

NAME \_\_\_\_\_ INDEX NUMBER \_\_\_\_\_

SCHOOL \_\_\_\_\_ DATE \_\_\_\_\_

## LINEAR MOTION

<i>KCSE 1989 – 2012 Form 2 Mathematics</i>		Working Space
1.	<p><b>1989 Q21 P1</b> Two towns T and S are 300km apart. Two buses A and B started from T at the same time travelling towards S. Bus B, travelling at an average speed of <math>10\text{kmh}^{-1}</math> greater than that of A reached S <math>1\frac{1}{4}</math> hours earlier.</p> <p>(a) Find the average speed of A (6marks)</p> <p>(b) How far was A from T when B reached S (2marks)</p>	
2	<p><b>1991 Q5 P1</b> Mwangi and Otieno live 40km apart. Mwangi starts from his home at 7.30 am and cycles towards Otieno's house at 16km/h. Otieno starts from his home at 8.00am and cycles at 8km/h towards Mwangi. At what time do they meet?</p> <p>(4marks)</p>	
3	<p><b>1992 Q14 P1</b> A vehicle moves at an initial speed of 20m/s with a constant acceleration of <math>2\text{m/s}^2</math> for five seconds before brakes are applied. If the car comes to rest under constant deceleration in 4 seconds, determine the total distance travelled during the 9 seconds</p> <p>(3marks)</p>	

		Working Space
4	<p><b>1992 Q2 P2</b></p> <p>A minibus covered a distance of 180km at an average speed of 90km/hr. It travelled at a speed of 80km/hr for <math>\frac{2}{3}</math> of its journey. At what speed did it travel the remaining part of the journey</p> <p style="text-align: right;">(3marks)</p>	
5	<p><b>1993 Q9 P1</b></p> <p>In a race, Ogot, running at a constant speed of 8m/s, is 5m ahead of Ondiek maintains a constant speed of 10m/s, how far does Ondiek run before catching up with Ogot?</p> <p style="text-align: right;">(3marks)</p>	

		Working Space
6	<p><b>1995 Q16 P1</b>  A bus takes 195 minutes to travel a distance of <math>(2x + 30)</math> km at an average speed of <math>(x - 20)</math> km/h  Calculate the actual distance traveled. Give your answers in kilometers.</p> <p style="text-align: right;">( 3 marks)</p>	
7	<p><b>1996 Q16 P16</b>  Two lorries A and B ferry goods between two towns which are 3120 km apart. Lorry A travelled at km/h faster than lorry B and B takes 4 hours more than lorry A to cover the distance.</p> <p>Calculate the speed of lorry B</p> <p style="text-align: right;">( 5 marks)</p>	

		Working Space
8	<p><b>1997 Q14 P1</b>  Two towns P and Q are 400 km apart. A bus left P for Q. It stopped at Q for one hour and then started the return journey to P. One hour after the departure of the bus from P, a trailer also heading for Q left P. The trailer met the returning bus <math>\frac{3}{4}</math> of the way from P to Q. They met t hours after the departure of the bus from P.</p> <p>(a) Express the average speed of the trailer in terms of t  (b) Find the ration of the speed of the bus so that of the trailer.</p> <p style="text-align: right;">( 3 marks)</p>	
9	<p><b>1997 Q15 P2</b>  The athletes in an 800 metres race take 104 seconds and 108 seconds respectively to complete the race. Assuming each athlete is running at a constant speed. Calculate the distance between them when the faster athlete is at the finishing line.</p> <p style="text-align: right;">( 2 marks)</p>	

		Working Space
10	<p><b>1998 Q16 P1</b></p> <p>A and B are towns 360 km apart. An express bus departs from A at 8 am and maintains an average speed of 90 km/h between A and B. Another bus starts from B also at 8 am and moves towards A making four stops at four equally spaced points between B and A. Each stop is of duration 5 minutes and the average speed between any two spots is 60 km/h. Calculate distance between the two buses at 10 am.</p> <p style="text-align: right;">( 3 marks)</p>	
11	<p><b>1999 Q9 P2</b></p> <p>Two towns A and B are 220km apart. A bus left town A at 11. 00am and traveled towards B at 60 km/h. At the same time, a matatu left town B for town A and traveled at 80 km/h. The matatu stopped for a total of 45 minutes on the way before meeting the bus. Calculate the distance covered by the bus before meeting the matatu.</p> <p style="text-align: right;">( 3 marks)</p>	

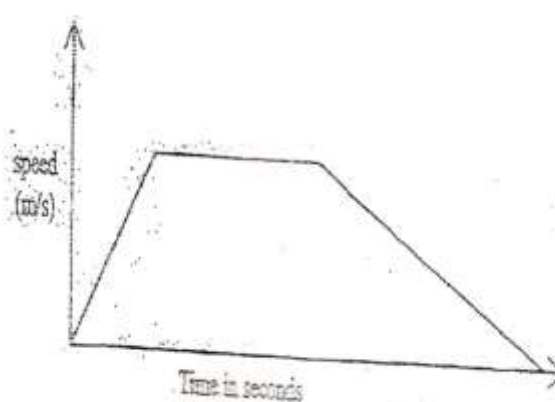
		Working Space
12	<p><b>2000 Q2 P2</b></p> <p>A passenger noticed that she had forgotten her bag in a bus 12 minutes after the bus had left. To catch up with the bus, she immediately took a taxi which traveled at 95 km/h. The bus maintained an average speed of 75 km/h. Determine</p> <p>a) The distance covered by the bus in 12 minutes</p> <p>b) The distance covered by the taxi to catch up with the bus</p> <p style="text-align: right;">( 3 marks)</p>	
13	<p><b>2001 Q15 P1</b></p> <p>A town N is 340 km due west of town G and town K is due west of town N. A helicopter Zebra left G for K at 9.00 am. Another helicopter Buffalo left N for K at 11.00 am. Helicopter Buffalo travelled at an average speed of 20 km/ h faster than Zebra.</p> <p>If both helicopters reached K at 12.30 pm find the speed of helicopter Buffalo.</p> <p style="text-align: right;">( 3 marks)</p>	

		Working Space
14	<p><b>2003 Q6 P2</b></p> <p>A train moving at an average speed of 72km/h takes 15 seconds to completely cross a bridge that is 80 metres long.</p> <p>a) Express 72km/h in metres per second (1mark)</p> <p>b) Find the length of the train in metres (2marks)</p>	
15	<p><b>2004 Q4 P2</b></p> <p>Two trains <math>T_1</math> and <math>T_2</math> travelling in the opposite directions, on parallel tracks are just beginning to pass one another. Train <math>T_1</math> is 72 m long and travelling at 108 km/h. <math>T_2</math> is 78 m long and is travelling at 72 km/h.</p> <p>Find the time, in seconds, the two trains take to completely pass one another</p> <p>( 4 marks)</p>	

		Working Space
16	<p><b>2005 Q17 P1</b></p> <p>The distance between towns M and N is 280 km. A car and a lorry travel from M to N. The average speed of the lorry is 20 km/h less than that of the car. The lorry takes 1 h 10 min more than the car to travel from M and N.</p> <p>(a) If the speed of the lorry is <math>x</math> km/h, find <math>x</math> (5 marks)</p> <p>(b) The lorry left town M at 8: 15 a.m. The car left town M and overtook the lorry at 12.15 p.m calculate the time the car left town M. ( 3 marks)</p>	
17	<p><b>2006 Q20 P1</b></p> <p>A bus left Mombasa and traveled towards Nairobi at an average speed of 60km/hr. after <math>2\frac{1}{2}</math> hours; a car left Mombasa and traveled along the same road at an average speed of 100km/ hr. If the distance between Mombasa and Nairobi is 500km, Determine</p> <p>(a) (i) The distance of the bus from Nairobi when the car took off ( 2 marks)</p> <p>(ii) The distance the car traveled to catch up with the bus</p> <p>(b) Immediately the car caught up with the bus, the car stopped for 25 minutes. Find the new average speed at which the car traveled in order to reach Nairobi at the same time as the bus. ( 4 marks)</p>	



		Working Space
18	<p><b>2007 Q16 P1</b></p> <p>A rally car traveled for 2 hours 40 minutes at an average speed of 120 km/h. The car consumes an average of 1 litre of fuel for every 4 kilometers. A litre of the fuel costs Kshs 59</p> <p>Calculate the amount of money spent on fuel</p> <p style="text-align: right;">( 3 marks)</p>	
19	<p><b>2008 Q21 P2</b></p> <p>Two policemen were together at a road junction. Each had a walkie talkie. The maximum distance at which one could communicate with the other was 2.5 km. One of the policemen walked due East at 3.2 km/h while the other walked due North at 2.4 km/h the policeman who headed East traveled for x km while the one who headed North traveled for y km before they were unable to communicate.</p> <p>(a) Draw a sketch to represent the relative positions of the policemen. (1mark)</p> <p>(b) (i) From the information above form two simultaneous equations in x and y. (2marks)</p>	

		Working Space
20	<p><b>2009 Q4 P1</b></p> <p>A bus traveling at an average speed of 63km/h left a station at 8.15 a.m. A car later left the same station at 9.00 a.m. and caught up with the bus at 10.45 a.m. Find the average speed of the car.</p> <p style="text-align: right;">(3marks)</p>	
21	<p><b>2009 Q22 P1</b></p> <p>The diagram below shows the time graph for a train travelling between two stations. The train starts from rest and accelerates uniformly for 150 seconds. It then travels at a constant speed for 300 seconds and finally decelerates uniformly for 200 seconds.</p>  <p>Given that the distance between the two stations is 10 450m, calculate the:</p> <p>(a) maximum speed , in Km/h the train attained (3 marks)</p> <p>(b) acceleration (2 marks)</p> <p>(c) distance the train travelling during the last 100 seconds (2 marks)</p> <p>(d) time the train takes to travel the first half of the journey (3 marks)</p>	

		Working Space
22	<p><b>2010 Q4 P1</b></p> <p>A bus left a petrol station at 9.20 a.m and y traveled at an average speed of 75 km/h to a town N. At 9.40 a.m a taxi traveling at an average speed of 95 mark/h, left the same petrol station and followed the route of the bus. Determine the distance, from the petrol station, covered by the taxi at he time it caught up with the bus</p> <p style="text-align: right;">(3marks)</p>	
23	<p><b>2011 Q3 P1</b></p> <p>A motorist took 2 hours to travel from one town to another town and 1 hour 40 minutes to travel back. Calculate the percentage change in the speed of the motorist.</p> <p style="text-align: right;">(3marks)</p>	

		Working Space
24	<p><b>2011 Q18 P1</b>  Makau made a journey of 700 km partly by train and partly by bus. He started his journey at 8.00 am. By train which traveled at 50km/h. After alighting from the train, he took a lunch break of 30 minutes. He then continued his journey by bus which traveled at 75km/h. The whole journey took <math>11\frac{1}{2}</math> hours.</p> <p>a) Determine  (i) the distance traveled by bus (4marks)  (ii) the time Makau started traveling by bus (3marks)</p> <p>b) The bus developed a puncture after traveling <math>187\frac{1}{2}</math> km. It took 15 minutes to replace the wheel. Find the time taken to complete the remaining part of the journey (3marks)</p>	
25	<p><b>2012 Q7 P1</b>  Koech left home to a shopping centre 12km away, running at 8km/h. Fifteen minutes later, Mutua left the same home and cycled to the shopping centre at 20km/h. Calculate the distance to the shopping centre at which Mutua caught up with Koech.</p> <p>(3marks)</p>	