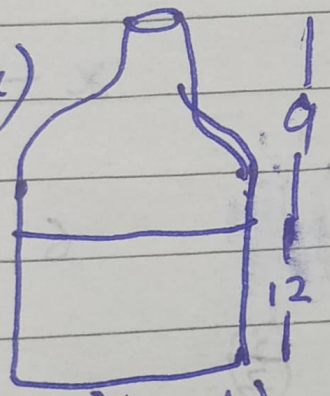
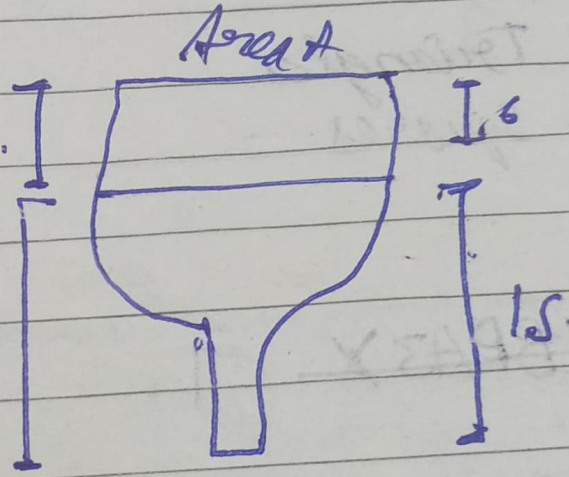
Q2) 19 Triangles
7 squares

Q2) K1BBPA3Y Satisfies all conditions

Q3) (1−x)



(x)



$1-x \rightarrow (6\,cm)(A)$

$x = (12\,cm)(A)$

Total = (18 cm) A

$x = \frac{2}{3}$ fraction 66%

Q4)

Circumference of large = $6\pi r$

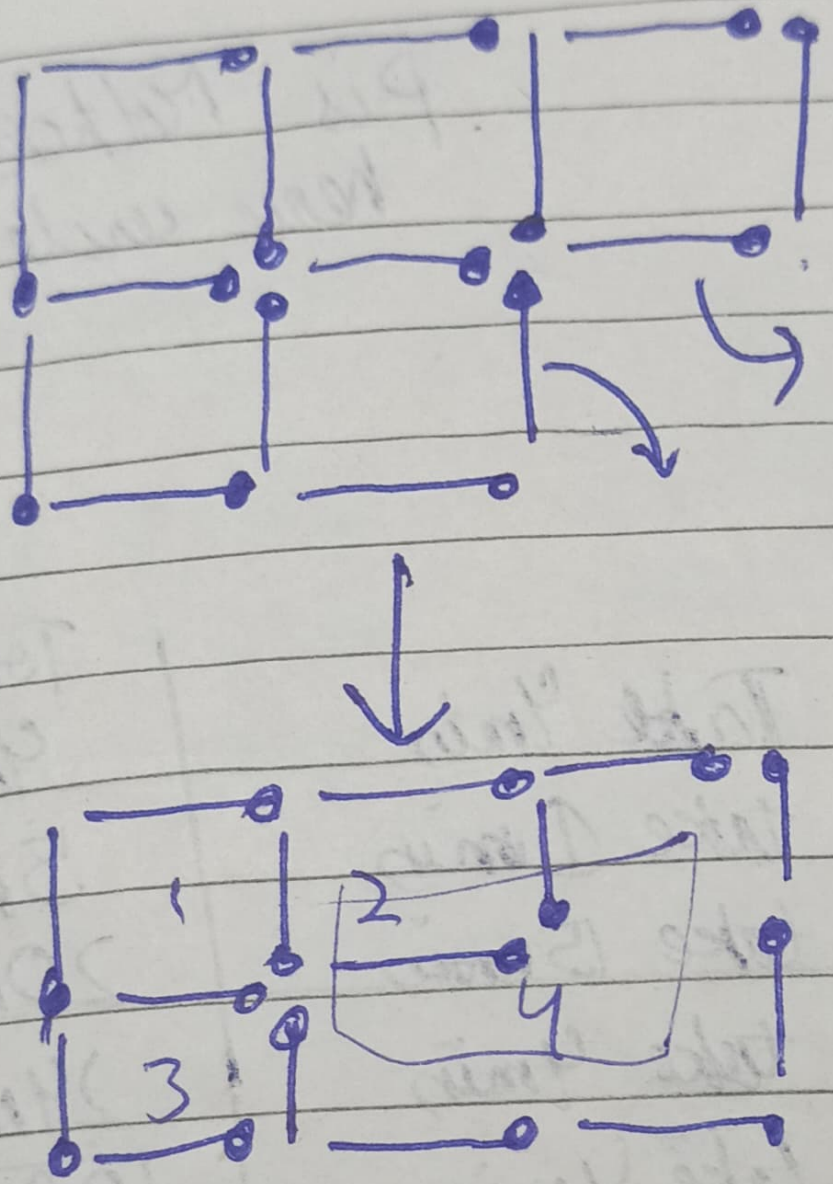
Circumference of small = $2\pi r$.

Large moves $\left(\frac{2\pi r}{6\pi r}\right) 360°$ = $\boxed{120°}$

or

$\frac{1}{3}$ revolution

Q5)



Q6) P(Birthday of Different Day) =

$$\frac{365}{365} \times \frac{364}{365} \times \frac{363}{365} \times \frac{362}{365} \cdots \cdots \cdots, \frac{335}{365} \leftrightarrow \text{Odds lesser than } \frac{1}{2}$$

for n students

$$P(n) = \frac{365!}{365-n!\,(365)^n}$$

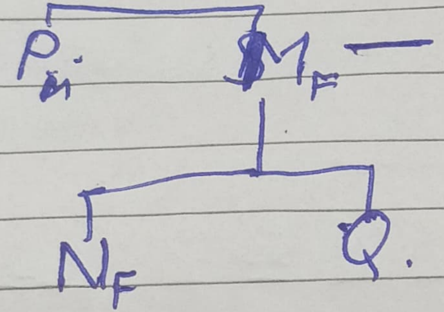
at $n \simeq 23$ odds are 50%
and at $n = 30$ it is even lower

(H) Hence He has high chance of winning

Because $P(\sim n) = 1 - P(n)$ $\quad P(n) < \frac{1}{2}$

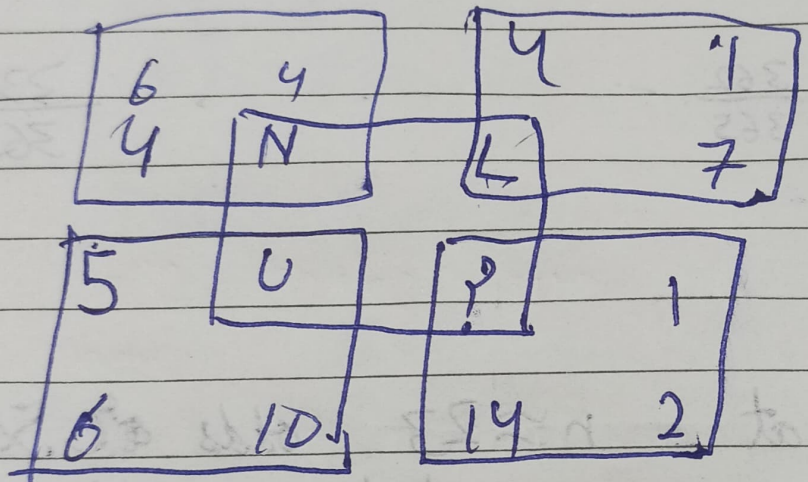
$P(\sim) \geq 1/2$.

2.8) (c)



P is Mother's Brother hence uncle.

2. (9)



N = 6+4+4 = 14th letter

L = 4+1+7 = 12th letter

U = 10+6+5 = 21st letter

? = Q = 14+2+1 = 17th letter.

04 & 1

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2.10) If B plays as efficiently as possible.

A can never win

If A plays	1 – 4	B plays	5 - A.
If A plays	5	B play	5
If A plays	6	B play	4

If happens till 30 - 35 is reached then B forces a ✱ total at (93) after which A can pick any and will lose

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2.(1) Let Person Be A B C D & so on

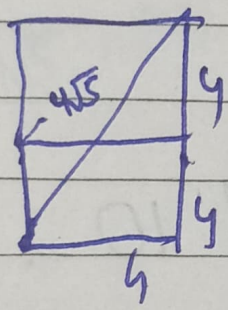
We ask person A "who always lies"

If A lies & is saying True
He says 'himself' and we find out
A lies & is lying he says B
We ask C "who always lies" & he tells
A so we find A.

If A says true
He says B
We ask C if he says B
We take B

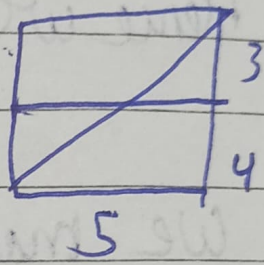
Hence we have ans.

2.1) Toms shortest path is



$4\sqrt{5} \simeq 8.9$

Jerry shortest path is



$\sqrt{79} \simeq 8.6$

Jerry always wins.

2.13) We make two piles of 10 & 490 coins.

490 pile has n tails

10 pile has 10 - n tails

Hence 10 pile has n heads

We flip 10 pile, now we have n tails & 10-n heads

2.14) $7x + x = 8x$ day

week =

7 days

25)

		Total
1 min & 4 min go	Take 4 min	4 min
1 min comes back	take 1 min	5 min
10 min & 15 min go	take 15 min	20 min
4 min comes back	take 4 min	24 min
1 min & 4 min go	take 4 min	28 min

∴ 28 min is minimum time

Firefinder.ipynb M | base.py 9, U

Python > UAS > base.py > initDist

```python
initDist = getFwdDist()
if initDist < 1.2:
    right()
forward(0.5)
newdist= getFwdDist()
v = 2 * (initDist - newDist)
s=0
while True:
    forward(0.1)
    s+=v*0.1
    newdist=getFwdDist()
    if newdist < 1.2 and s>5:
        left()
    elif newdist < 1.2:
        right()

```

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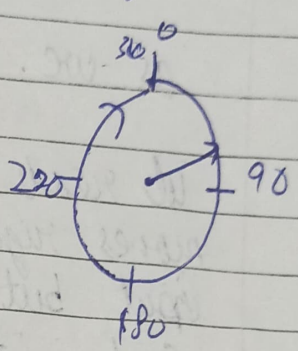
3.2. In mountainous Area,
It still has active IMU
that can tell its velocity.

It has latitude longitude of last point
It also has previous direction from
compass

It can use trigonometry
to check its velocity
latitudinally & longitudinally.



taking constant velocity
& time from loss of GPS.

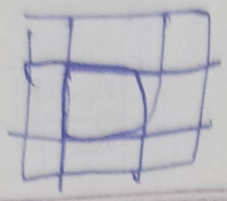
dir = θ (in angle).
V = speed (m) (by IMU).
time = t. (by clock)

$$lat = \frac{V t \cos\theta}{(111)(1000)} + lat_{old}$$

111 km is 1° lat
111.3 km is 1° long

$$longitude = long_{old} + \frac{V t \cos\theta}{(111.3)(1000)}$$

(Altitude can be measure by taking monocular
image downwards) and processing change
by image libraries.



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Q3.3) b&d kernel are good for detecting vertical edges.

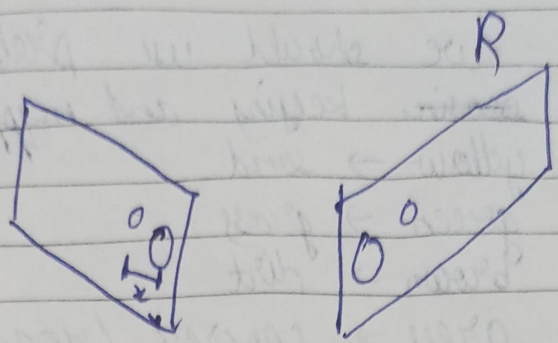
b is better with top and left edge
d is better with bottom and right edge.

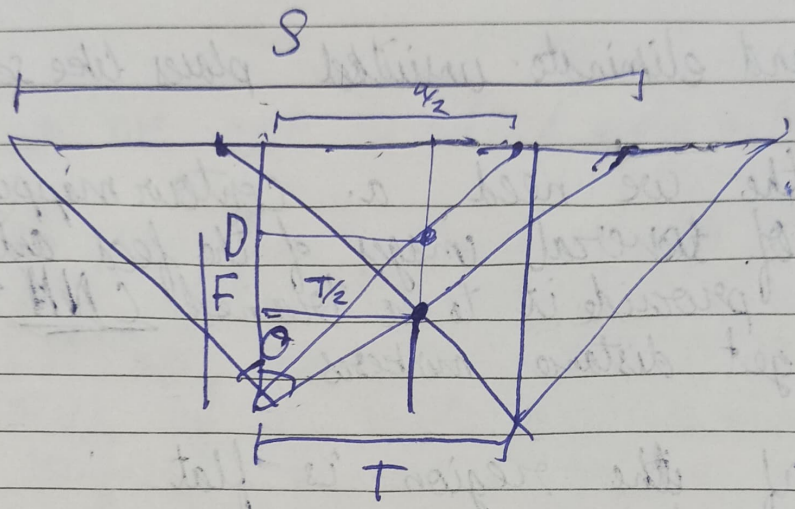
as we mask kernel and apply on top left

it reads from corners and outputs as it moves rightwards its still going to have edge input but have varying input on other scales if in error and deviation range it should detect an edge

similar for bottom right d kernel.

3.4)





FOV = θ

Parallax = a

S = see

$$D = \frac{S}{2}\cot(\theta/2)$$

$$\tan\delta = \frac{a}{S\cot(\theta/2)} = \frac{T}{2F}. \quad \text{(BPT Theorem)}$$

$$F = \frac{TS\cot(\theta/2)}{2a}$$

Since the monocular camera is not 100% accurate throughout and parallax does not account for. width of object wdt.

$$F = \frac{TS\cot(\theta/2)}{2a}$$

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Q.5) Firstly we should use preliminary chroma ~~sensing~~ keeping and mapping
eg. yellow → sand
green → grass
brown → dirt
grey → concrete / road.

and eliminate unsuitable places like sand.

the we need a contour mapping of several images of the feed and provide it to a trained CNN to get distance markers.

if the region is flat and there are no objects moving quickly (animal, kids, human, car) The drone may land at the site nearest.