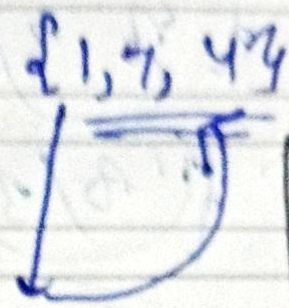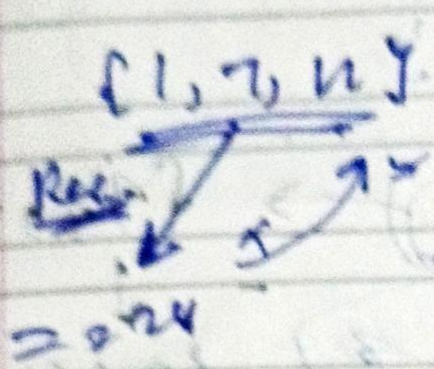
{ (8), 1, (4), 74

ㄴ ₁ ᵇ

L₁ = { (14) , (4) , (-4), 32, 2, 0.5}

remain = {1,7}

{1, 7, 4 }   {1,7, 4}   {1,7,-4}

Result

= 0.24

remain = {1, 7, 4}

{1, 7, 4 }

{ 8, -6, 6, 7, 0, 7}

{ 4 }, -6 }

{ 10, -2, 2, 24, 4/6, 6/4 }

{ a\b
  a-b
  b-a
  a+b
  b+a
  a/b
  b/a }

(b)

real division
↓
float

if (cards[0] == 24)
R → True
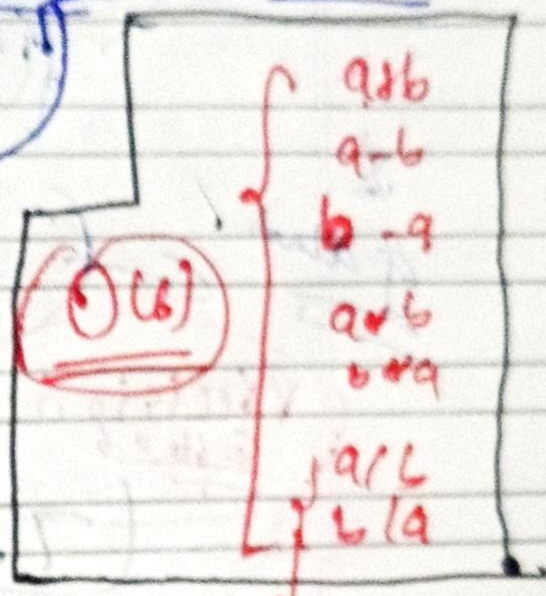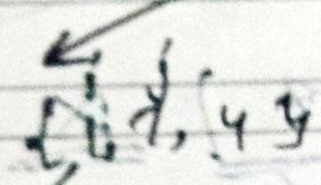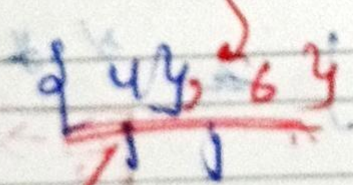
Floating point Errors & the Role of ε (epsilon)

$$\boxed{double}$$

$$\{ 8, 3, 3 \}$$

$$\{ 8/3, (3) \} \rightarrow \{ 3/9, 3 \}$$

$$q \quad \left(\frac{8}{3} \propto \propto, 6 \right) \quad \{ 2.666, 3 \}$$

$$\Downarrow$$

$$\{ 7.98 \}$$

Precision
ε sb 6

$$(7.999 \ldots 8) \quad \times$$

"Epsilon" (ε)

$$\rightarrow 8 \qquad \downarrow \underline{x}$$

0.6 ←
0.06 ←

$$(8 - 7.999) 2$$

$$\boxed{\varepsilon = \frac{10^{-6}}{7} \\ 1.2^{-6}}$$

Target = 24

$$\downarrow$$
0.000006

$\varepsilon \rightarrow$ Should be very small value

abs (cards[0] − target) $\leq \varepsilon$

```
if ( cards. size() == 1) {
return abs ( card[0] - 29.0) <= €';
}
```

Time complexity:- constant

$$O(1)$$