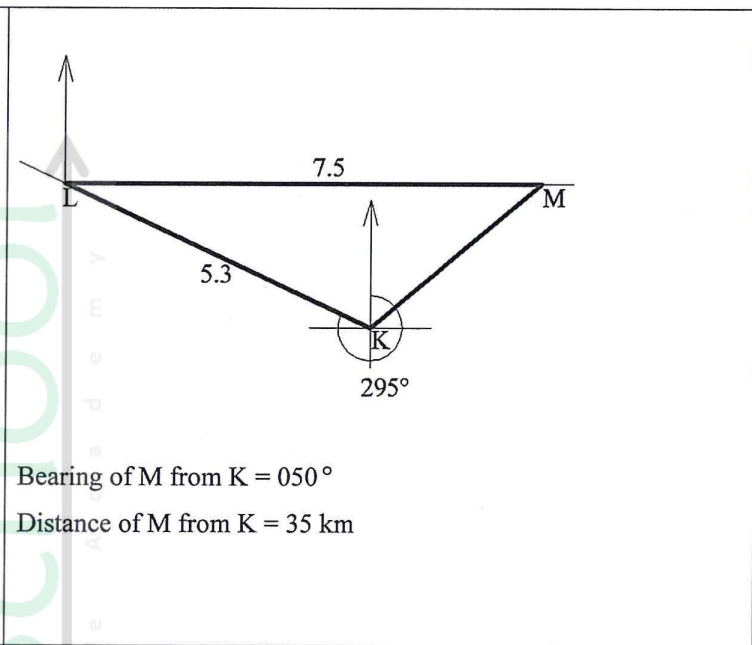


#### 4.4 MATHEMATICS ALTERNATIVE B (122)

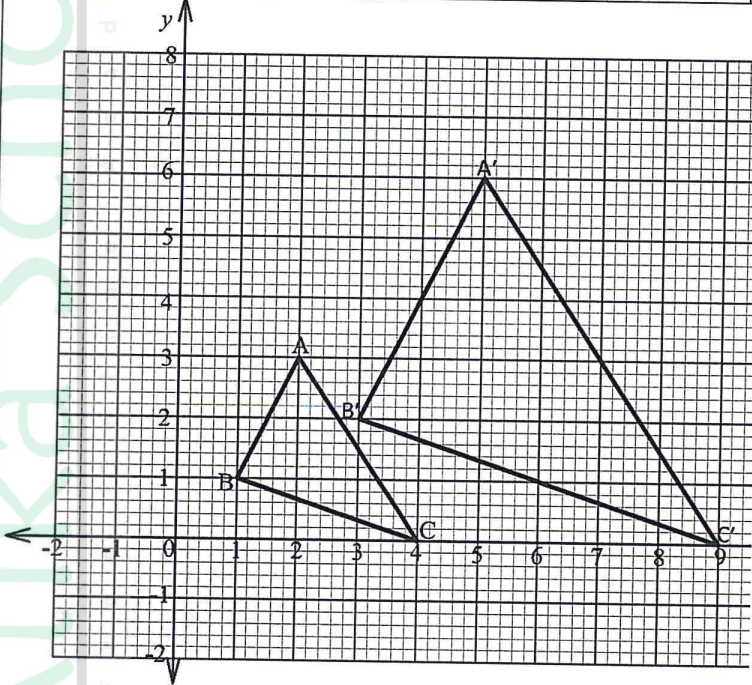
##### 4.4.1 Mathematics Alternative B (122/1)

No	Marking scheme	Marks	Comments
1	$3133792 + 5293476 + 7672598 + 4257348 = 20357214$ To the nearest 10000 $= 20360000$ Difference = $20\ 360\ 000 - 20\ 357\ 214$ $= 2786$	B1	
		B1	
		B1	
		3	
2	$1728 = 2^6 \times 3^3$ $\sqrt[3]{1728} = \sqrt[3]{2^6 \times 3^3}$ $= 2^2 \times 3$ $= 12$	B1	
		M1	
		A1	
		3	
3	$22 + 5 - n = 3$ $n = 27 - 3$ $= 24$ Number of floors while in lift = 24	M1	
		A1	
		2	
4	$2^{2x} = 2^{10}$ $2x = 10$ $x = 5$ $\therefore 3^5 = 243$	M1	
		A1	
		B1	
		3	
5	$8 = 2 \times 2 \times 2$ $15 = 3 \times 5$ $21 = 3 \times 7$ L.C.M = $2^3 \times 5 \times 7 \times 3$ $= 840$	M1	For the factors
		M1	
		A1	
		3	

<p>6 (a)</p>  <p>(b) Bearing of M from K = 050° Distance of M from K = 35 km</p>		<p>B1 B1</p>	<p>Location of L Location of M</p>
<p>7</p> $2x^2 - 3x - 9 = 0$ $2x^2 - 6x + 3x - 9 = 0$ $2x(x - 3) + 3(x - 3) = 0$ $(x - 3)(2x + 3) = 0$ $x = 3 \text{ or } x = -1.5$		<p>M1 M1 A1</p>	
<p>8</p> <p>Gradient of <math>2x + 3y = 6</math> is <math>\frac{-2}{3}</math></p> <p>Gradient of L = <math>\frac{3}{2}</math></p> $\frac{y - 5}{x + 3} = \frac{3}{2}$ $3x + 9 = 2y - 10$ $3x - 2y = -19$		<p>B1 M1 A1</p>	
		<p>4 3 3</p>	

9	Time the journey took 8hrs 20min + 10min + 42min = 9hrs 12 min Time of arrival = 9.45p.m. + 9hrs 12min - 12hrs = 06.57am Day and Time of arrival Monday at 0657h	M1	
		M1	
		A1	
		<b>3</b>	
10	$\frac{x^2 + xy - 3x - 3y}{(x-3)(x+3)}$ $= \frac{x(x+y) - 3(x+y)}{(x-3)(x+3)}$ $= \frac{(x+y)(x-3)}{(x-3)(x+3)}$ $= \frac{x+y}{x+3}$	M1	Factorization of numerator
		M1	Factorization of denominator
		A1	
		<b>3</b>	
11	Radius of cone = $\sqrt{10^2 - 8^2} = 6$ Volume = $\frac{1}{3} \times 3.142 \times 6^2 \times 8$ = 301.632cm <sup>3</sup>	B1	
		M1	
		A1	
		<b>3</b>	

12	<p style="text-align: center;"><math>x = 4</math>    <math>y = 6</math></p>	S1 L1 L1 B1 4	$4y - 3x = 12$ $2y + 3x = 24$
13	$\cos \theta = \frac{2}{3}$ $\theta = \cos^{-1} \frac{2}{3}$ $= 48.19^\circ$ $\tan \theta = 1.12$	B1 B1 2	
14	$\text{Vol} = \frac{22}{7} \times 14 \times 14 \times 45$ $= 27720 \text{cm}^3$ $\text{Density} = \frac{26.61 \times 1000}{27720}$ $= 0.96 \text{g/cm}^3$	M1 M1 A1 3	

15	<p>Amount in dollars</p> $= \frac{81000}{101.25}$ <p>= 800 Dollars</p> <p>Amount gained</p> $= 800 \times 102.56 - 81000$ <p>= Ksh 1048</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>4</p>	
16	 <p>(a) <math>\Delta ABC</math> correctly drawn</p> <p>(b) Location of <math>A'(5, 6)</math>, <math>B'(3, 2)</math> and <math>C'(9, 0)</math></p> <p>Drawing <math>\Delta A'B'C'</math></p>	<p>B1</p> <p>B2</p> <p>B1</p> <p>4</p>	

17	(a) Cash price = $\frac{80}{100} \times 54\,000$ = Ksh 43 200	M1	
		A1	
	(b)		
	(i) $\frac{10}{100} \times 54\,000$ = Ksh 5 400	M1	
		A1	
	(ii) Monthly installment = $\frac{54\,000 - 5\,400}{18}$ = Ksh 2 700	M1	
		A1	
	(c) H.P price for Karigo = $1.12 \times 54\,000$ = Ksh 60 480	M1	
	Deposit = $\frac{10}{100} \times 60\,480$ = Ksh 6048	M1	
	No. of months = $\frac{60\,480 - 6\,048}{2\,268}$ = 24 months	M1	
	A1		
	<b>10</b>		

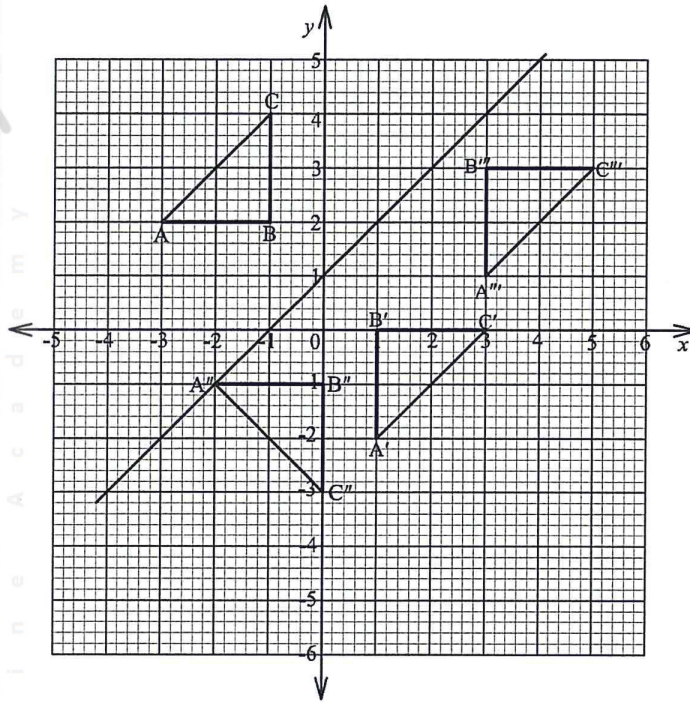
18.	(a)	Fraction of work Mary can do in 1 hr = $\frac{1}{2 \times \frac{1}{6}} = \frac{6}{13}$	B1	
		Fraction of work Jane can do in 1hr = $\frac{1}{2}$		
		Fraction of work done by Mary and Jane in 1 hr = $\frac{1}{2} + \frac{6}{13} = \frac{25}{26}$	B1	
		Time taken to complete = $1 \div \frac{25}{26}$ = 1.04hrs	M1 A1	
	(b)	(i)	Fraction of work done by Mary and Jane in 30 min	
			$= \frac{25}{26} \times \frac{1}{2}$ $= \frac{25}{52}$	M1
			Remaining portion = $1 - \frac{25}{52} = \frac{27}{52}$	A1
		(ii)	Fraction of work done by Mary and Jane in 20 minutes	
			$= \frac{25}{26} \times \frac{1}{3}$ $= \frac{25}{78}$	M1 A1
			Fraction of work done by Rachel	
			$\frac{25}{78} + x = \frac{27}{52}$	M1
			$x = \frac{27}{52} - \frac{25}{78}$	
			$= \frac{31}{156}$	A1
			<b>10</b>	

19.			
(a)	$(3x+9)(x-3) = 3x^2 + 9x - 9x - 27$ $3x^2 - 27 = 648$ $\therefore 3x^2 - 675 = 0$	M1	
		A1	
(b)	$3x^2 - 675 = 0$ $x^2 - 225 = 0$ $(x+15)(x-15) = 0$ $x = 15\text{m}$	M1	
		A1	
	Length of plot = $3 \times 15 + 9 = 54\text{m}$	B1	
	Width of plot = $15 - 3 = 12\text{m}$	B1	
(c)	$\text{A.S.F.} = \frac{2592}{648}$ $= 4$	B1	
	$\text{L.S.F.} = \sqrt{4} = 2$	B1	
	Length of similar plot = $54 \times 2 = 108\text{m}$	B1	
	Width of similar plot = $12 \times 2 = 24\text{m}$	B1	
		<b>10</b>	



20.			
(a)	$\angle AOD = 2 \times 34^\circ = 68^\circ$ Angle subtended at centre by arc AD = 2 $\times$ angle subtended at circumference	B1 B1	
(b)	$\angle BDC = \angle BAC = 25^\circ$ Angle subtended by same chord at the circumference	B1 B1	
(c)	$\angle ACB = 90 - 25^\circ = 65^\circ$ Angle sum of triangle. $\angle ABC = 90^\circ$ (angle subtended by diameter to the circumference)	B1 B1	
(d)	$\angle FDC = 90 - 34^\circ = 56^\circ$ $\angle ODF = 90^\circ$ angle made by tangent and radius and $\Delta ODC$ is isosceles	B1 B1	
(e)	$\angle ATD = 360^\circ - (155 + 90 + 68)$ $= 47^\circ$ Angle sum in quadrilateral AODT	B1 B1	
		<b>10</b>	

21.



(a)  $\Delta ABC$  correctly drawn

B1

(b)(i) Line  $y = x + 1$

B2

(ii) Plotting of points  $A', B'$  and  $C'$   
 $\Delta A'B'C'$  correctly drawn

B1

B1

(c) Points  $A'', B''$  and  $C''$  plotted  
 $\Delta A''B''C''$  correctly drawn

B1

B1

(d)(i) 
$$\begin{pmatrix} 1 \\ -2 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 3 \\ 1 \end{pmatrix},$$

$$\begin{pmatrix} 1 \\ 0 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 3 \\ 3 \end{pmatrix},$$

M1

$$\begin{pmatrix} 3 \\ 0 \end{pmatrix} + \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 5 \\ 3 \end{pmatrix}$$

(ii)  $\therefore A'''(3,1), B'''(3,3), C'''(5,3)$

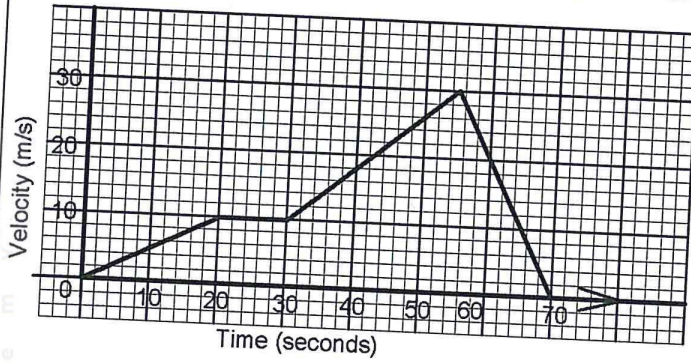
A1

$\Delta A'''B'''C'''$  correctly drawn

B1

**10**

22.



Scale

Acceleration parts

Constant speed

Deceleration

B1

B1

B1

B1

$$\text{Deceleration} = \frac{30}{15}$$

(b)

$$= 2\text{m/s}^2$$

M1

(c) Total distance covered

$$= \frac{1}{2} \times 10 \times 20 + 10 \times 10 + \frac{1}{2} (10 + 30) \times 25 + \frac{1}{2} \times 15 \times 30$$

$$= 100 + 100 + 500 + 225$$

$$= 925\text{m}$$

A1

M1

Average speed

(d)

$$= \frac{925}{70}$$

$$= 13.21\text{m/s}$$

A1

M1

A1

**10**

23. (a)	$\frac{120}{40} = \frac{r}{9}$ $r = 27$	M1	
		A1	
(b)	Slant height of larger cone		
	$= \sqrt{27^2 + 120^2}$	M1	
	$= 123$		
	Slant height of smaller cone		
	$= \sqrt{40^2 + 9^2}$	M1	
	$= 41$		
	Slant height of cone = 123 - 41	M1	
	$= 82 \text{ cm}$	A1	
(c)	Surface Area of model		
	$\frac{22}{7} \times 27 \times 27 + \left( \frac{22}{7} \times 27 \times 123 - \frac{22}{7} \times 9 \times 41 \right) + \frac{22}{7} \times 2 \times 9 \times 30 + \frac{22}{7} \times 9^2$	M1	S.A of Frustum part
	$2291.14 + 9277.71 + 1697.14 + 254.57$	M1	S.A of cylindrical part
	$= 13520.56 \text{ cm}^2$	M1	Addition
		A1	
		<b>10</b>	

24			
(a)	Height of container		
	$\frac{22}{7} \times 14 \times 14 \times h = 12.32 \times 1000 \text{cm}^3$	M1	
	$h = \frac{12320 \times 7}{22 \times 14 \times 14}$	M1	
	$= 20 \text{cm}$	A1	
(b)	Amount of juice used		
	$= \frac{22}{7} \times 15 \times 14 \times 14$	M1	
	$= 9240 \text{cm}^3$	A1	
	In litres $= \frac{9240}{1000}$		
	$= 9.24 \text{ litres}$	B1	
(c)	Vol of bottle		
	$= \frac{22}{7} \times 2 \times 2 \times 8.4$	M1	
	$= 105.6 \text{cm}^3$		
	Remaining juice		
	$= 12.320 - 9.24$	M1	
	$= 3.08 \text{ litres}$		
	No. of bottles packed		
	$= \frac{3.08}{0.1056} = 29.16$	M1	
	$= 29 \text{ bottles}$	A1	
		<b>10</b>	