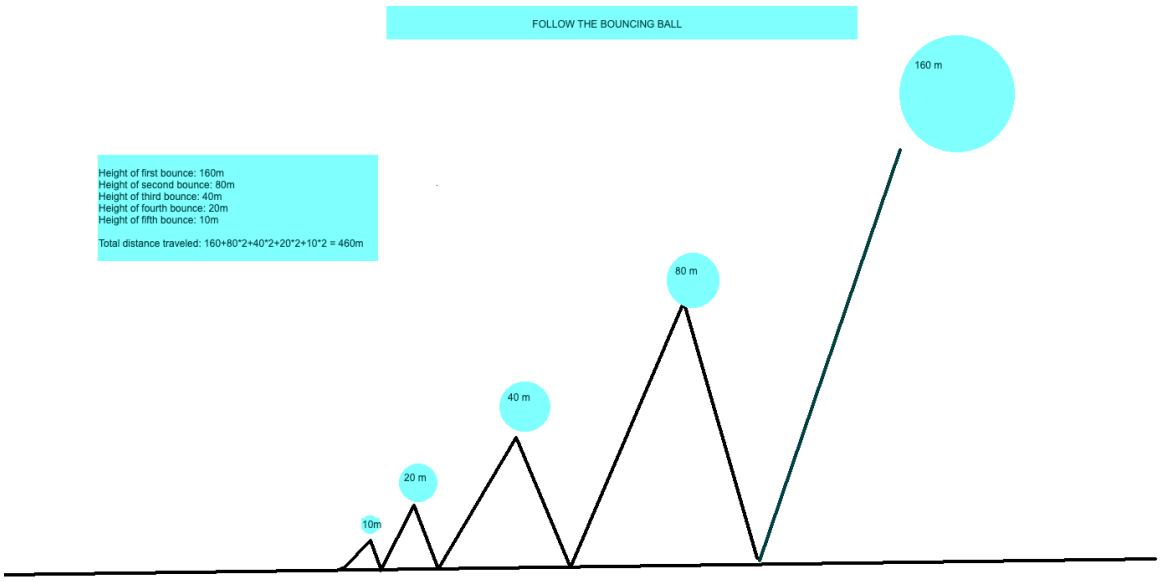
Diagrams and Lists

Dany [redacted]

Draw a diagram to solve each of these problems:

1. FOLLOW THE BOUNCING BALL



Height of first bounce: 160m
Height of second bounce: 80m
Height of third bounce: 40m
Height of fourth bounce: 20m
Height of fifth bounce: 10m

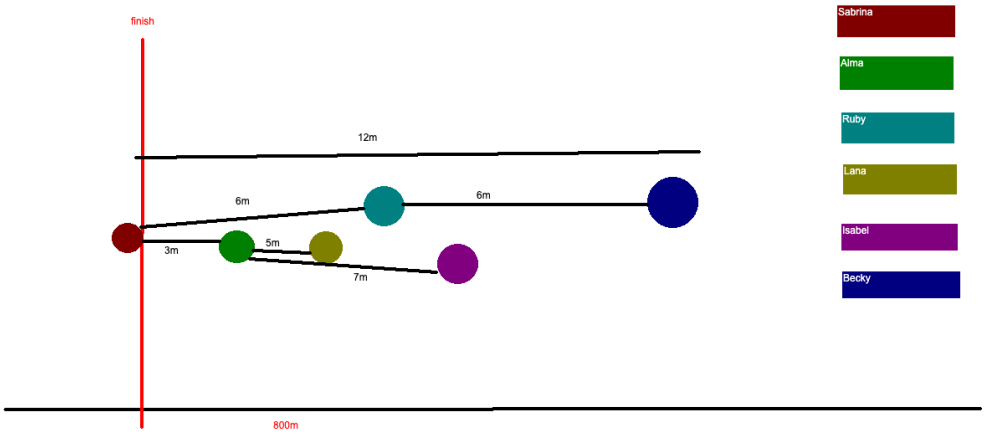
Total distance traveled: 160+80*2+40*2+20*2+10*2 = 460m

2. WORM JOURNEY

		Day										
		1	2	3	4	5	6	7	8	9	10	
	1										+1m	
	2									-1m	+1m	
	3								-1m	-1m	+1m	Day 1: Worm climbs up 3m.
	4							-1m	-1m	+1m		Day 2: Worm slips down 2m.
	5						-1m	-1m	+1m			Day 3: Worm climbs up 3m.
	6					-1m	-1m	+1m				Day 4: Worm slips down 2m.
	7				-1m	-1m	+1m					Day 5: Worm climbs up 3m.
	8			-1m	-1m	+1m						Day 6: Worm slips down 2m.
	9		-1m	-1m	+1m							Day 7: Worm climbs up 3m.
	10	-1m	-1m	+1m								Day 8: Worm slips down 2m.
	11	-1m	+1m									Day 9: Worm climbs up 3m.
Hight	12	+1m										Day 10: Worm reaches the top of the wall.

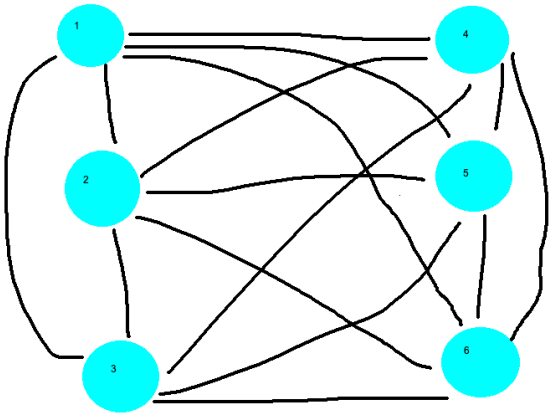
Day 1: Worm climbs up 3m.
Day 2: Worm slips down 2m.
Day 3: Worm climbs up 3m.
Day 4: Worm slips down 2m.
Day 5: Worm climbs up 3m.
Day 6: Worm slips down 2m.
Day 7: Worm climbs up 3m.
Day 8: Worm slips down 2m.
Day 9: Worm climbs up 3m.
Day 10: Worm reaches the top of the wall.

3. RACE



1. Sabrina beats Becky by 12m.
2. Alma finishes 5m ahead of Lana.
3. Alma beats Isabel by 7m.
4. Ruby finishes halfway between the first and the last people.

4. A WHOLE LOT OF SHAKING GOIN’ ON



1. Person 1 shakes hands with person 2.
2. Person 1 shakes hands with person 3.
3. Person 1 shakes hands with person 4.
4. Person 1 shakes hands with person 5.
5. Person 1 shakes hands with person 6.
6. Person 2 shakes hands with person 3.
7. Person 2 shakes hands with person 4.
8. Person 2 shakes hands with person 5.
9. Person 2 shakes hands with person 6.
10. Person 3 shakes hands with person 4.
11. Person 3 shakes hands with person 5.
12. Person 3 shakes hands with person 6.
13. Person 4 shakes hands with person 5.
14. Person 4 shakes hands with person 6.
15. Person 5 shakes hands with person 6.

1. Person 1 shakes hands with person 2.
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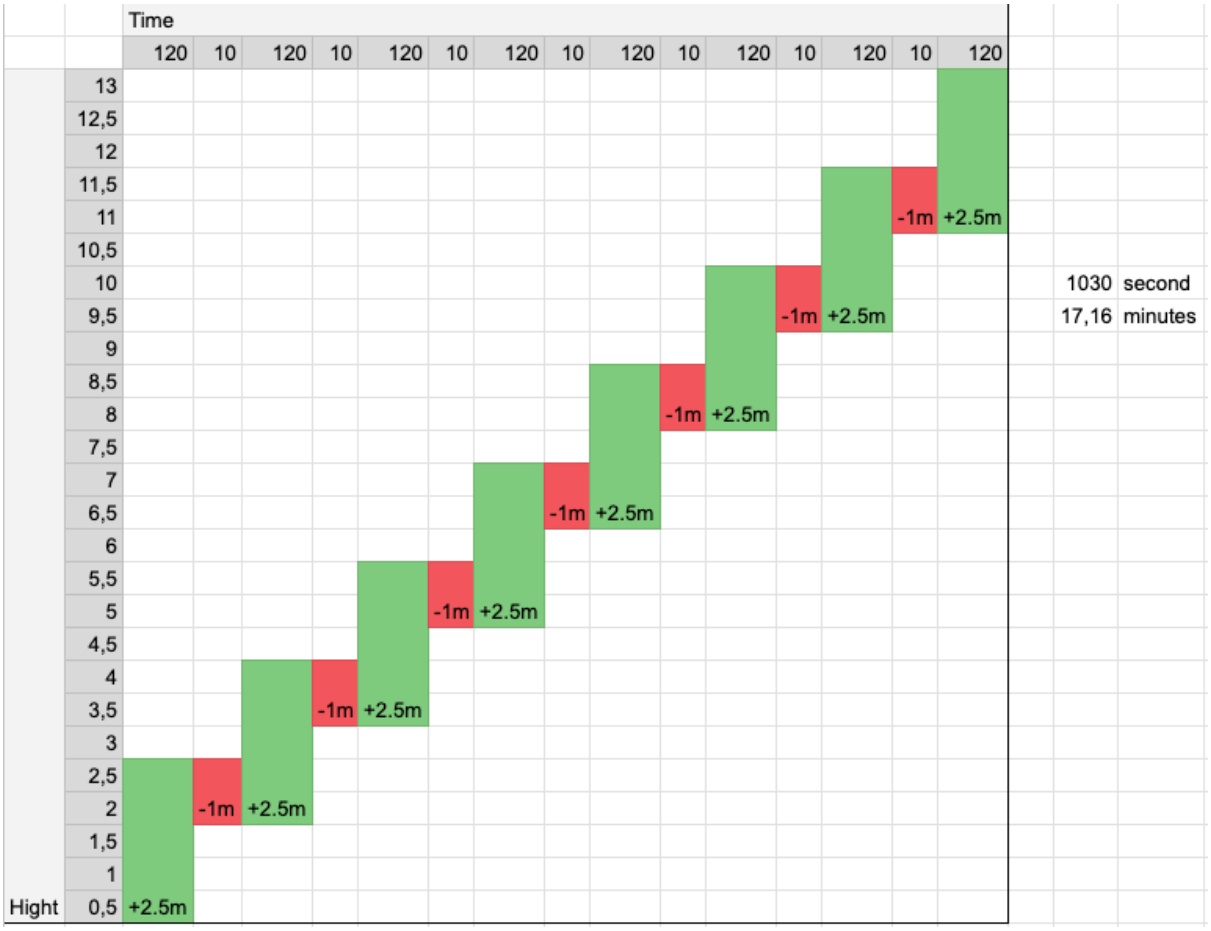
10. Person 3 shakes hands with person 4.
11. Person 3 shakes hands with person 5.
12. Person 3 shakes hands with person 6.
13. Person 4 shakes hands with person 5.
14. Person 4 shakes hands with person 6.
15. Person 5 shakes hands with person 6.

5. ROCK CLIMBING



1030 seconds

7,16 minutes

Solve each of these problems by making a systematic list:

1. CARDS AND COMICS

comic book - 60c
deluxe package - 1.20€

comics	**cards**	**total**
10	0	6€
8	1	6€
6	2	6€
4	3	6€
2	4	6€
0	5	6€

2. TENNIS TOURNAMENT

1. Justin vs. Julie
2. Justin vs. Jamie
3. Justin vs. Matt
4. Justin vs. Ryan
5. Justin vs. Roland
6. Julie vs. Jamie
7. Julie vs. Matt
8. Julie vs. Ryan
9. Julie vs. Roland
10. Jamie vs. Matt
11. Jamie vs. Ryan
12. Jamie vs. Roland
13. Matt vs. Ryan
14. Matt vs. Roland
15. Ryan vs. Roland

3. FEE CONCERT TICKETS

4! = 4 * 3 * 2 * 1 = 24

A - Alex
B - Blake
C - Chuck
D - Darren

1. ABCD
2. ABDC
3. ACBD
4. ACDB
5. ADBC
6. ADCB
7. BACD

8. BACK
9. BCAD
10. BCDA
11. BDAC
12. BDCA
13. CABD
14. CABA
15. CBAD
16. CBDA
17. CADB
18. CDBA
19. DABC
20. DABA
21. DBAC
22. DBCA
23. DCAB
24. DCBA

4. TWENTY-FOUR

(2 + 4 + 6 + 12) = 24
(2 + 4 + 8 + 10) = 24
(2 + 6 + 8 + 8) = 24
(4 + 4 + 8 + 8) = 24
(4 + 6 + 6 + 8) = 24
(6 + 6 + 6 + 6) = 24
There are 495 ways in total
Combinatorics:
12C4 = 12! / (4!(12-4)!) = 495

nCr = n! / (r!(n-r)!)
*n is the total number of items
*r is the number of items to choose

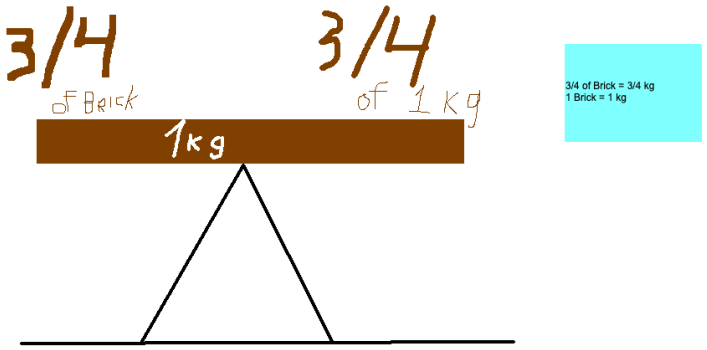
5. FINISHED PRODUCT

product(x*y) = 360
sums(x+y) < 100

1. (4, 90)
2. (5, 72)
3. (6, 60)
4. (8, 45)
5. (9, 40)
6. (10, 36)
7. (12, 30)
8. (15, 24)
9. (18, 20)

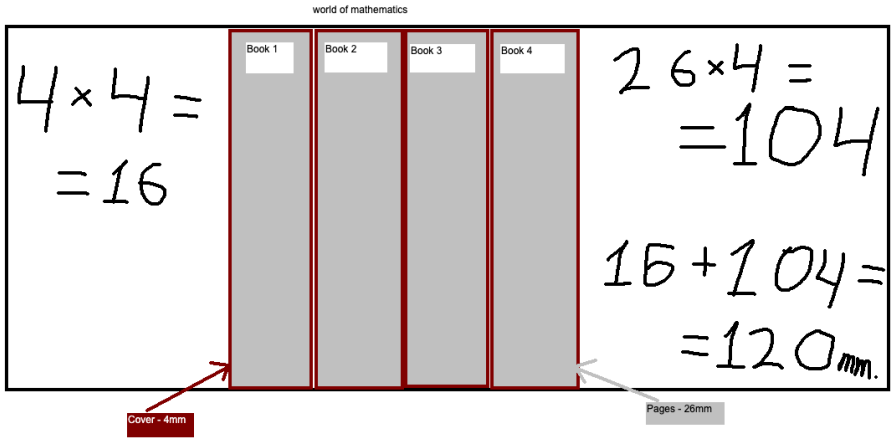
Classic Problems:

1. THE WEIGHT OF A BRICK



¾ of Brick = ¾ kg
1 Brick = 1kg

2. THE HUNGRY BOOKWORM



4 books with covers (4mm) — 4*4 = 16mm
4 books with pages (26mm) — 4*26 = 104mm

3. ARCHERY PUZZLE

The archer should take four arrow
Ways:
16 + 24 + 23 + 37 = 100
17 + 23 + 39 + 21 = 100