Kinematics

Animal examples

1.Little turtle went to school for the first time, its speed is 2 m in a minute, but forgot his lunchbox. After 5 minutes his mother went after him with speed 4 m in a minute. How fast mom catches up with her son.

Solution

Turtle son		Turtle mother					
Time (minutes)	Position (m)	Time (minutes)	Position (m)				
1	2	1					
2	4	2					
3	6	3					
4	8	4					
5	10	5					
6	12	6	4m				
7	14	7	8 m				
8	16	8 minutes	12 m				
9	18	9 minutes	16 m				
10	20	10 minutes	20 m				
n	n.2	(n-5) minutes	(n-5)4m				

n.2m = (n-5)4m

n = 10 minutes

Mother caught her son with his lunchbox after 10 minutes.

Use table and figurines from Children's board game Man, don't be angry

20 m					
18 m					
16 m					
14 m					

12 m										
10 m										
8m										
6m										
4m										
2m										
	1minut e	2 minute s	3 minute s	4 minute s	5 minute s	6 minute s	7 minute s	8 minute s	9 minute s	10 minute s

2.Cat and dog were good friends and wanted to play together. They lived 4700m apart. Dog ran faster 250 m per minute and cat 200 m per minute. Cat ran out 10 minutes sooner than dog. Where will they meet?

Solution

Cat		Dog	Dog				
Time (minutes)	Position (m)	Time (minutes)	Position (m)	Distance done by cat and dog together (m)			
0	0	0	0	0			
1	200	1	0	200			
3	600	3	0	600			
5	1000	5	0	1000			
8	1600	8	0	1600			
10	2000	10	0	2000			
11	2200	11	250	2450			
12	2400	12	500	2900			
13	2600	13	750	3350			
14	2800	14	1000	3800			
15	3000	15	1250	4250			
16	3200	16	1500	4700			
n minutes		(n-10) minutes					

250(n-1) + 250n = 4700

n = 16 minutes

Word game:

Variable with unit m.s⁻¹, the rate at which an object changes its location (speed).

Variable measures with watch (time).

Graphical expression of relation between 2 variables (graph).

Point in space or a point on a plane or just a point on a line (position).

Physical quantity equal to the length of the shortest path between the final and the initial points (displacement).

Path taken to move from one position to another (distance).

Change of speed in time interval (acceleration)

В	R	Α	F	G	0	U	I	Ρ	E	S	Т	Ρ
R	1	V	Α	L	R	Y	S	Т	0	Р	S	0
Α	V	Α	L	Α	Ν	С	Н	E	В	U	Т	S
V		Т	Α	L	Ι	Т	Υ	Н	E	R	0	Ι
Α	С	С	E	L	Е	R	Α	Т	I	0	Ν	Т
Т	D	1	S	Т	Α	Ν	С	E	Κ	L	0	1
I	1	S	Υ	Μ	Ι	S	Т	Α	G	E	В	0
Ν	G	Ρ	Μ	Т	Ι	Μ	Е	Μ	R	S	L	Ν
Υ	Ν	E	Ρ	R	Ι	V	Т	Α	Α	R	G	U
Α	1	E	Α	K	L	Е	0	Ν	Ρ	0	U	R
Ν	Т	D		G	Ν	I	Т	1	Н	0	Ν	Т
D	1	S	Ρ	L	Α	С	E	Μ	Е	Ν	Т	0

Solution

												Ρ
												0
												S
												-
Α	С	С	Е	L	Е	R	Α	Т		0	Ν	Т
	D	1	S	Т	Α	Ν	С	E				-
		S							G			0
		Ρ		Т	I.	Μ	E		R			Ν
		E							Α			
		E							Ρ			
		D							Н			
D	1	S	Ρ	L	Α	С	Ε	Μ	Ε	Ν	Т	