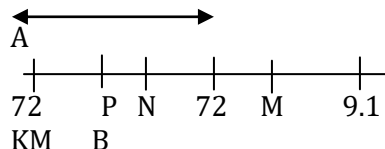
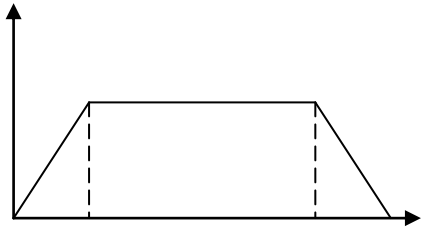
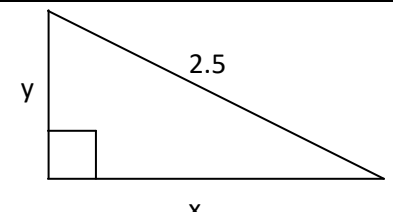


## LINEAR MOTION MARKING SCHEME

1.	(a) 44.25 km/h (b) 244.69 km <p style="text-align: right;"><b>1989Q21</b></p>	8M	
2.	$D = S \times T$ $= 16 \times \frac{1}{2} = 8 \text{ km}$ $40 \text{ km} - 8 \text{ km} = 32$ $t = \frac{x}{16} = \frac{32 - x}{8}$ $8x = 16(32 - x)$ $8x = 512 - 16x$ $24x = 512$ $x = 21\frac{1}{3} \text{ km}$ $t = \frac{64}{3} \div 16$ $= \frac{64}{3} \times \frac{1}{16} = \frac{4}{3}$ Time taken = 1 hr 20 min 8.00 + 1.20 = 9.20 am <p style="text-align: right;"><b>1991Q5</b></p>	4M	
3.	$U = 20 \text{ m/s}$ $A = 2 \text{ m/s}^2$ $T = 5$ $\text{Area} = \frac{1}{2} \times 5 (20 + 30) + \frac{1}{2} \times 30 \times 4$ $= \frac{5}{2} \times 50 + 30 \times 2$ $= 125 + 60$ $= 185 \text{ m}$ <p style="text-align: right;"><b>1992Q14</b></p>	3M	
4.	120 km/h <p style="text-align: right;"><b>1992Q2</b></p>	3M	
5.	Let the distance covered by Ondiek be x km Distance covered by Ogot = x - 5 in time t $T = \frac{x - 5}{5} = \frac{x}{10}$ $10x - 50 = 8x$ $2x = 50$ $x = 25 \text{ m}$ <p style="text-align: right;"><b>1993Q9</b></p>	3M	
6.	182 km <p style="text-align: right;"><b>1995Q16</b></p>	3M	
7.	Let speed of B be x km/h And " " A be (x + 5) km/h Time for A = $\frac{3120}{x+5}$ hours  Time for B = $\frac{3120}{x}$ hours $= \frac{3120}{x} - 4 = \frac{3120}{x+5}$ $3120(x + 5) - 4x(x + 5) = 3120x$ $3120x + 15600 - 4x^2 - 20x = 3120x$ $3120x + 15600 - 4x^2 - 20x = 3120x$ $4x^2 + 20x - 15600 = 0$ $x^2 + 5x - 3900 = 0$ $(x - 60)(x + 65) = 0$ $x = 60 \text{ km/h}$ <p style="text-align: right;"><b>1996Q16</b></p>	3M	
8.	a). $\frac{300}{t-1}$ b). speed of the bus = $\frac{500}{t-1}$  $\frac{500}{t-1} : \frac{300}{t-1} = 5 : 3$ <p style="text-align: right;"><b>1997Q14</b></p>	B1 B1 A1 3 Mar ks	
9.	Speed of slower athlete = $\frac{800}{108}$  Distance = $\frac{800 \times 4}{108}$ = 29.63  <p style="text-align: right;"><b>1997Q15</b></p>	M1  A1	
10.	 <p style="text-align: right;"><b>1997Q15</b></p>	B1  B1	
	Distance covered by bus A at 10 a.m = 90 x 2 = 180 km Bus B Time between 2 stops = 72 = 1.2 hrs (1 hr 12 min) Bus B leaves L at 9.17 a.m Distance between 9.17 - 10 a.m		

	$60 \times \frac{43}{60} = 43\text{km}$ At 10a.m bus Bhas covered $(72 + 43) = 115\text{km}$ Distance between bus A and B at 10a.m $= 360 - (180 + 115) = 65 \text{ km}$ <p style="text-align: right;"><b>1999Q9</b></p>	B1 8M		
11.	Let dist. Covered by be x km $\frac{x}{60} = \frac{220 - x}{80} + \frac{3}{4}$ $4x = 3(220 - x) + 3 \times 60$ $4x = 3(220 - x) + 3 \times 60$ $4x = 660 - 3x + 180$ $4x = 660 - 3x + 180$ $7x = 840$ $x = 120$ Dist. bus covered $1.25 \times 60 + 45$ <p style="text-align: right;"><b>1999Q9</b></p>	M1  M1 M1  A1 4 M		
12.	distance covered $= 15x^{12}/60$ $= 15\text{km}$ Distance covered by taxi $= \frac{x - 15}{75} = \frac{x}{95}$ $x = \frac{95 \times 15}{20}$ $x = 71.25$ <p style="text-align: right;"><b>2000Q2</b></p>	B1  M1 A1 3 M		
13.	Let x be speed of zebra $3.5x = 1.5(x+20) + 340$ $3.5x = 1.5x + 30 + 340$ $2x = 370$ $X=185\text{km/h}$ Buffalo's speed is $185+20=205\text{km}$ <p style="text-align: right;"><b>2001Q15</b></p>	M1  M1 A1 3 M		
14.	a). $72\text{km/h} = \frac{72 \times 100\text{m}}{60 \times 605}$ b) Let 1 be length of train $\frac{1 + 80}{20} = 15$ $1 = 300 - 80$ $= 220\text{m}$ <p style="text-align: right;"><b>2003Q6</b></p>	B1  M1 A1 3 M		
15.	Distance = $72+78=150\text{m}$	M1		
	Speed = $108 + 72 = 180\text{km/h}$ Time = $\frac{150 \times 60 \times 60}{180 \times 1000}$ $= 3 \text{ sec}$ <p style="text-align: right;"><b>2004Q4</b></p>	M1 A1 3 M		
16.	The speed of the car is $(x+20)\text{km/h}$ Time taken by the car = $\frac{280}{x}$ hrs Time taken by the car = $\frac{780}{x-20}$ hrs $\frac{280}{x} - \frac{280}{x+20} = \frac{7}{6}$ $\frac{280(x+20) - 280x}{x(x+20)} = \frac{7}{6}$ $7x^2 + 140x = 33600$ $x^2 + 20x - 4800 = 0$ $x^2 - 60x + 80x - 4800 = 0$ $x(x-60) + 80(x-60) = 0$ $(x-60)(x+80) = 0$ $x = 80 \text{ or } x = 60$ b). time taken by the lorry = 12.15 $= 4 \text{ hrs}$ Distance covered by lorry = speed $\times$ time $= 60 \times 4$ $= 240\text{km}$ Time taken by the car = $\frac{\text{distance}}{\text{time}}$ $= \frac{240}{100} = 2.4 \text{ hrs}$ Time left town M = $12.15 - 2 \text{ hrs } 24$ minutes $= 9.51\text{a.m}$ <p style="text-align: right;"><b>2005Q17</b></p>	B1  M1  M1  A1 A1		
17.	a). i). Distance of bus from Nairobi $560 - 2.5 \times 60$ $= 350\text{km}$ ii). Let distance be xkm for bus $x = 150 + 60t$ for car $x = 100t$ $100t = 150 + 60t$ $T = \frac{3}{h}$ $= 375\text{km}$ b). Yet to be covered $500 - 375 = 125\text{km}$	M1  A1 B1 M1 M1  A1 B1		

	<p>Time bus takes  <math>= 125/60</math>            2hrs 15 minutes 125 or            125minutes            New speed of car  <math>\frac{125}{125-25} \times 10 = \frac{100}{60}</math>  <math>x = 75\text{km/hr}</math></p> <p>Or            Distance from Nairobi  <math>500 - 60 \times 25</math>  <math>= 350\text{km}</math>            Relative velocity <math>100 - 60</math>  <math>= 40\text{km/hr}</math>            Time car takes to reach bus  <math>150/40 = 3 \frac{3}{4} \text{ h}</math>            Distance covered  <math>3 \frac{3}{4} \times 100 = 375\text{km}</math></p> <p>b). Time taken by car for remaining            distance 25min -2hrs 5 minutes</p> <p>Average speed  <math>\frac{125}{1 \frac{2}{3}} = 75\text{km/hr}</math></p> <p style="text-align: right;"><b>2006Q20</b></p>	<p>M1 A1 10 M M1 A1 B1 M1 A1 B1 M1 A1</p>
	<p style="text-align: center;">25  <math>x = 2\text{km}</math>  <math>y = \frac{3}{4} \times 2 = 1.5 \text{ km}</math>            iii). Time taken <math>= \frac{2}{3.2}</math> or <math>\frac{1.5}{2.4}</math>  <math>= 0.625\text{hours}</math></p> <p style="text-align: right;"><b>2008Q21</b></p>	<p>M1 A1 10 M</p>
20.	<p>Distance covered by bus  <math>= 63 \times (10.45 - 8.15)</math>  <math>= 63 \times 2.5</math>  <math>= 157.5</math>            Speed of car <math>= \frac{157.5}{1.75}</math>  <math>= 90 \text{ km/h}</math></p> <p style="text-align: right;"><b>2009Q4</b></p>	<p>M1 M1 A1 3 M</p>
21.	 <p>a). <math>\frac{1}{2} \times 150\text{h} \times \frac{1}{2} \times 200\text{h} + 300\text{h}</math>  <math>= 10450</math>  <math>4754\text{h} = 10450</math>  <math>h = 22 \text{ m/s}</math>            Maximum speed <math>= \frac{22 \times 60 \times 60}{1000}</math>  <math>= 79.2\text{km/h}</math></p> <p>b). Acceleration <math>= \frac{22 \text{ m/s}}{150}</math>  <math>= \frac{11}{75}\text{m/s}^2</math></p> <p>c). <math>\frac{1}{2} \times 100 \times 11</math>  <math>= 550</math></p> <p>d). Time for half of journey  <math>\frac{1}{2} \times 22 (150 + t + t) = \frac{1}{2} \times 10450</math>  <math>T = 162.5</math>            Total time <math>= 150 + 162.5</math>  <math>= 312.5</math></p> <p style="text-align: right;"><b>2009Q21</b></p>	<p>M1 A1 B1 M1 A1 M1 A1 M1 A1 B1 10 M</p>
18.	<p>Amount of fuel used <math>= \frac{120}{4} \times \frac{8}{3}</math>  <math>= 50\text{litres}</math>            Amount of money spent <math>= 80 \times 59</math>  <math>= 4720</math></p> <p style="text-align: right;"><b>2007Q16</b></p>	<p>M1 M1 A1 3 M</p>
19.	<p>a). </p> <p>b). i). <math>x^2 + y^2 = 2.5x</math>  <math>y/2.4 = x/3.2</math>            ii). <math>y = \frac{3}{4}x</math>  <math>x^2 + (\frac{3}{4}x)^2 = 2.5^2</math>  <math>16x^2 + 9x^2 = 6.25 \times 16</math>  <math>x^2 = 6.25 \times 16</math></p>	<p>B1 B1 B1 M1 M1 M1 A1 B1</p>

22.	Let the distance be d km $d/75$ and $d/95$ $\therefore$ Time taken = $\frac{25}{20} = 1\frac{1}{4}$ hr $\therefore d/75 - d/45 = 20/60$ $= 118.75$ $d = 118.75$ km <p style="text-align: right;"><b>2010Q4</b></p>	M1 M1 A1 A1	Time needed to cover the remaining part of the journey: $= 11\frac{1}{2} - (5\frac{1}{2} + 2\frac{1}{2} + \frac{1}{4})$ $= 3\frac{1}{4}$ hrs <p style="text-align: right;"><b>2011Q18</b></p>	
23.	Let d be distance $\frac{3d}{5} - \frac{d}{2} = \frac{d}{10}$ % change $= \frac{10}{d} \times 100\%$ $= \frac{d}{10} \times 2 \times 100$ $= 20\%$ <p style="text-align: right;"><b>2011Q3</b></p>	M1 M1 A1 3	$\frac{x}{8} = \frac{x}{20} + \frac{1}{4}$ $\frac{x}{8} - \frac{x}{20} = \frac{1}{4}$ $x = 3\frac{1}{3}$ Distance to shopping centre $12 - 3\frac{1}{3} = 8\frac{2}{3}$ km <p style="text-align: right;"><b>2012Q7</b></p>	M1 M1 A1 3
24.	(a) (i) let the distance covered by bus be b km Therefore; time by train = $\frac{700-b}{50}$ Time by bus = $\frac{b}{75}$ $\frac{700-b}{50} + \frac{b}{75} = 11\frac{1}{2} - \frac{1}{2}$ $\frac{2100-36+2b}{150} = 11$ $2100 - b = 11 \times 150$ $b = 2100 - 1650$ $b = 450$ (ii) Time taken by the train $= \frac{700 - 450}{50}$ $= 5$ hours Total time before departure of bus $= 5$ hours + 30 min Departure time for the bus: $= 8.00 + 5$ hrs + 30 min $= 1.30$ p.m. (b) time the bus took before departure $= \frac{187.5}{75}$	M1 M1 M1 A1 M1 M1 A1 M1 M1 A1 10		

