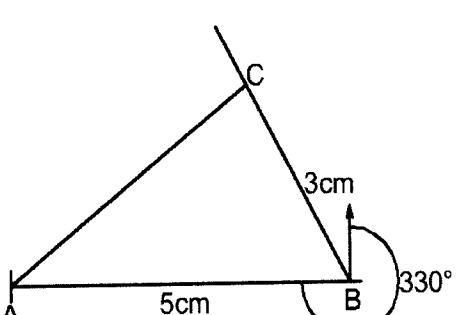


## 4.4 MATHEMATICS ALTERNATIVE B (122)

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

No	Marking scheme	Marks	Comments
1	$\frac{-9 \div 3 + 7 + 4}{-3 + 2 \times 6} = \frac{8}{9}$	M1  A1  <b>2</b>	
2	$2744 = 2^3 \times 7^3$  $\sqrt[3]{2744} = \sqrt[3]{2^3 \times 7^3}$ $= 2 \times 7$ $= 14$	B1  M1  A1  <b>3</b>	
3	$12 = 2^2 \times 3$  $15 = 3 \times 5$  $20 = 2^2 \times 5$  $\text{L.C.M} = 2^2 \times 3 \times 5$ $= 60 \text{ minutes}$  Time together again 8.00 + 1 hr = 9:00a.m.	M1  M1  A1  B1  <b>4</b>	
4	Let the original number of fruits be $x$ $\frac{2}{5}x + \frac{2}{3} \text{ of } \frac{3}{5}x = \frac{2}{5}x + \frac{2}{5}x = \frac{4}{5}x$ Remainder = $\frac{1}{5}x$ $\frac{1}{5}x = 250$ $x = 250 \times \frac{5}{1}$ $x = 1250$	M1  M1  A1  <b>3</b>	

5	Circumference = $\frac{22}{7} \times 70$ = 220cm = 2.2m	M1	
	No. of line times rolled = $\frac{66}{2.2}$ = 30 times	A1  B1  3	
6	Length of 3 <sup>rd</sup> side = 20 - 13 = 7cm	B1	
	Area = $\sqrt{s(s-a)(s-b)(s-c)}$		
	$s = \frac{1}{2}(20) = 10$		
	Area = $\sqrt{10(10-7)(10-5)(10-8)}$ = $\sqrt{10 \times 3 \times 5 \times 2}$ = $\sqrt{300}$ = 17.32 cm <sup>2</sup>	M1  A1  3	
7	No log		
	37.32 1.5719	M1	Correct logs
	27.43 1.4382 +	M1	Division multiplication
	3.0101 -		
	6541 3.8156		
	$\pm 1.1945$ or $-0.8055 \times \frac{1}{2}$	M1	Square root
	= 0.3956 1.5973 or -0.4028	A1  4	

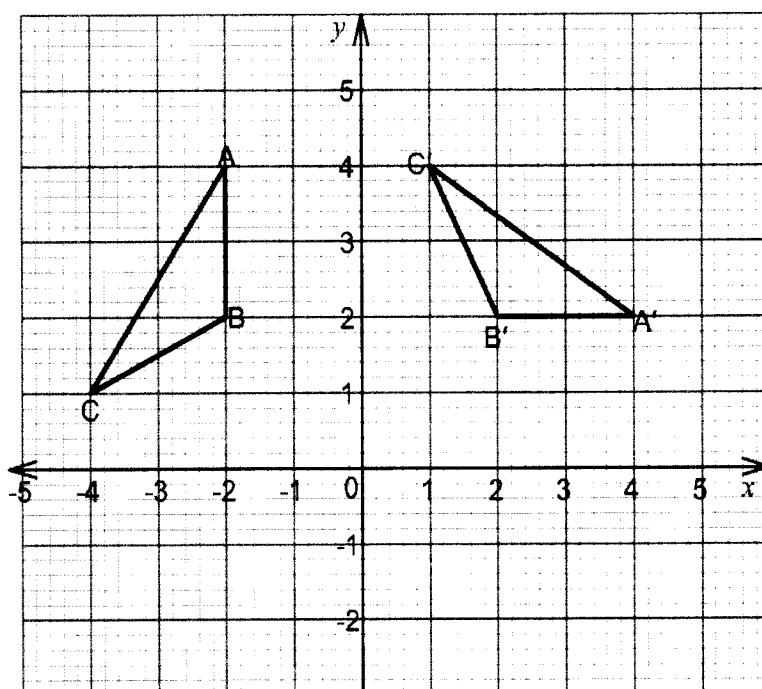
8	$\frac{y-3}{x-5} = 2$	M1	Gradient of $L_2$
	$y-3 = 2x-10$	A1	
	$y = 2x-7$	B1	
	Y intercept = (0, -7)	B1	
	Gradient of $L_2 = -\frac{1}{2}$	B1	
	Equation of $L_2$	B1	
	$y = \frac{1}{2}x - 7$	4	
9	9000 litres = $9 \text{ m}^3$	B1	
	Vol = $1.5 \times 2 \times h = 9 \text{ m}^3$	M1	
	$h = \frac{9}{1.5 \times 2}$	A1	
	= 3 m	3	
10 (a)			
		B1	
		4	
(b) (i)	$AC = 4.3 \pm 0.1 = 43m$	B1	
		B1	
(ii)	Bearing of C from A = $53^\circ \pm 1^\circ$	B1	
		4	

11				
(a)	$(2n-4)90 = 900$ $2n - 4 = 10$ $n = 7$		M1 A1 B1 <b>3</b>	
(b)	Heptagon			
12	New price = $\frac{140}{100} \times 300$ $= \text{Ksh. } 420$  Price after reduction $= \frac{60}{100} \times 420$ $= \text{Ksh. } 252$		M1 M1 A1 <b>3</b>	
13	$\frac{5(2) + 4(-2) + 1}{-2}$ $= \frac{10 - 8 + 1}{-2}$ $= \frac{3}{-2}$ $= -1.5$		M1 M1 A1 <b>3</b>	Substitution
14	$\cos 2x = \sin 4x$ $2x + 4x = 90$ $6x = 90$ $x = 15^\circ$		M1 A1 <b>2</b>	

15

(a)

(b)

 $\Delta ABC$  Correctly drawn.

B1

Location of points  $A'$ ,  $B'$  and  $C'$ 

B1

 $\Delta A'B'C'$  Correctly drawn.

B1

3

16

let distance travelled in 45minutes be  $D_1$ 

B1

$$D_1 = 60 \times \frac{45}{60} = 45 \text{ km}$$

M1

$$\begin{aligned} \text{Average speed} &= \frac{45+40}{45+30} \\ &= \frac{60}{85 \text{ km}} \\ &= \frac{1.25 \text{ h}}{68 \text{ km/h}} \end{aligned}$$

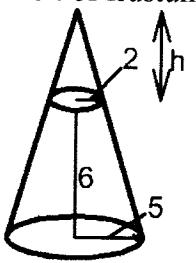
A1

3

17 (a)	<p>Total earnings = Ksh 15 000</p> <p>Commission = <math>15\ 000 - 9\ 000</math> = Ksh 6 000</p> <p>Let the sales above Ksh 150 000 that month be y</p> $\frac{5}{100} \times y = 6000$ $y = 6000 \times \frac{100}{5}$ $= \text{Ksh. } 120000$ <p>Total sales = <math>120000 + 150000</math> = Ksh. 270000</p>	B1  M1  M1  A1	
(b) (i)	<p>New salary = <math>1.1 \times 9000</math> = Ksh 9 900</p> <p>Commission = <math>(378000 - 150000) \times \frac{7.5}{100}</math> = Ksh. 17 100</p> <p>Total earnings = <math>17100 + 9900</math> = Ksh. 27 000</p>	B1  M1  M1  A1	
(ii)	<p>% increase = <math>\frac{27000 - 15000}{15000}</math> = 80%</p>	M1  A1	<b>10</b>

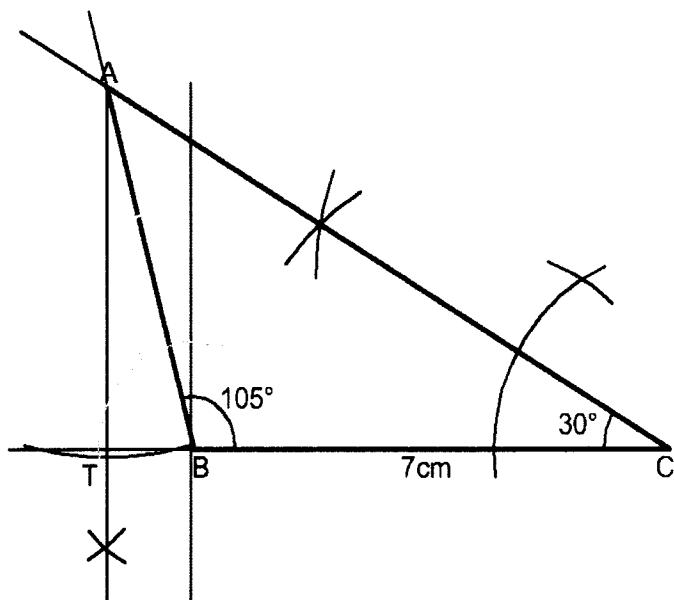
18. (a) $3r - 2 = \frac{r}{r^2}$ $r(3r - 2) = 1$ $3r^2 - 2r - 1 = 0$ $(3r + 1)(r - 1) = 0$ $r = -\frac{1}{3} \text{ or } 1$	M1 M1 A1
(b) (i) $(5x+12)^2 + (x-5)^2 = (6x-7)^2$ $25x^2 + 120x + 144 + x^2 - 10x + 25 = 36x^2 - 84x + 49$	M1 M1
$10x^2 - 194x - 120 = 0$ $5x^2 - 97x - 600 = 0$ $(5x + 3)(x - 20) = 0$ $x = 20 \text{ or } -\frac{3}{5}$	M1 M1 A1
(ii) Length = $5(20) + 12$ $= 112 \text{ m}$  Width = $20 - 5$ $= 15 \text{ m}$	B1 B1
	<b>10</b>

19.			
(a)	$\tan 34 = \frac{TB}{x+6}$ $TB = (x+6) \tan 34$ $TB = x \tan 63$ $x \tan 63 = (x+6) \tan 34$ $x = \frac{6 \tan 34}{\tan 63 - \tan 34}$ $x = 3.1 \text{ m}$ $\therefore BC = 3.1 + 6$ $= 9.1 \text{ m}$	M1 M1 M1 A1 B1	
(b)	$TB = x \tan 63$ $= 6.1 \text{ m}$	M1 A1	
(c)	$\sin 63 = \frac{6.1}{TA}$ $TA = \frac{6.1}{\sin 63} = 6.8 \text{ m}$ $\sin 34 = \frac{6.1}{TC}$ $TC = \frac{6.1}{\sin 34} = 10.9 \text{ m}$ <p>Total length of cable TA and TC = <math>6.8 + 10.9</math>  <math>= 17.7 \text{ m}</math></p>	M1 M1 A1	
			<b>10</b>

20.			
(a)	$\text{Vol of cylinder} = \pi \times 5^2 \times 12$ $= 942.5 \text{ cm}^3$	M1	
(b)	$\text{Vol. of frustum}$  $\frac{h}{h+6} = \frac{2}{5}$ $5h = 2h + 12$ $3h = 12$ $h = 4 \text{ cm}$ $\text{Vol} = \frac{1}{3} \times \pi \times 5^2 \times 10 - \frac{1}{3} \pi \times 2^2 \times 4$ $= 245.0 \text{ cm}^3$	A1 M1 A1 M1 A1	Accept 245 $\text{cm}^3$
	$\text{Volume of container} = 942.5 + 245$ $= 1187.5 \text{ cm}^3$	M1 A1	
(c)	$\text{Capacity} = \frac{1187.5}{1000}$ $= 1.1875$ $= 1.2 \text{ litres}$	M1 A1	<b>10</b>

21.

(a)(i)



B1

B1

B1

(ii)

Perpendicular dropped

B1

(iii)

 $\angle TAB = 15^\circ$ 

B1

(iv)

 $TA = 5 \pm 0.1 \text{ cm}$ 

B1

(b)

$$\begin{aligned} \text{Area of } \triangle ABC &= \frac{1}{2} \times 7 \times 5 \\ &= 17.5 \text{ cm}^2 \end{aligned}$$

M1

A1

$$\begin{aligned} \text{Area in acres} &= \frac{17.5 \times 500 \times 500}{100 \times 100} \\ &= 437.5 \text{ acres} \end{aligned}$$

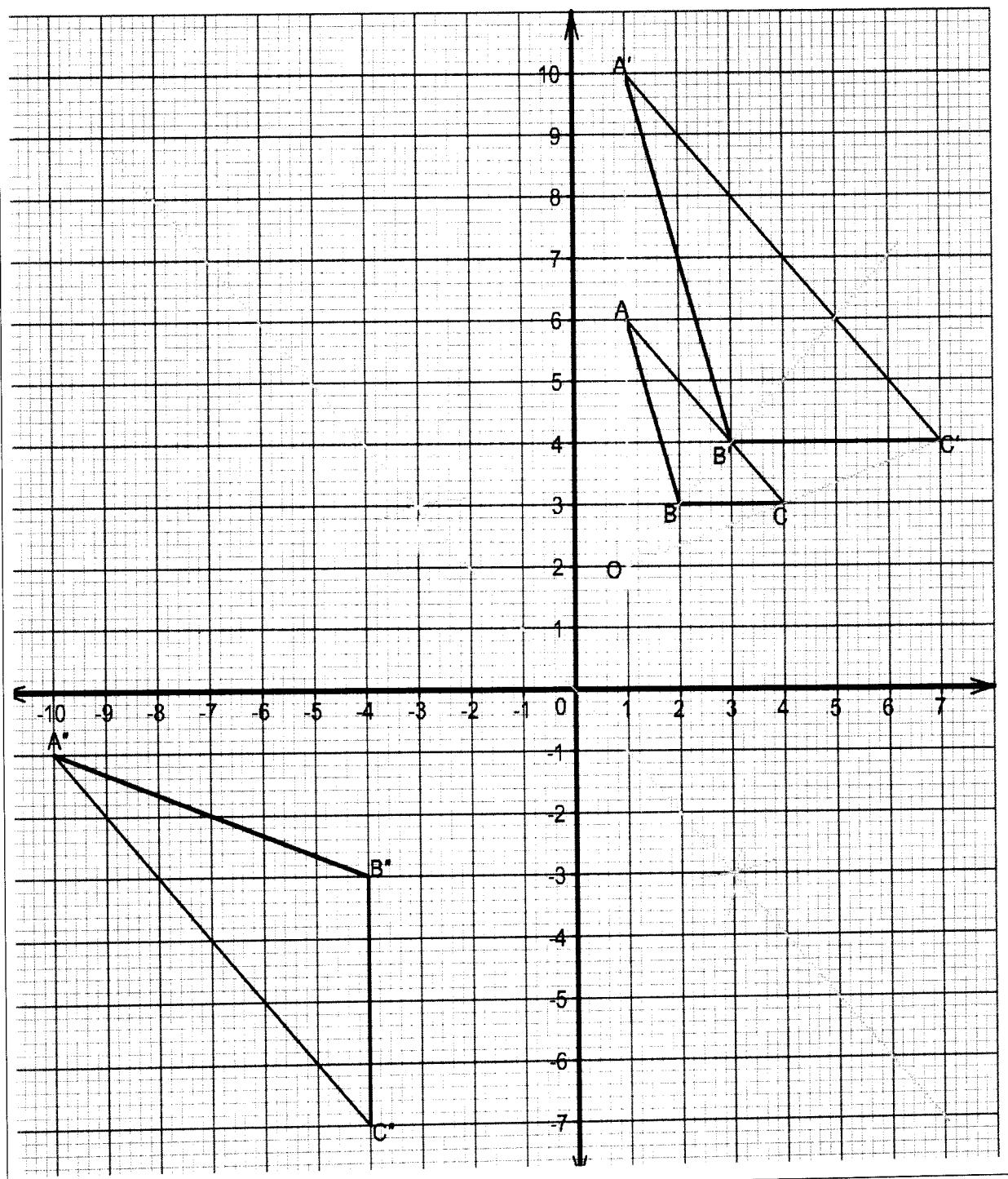
M1

A1

10

22.			
(a)	40 m/s	B1	
(b)	$\text{Distance} = \frac{1}{2} \times 4 \times 40$ $= 80 \text{ metres}$	M1	A1
(c)	$\text{Acceleration} = \frac{60 - 40}{20 - 10}$ $= \frac{20}{10}$ $= 2 \text{ m/s}^2$	M1	A1
(d)	$\text{Deceleration}$ $= \frac{60}{5}$ $= 12 \text{ m/s}$	M1	A1
(e)	$\text{Average speed} = \frac{\text{total distance}}{\text{total time}}$ $\text{Total distance} = 80 + 240 + \frac{1}{2} \times 10(40 + 60) + \frac{1}{2} \times 60 \times 5$ $= 80 + 240 + 500 + 150$ $= 970 \text{ m}$ $\text{Average speed} = \frac{970}{25}$ $= 38.8 \text{ m/s}$	M1 M1 M1	A1
			<b>10</b>

23 (a)



23.	$\Delta ABC$ correctly drawn	B1	
	$\Delta A'B'C'$ correctly drawn	B1	
	Centre(1,2)	B1	
(b)	$s.f = \frac{OA'}{OA} = \frac{8}{4} = 2$	M1 A1	Or equivalent
(c)			
(i)	$\Delta A''B''C''$ correctly drawn	B1	
(ii)	Reflection	B1	
	On line $y = -x$	B2	For line
(iii)	Oppositely congruent	B1	
		<b>10</b>	

24			
(a)(i)	$y + 7$	B1	
(ii)	$2(y + 7) = 2y + 14$	B1	
(b)(i)	$y + y + 7 + 2y + 14 + 3y = 112$ $7y + 21 = 112$ $7y = 91$ $y = 13$ years	M1 M1 A1	
(ii)	Difference in age $= 3 \times 13 - (13+7)$ $= 19$ years	M1M1 A1	
(iii)	Fathers age $= 2y + 14$ $= 40$ years In 12 years time $= 40 + 12$ $= 52$ years	B1 B1	
		<b>10</b>	