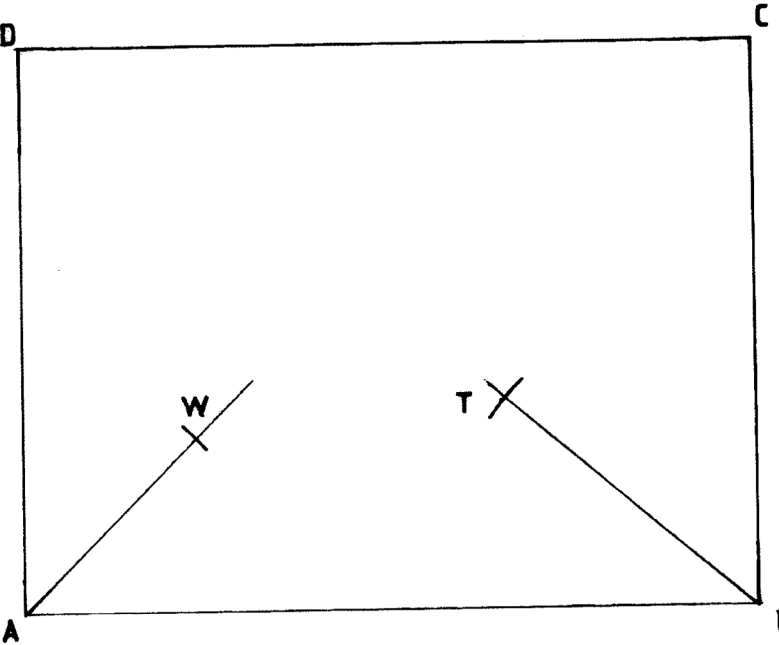


#### 4.4 MATHEMATICS ALTERNATIVE B (122)

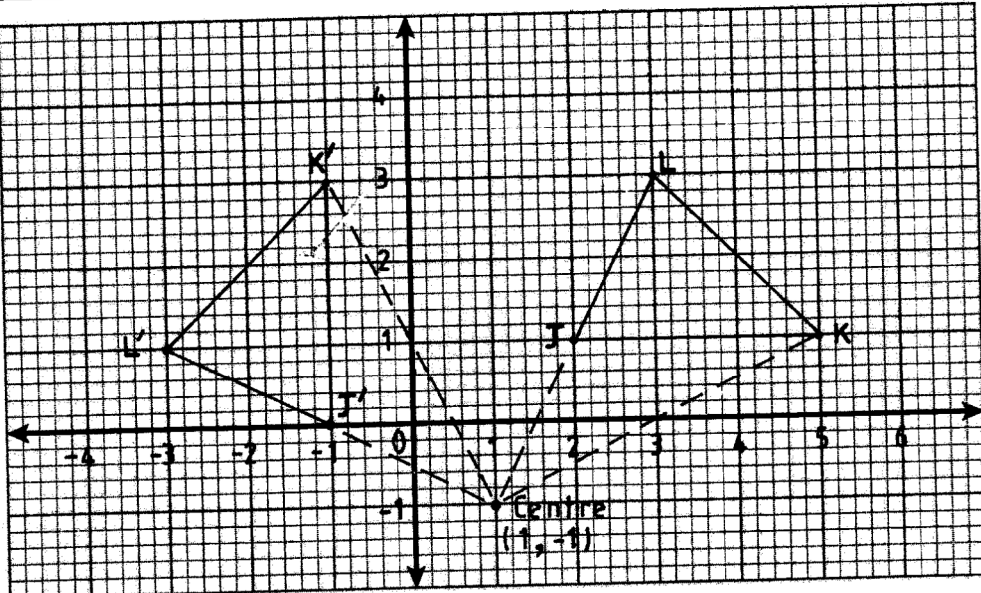
##### 4.4.1 Mathematics Alternative B (122/1)

1.	368800 and 369000  Difference : $369000 - 368000$ $= 200$	B1  B1  2													
2.	(a) $28 = 2^2 \times 7$ $16 = 2^4$ $40 = 2^3 \times 5$  Length of ribbon = $2^4 \times 5 \times 7$ $= 560$  (b) $\frac{560}{16} = 35$	M1  A1  B1  3	For all factors												
3.	Volume = $\frac{5.06 \times 1000}{2.3}$  $= 2200 \text{ cm}^3$  Length = $\frac{2200}{44} = 50 \text{ cm}$	M1  A1  B1  3													
4.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Number</th> <th style="padding: 5px;">Log</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">0.04068</td> <td style="padding: 5px;"><math>\bar{2}.6094</math></td> </tr> <tr> <td style="padding: 5px;">35.72</td> <td style="padding: 5px;"><math>1.5529^+</math></td> </tr> <tr> <td style="padding: 5px;">0.2799</td> <td style="padding: 5px;"><math>0.1623</math> <math>\bar{1}.4470^-</math></td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px;"><math>0.7153 \times \frac{1}{3}</math></td> </tr> <tr> <td style="padding: 5px;">1.732</td> <td style="padding: 5px;">0.2384</td> </tr> </tbody> </table>	Number	Log	0.04068	$\bar{2}.6094$	35.72	$1.5529^+$	0.2799	$0.1623$ $\bar{1}.4470^-$		$0.7153 \times \frac{1}{3}$	1.732	0.2384	M1  M1  A1  3	All logs  Operations  Accept 1.731
Number	Log														
0.04068	$\bar{2}.6094$														
35.72	$1.5529^+$														
0.2799	$0.1623$ $\bar{1}.4470^-$														
	$0.7153 \times \frac{1}{3}$														
1.732	0.2384														
5.	$360 = x^2 + 26x$  $x^2 + 26x - 360 = 0$  $(x + 36)(x - 10) = 0$ $x = 10$	M1  M1  A1  3													

6.	 <p>Distance <math>WT = (3.8 \pm 0.1) \times 10</math>  <math>= 38 \pm 1\text{m}</math></p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>4</p>	<p>Suitable scale used</p> <p>Rectangular field ABCD correctly drawn.</p> <p>✓ Location of W and T</p>
7.	<p>Angle at the centre = <math>120^\circ</math></p> $\frac{120}{360} \times \frac{22}{7} \times 3.5 \times 3.5 - \frac{1}{2} \times (3.5)^2 \sin 120^\circ$ <p><math>= 12.83 - 5.304</math>  <math>= 7.526</math></p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>4</p>	<p>Area of sector</p> <p>Area of triangle</p>

8.	$3 \geq 10x - 5$ $8 \geq 10x$ $x \leq \frac{4}{5}$ , $x > -4$ Integral values; $-3, -2, -1, 0$ .	M1  A1  B1 <hr/> 3	
9.	Let x be monthly salary $x - \left\{ \frac{1}{5}x + 26000 + \frac{3}{8}x \right\} = 8000$ $\frac{17}{40}x = 34000$ $x = \text{Ksh. } 80000$	M1  M1  A1 <hr/> 3	Simplification
10.	(a) Gradient of $L_1 = -\frac{1}{3}$  Equation of $L_1$ $\frac{y+4}{x-3} = -\frac{1}{3}$ $-3y - 12 = x - 3$ $3y + 12 = -x + 3$ $x + 3y = -9$  (b) x intercept $x = -9$	B1    M1    A1    B1 <hr/> 4	

11.



Drawing object JKL  
 Locating image points J', K' and L'  
 Image J' K' L' drawn

B1

B1

B1

Image J'K'L'  
 drawn

3

12.

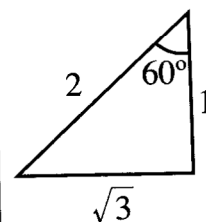
(a) 3rd side of  $\Delta = \sqrt{2^2 - 1^2} = \sqrt{3}$

$$\sin 60^\circ = \frac{\sqrt{3}}{2}$$

(b)  $\tan 30^\circ = \frac{1}{\sqrt{3}}$

M1

A1



B1

3

13.

Number of whole tile along the length  
 $= \frac{307.8}{34.2} = 9$

Number of whole tiles along the width

$$= \frac{236.7}{34.2} = 6$$

Total number of tiles fitted  
 $= 9 \times 6 = 54$

M1

M1

A1

3

14.	<p>Hypotenuse of <math>\Delta = \sqrt{5^2 + 12^2} = 13</math></p> <p>Area of <math>\Delta s = \frac{1}{2} \times 12 \times 5 \times 2</math></p> <p style="padding-left: 40px;"><math>= 60</math></p> <p>Area of rectangles:</p> <p><math>= 5 \times 30 + 12 \times 30 + 13 \times 30</math></p> <p><math>= 900</math></p> <p>Total S.A <math>= 900 + 60 = 960 \text{ cm}^2</math></p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p>	
15.	<p>Volume of hemisphere</p> <p><math>\frac{1}{2} \times \frac{4}{3} \pi r^3 = 41.2</math></p> <p><math>r = \sqrt[3]{\frac{41.2 \times 3}{2\pi}}</math></p> <p><math>= 2.7</math></p>	<p>M1</p> <p>A1</p>	
16.	<p>Distance covered</p> <p><math>= \frac{1}{2} (16 \times 25) + 34 \times 25 + \frac{1}{2} \times 25 \times 40</math></p> <p style="padding-left: 40px;"><math>= 1550</math></p> <p>Speed <math>= \frac{1550}{90}</math></p> <p style="padding-left: 40px;"><math>= 17.2 \text{ m/s}</math></p>	<p>M1</p> <p>M1</p> <p>A1</p>	

17.	<p>(a) (i) No of bags transported by lorry  <math>2 \times 4 \times 132 = 1056</math></p> <p>Total number of bags transported</p> $x = \frac{1056}{8} \times 11$ $= 1452$	M1	
	<p>(ii) Bags transported by pick-up</p> $1452 \times \frac{3}{11}$ $= 396$	M1	
	<p>No of bags carried by each pickup per trip.</p> $= \frac{396}{3 \times 7 + 2 \times 6}$ $= \frac{396}{33} = 12$	M1 M1	
	<p>(b) Lorry transport cost:</p> $2 \times 4 \times 5000$ $= 40000$	M1	
	<p>Pickup transport cost:</p> $(3 \times 7 + 2 \times 6) \times 1500$ $= 49500$	M1	
	<p>Total cost:</p> $40000 + 49500 = \text{Ksh. } 89500$	B1	
		10	

18.	<p>(a) (i) Expression:</p> $2(x + x + 12) = 4x + 24$ <p>(ii) <math>4x + 24 = 84</math>  <math>4x = 60</math>  <math>x = 15</math></p> <p>Length of plot <math>15 + 12 = 27\text{m}</math>  Ratio of length to width  <math>27: 15 = 9:5</math></p> <p>(b) (i) Length of 1 strand with allowance</p> $84 - 3 + 0.3$ $= 81.3$ <p>Total length:</p> $81.3 \times 4$ $= 325.2 \text{ m}$ <p>(ii) Number of poles:</p> $\frac{84}{3}$ $= 28$	<p>B1</p> <p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>10</p>	<p>or <math>\frac{81}{3} + 1 = 28</math></p>
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19.	<p>(a) (i) <math>\frac{3 \times 2.5 \times 4 \times 100 \times 100 \times 100}{1000}</math></p> <p style="text-align: center;">= 30000 litres</p> <p>(ii) <math>3 \times 4 \times 2 + 2.5 \times 4 \times 2 + 3 \times 2.5</math>  <math>= 24 + 20 + 7.5 = 51.5 \text{ m}^2</math></p> <p>(b) (i) <math>\pi r^2 \times 4 = 3 \times 2.5 \times 4</math></p> <p style="text-align: center;"><math>r = \sqrt{\frac{7.5}{\pi}}</math></p> <p style="text-align: center;">= 1.5</p> <p>(ii) <math>\pi (1.5 \times 1.5) + 2 \times 1.5 \times \pi \times 4</math>  <math>= 44.8 \text{ m}^2</math></p>	<p>M1 M1</p> <p>A1</p> <p>M1 A1</p> <p>M1</p> <p>M1 A1</p> <p>10</p>	<p>Volume Conversion to litre</p>
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<p>20. (a)</p>		<p>B1</p> <p>B1</p>	<p>Construction of <math>60^\circ</math></p> <p>Construction of quad ADBC</p>
<p>(b) (i) ADBC is a rhombus</p>	<p>(ii) - All sides equal  - Opposite sides equal and parallel  - Opposite <math>\angle</math>s equal  - Diagonals bisect each other at right angles</p>	<p>B1</p> <p>B1</p> <p>B1</p>	<p>Any two correct 1 mark each.</p>
<p>(c) Construction of circle:</p>		<p>B1</p> <p>B1</p>	<p>Identifying centre</p> <p>Circle drawn</p>

(d)	<p>Area inside quad. and outside circle.</p> $8^2 \sin 60^\circ - \pi \times 3.5^2$ $55.4 - \pi \times 3.5^2$ $= 55.4 - 38.5$ $= 16.9 \text{ cm}^2$	<p>M1</p> <p>M1</p> <p>A1</p> <p>10</p>	<p>Area of rhombus</p> <p>Area of circle (radius <math>3.5 \pm 0.1</math>)</p>
21.	<p>(a) <math>\angle XYN = 70^\circ</math> angle in alternate segment</p> <p>(b) <math>\angle ZYX = 180 - (70 + 35) = 75^\circ</math> Sum of angles on a straight line</p> <p>(c) <math>\angle ZXY = 35^\circ</math> angle in alternate segment.</p> <p>(d) <math>\angle ZWY = 35^\circ</math> angle in alternate segment or angle subtended by chord ZY</p> <p>(e) <math>\angle WXZ = 130 - 70 = 60^\circ</math> exterior angle in triangle equal to sum of opposite interior angles</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>10</p>	<p>NB</p> <p>Reason should be relevant to situation.</p>

22.	<p>(a) (i) Discount = <math>\frac{1.2}{100} \times \frac{3}{5} \times 300 \times 1700</math>  = Ksh 3672</p> <p>(ii) <math>\frac{3}{100} \times 120 \times 1700 + \frac{2}{100} \times 180 \times 1700</math>  = 6120 + 6120 = Ksh 12 240</p> <p>Net commission:  = 12240 - 3672 = Ksh 8568</p> <p>(b) Profit:  = 300 (1850 - 1700) + 3672 - 3000  = Ksh 45 672</p> <p>(c) Tax:  <math>\frac{16}{100} \times 45672</math>  = Ksh 7307.52</p>	M1 A1 M1 A 1 B1 M1 M1 A1 M1 A1 10	
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23.	$x(x + 6) = 567$  $x^2 + 6x - 567 = 0$  $(x + 27)(x - 21) = 0$  $x = 21$ or $-27$  $\therefore$ Length of wire $= [(21 + 6) + 21] \times 2$ $= 96$ cm  (b) Let radius be $r$  $\therefore 2r + \pi r = 96$  $r = \frac{96}{2 + \pi}$  $= 18.7$  Area of semicircle $= \frac{1}{2} \pi \times 18.7^2$  $= 549.3$  (c) Area of semicircle as percentage of area of rectangle:  $\frac{549.3}{567} \times 100$ $= 96.9\%$	M1   M1  A1   B1    M1   A1  M1  A1   M1  A1	
		10	

24.	<p>(a) <math>\frac{1}{2} \times \frac{600 \times 500 \times \sin 30 \times 2}{10000}</math>  <math>= 15 \text{ ha}</math></p> <p>(b) (i) <math>\frac{6 \times \frac{1}{2} \times 10^2 \sin 60}{10000}</math>  <math>= 0.026 \text{ ha}</math></p> <p><math>\therefore \text{grazing area} = 15 - 0.026</math>  <math>= 14.974 \text{ ha}</math></p> <p>(ii) Number of animals  <math>= 14.974 \div 0.0625</math>  <math>= 239.584</math>  <math>= 239 \text{ animals}</math></p>	<p>M1  M1  A1</p> <p>M1  M1  A1</p> <p>B1</p> <p>M1  A1  B1</p> <p>10</p>	<p>Conversion to hectares</p> <p>area of 1 triangle  mult. by 6</p>
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