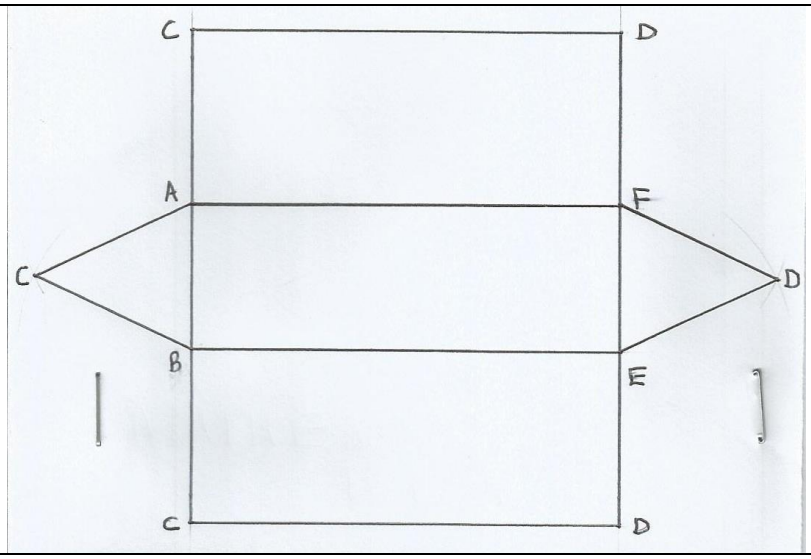
121/1
MATHEMATICS
JULY, 2018
PAPER 1
TIME: 2½ HOURS

BUURI EAST STANDARDS

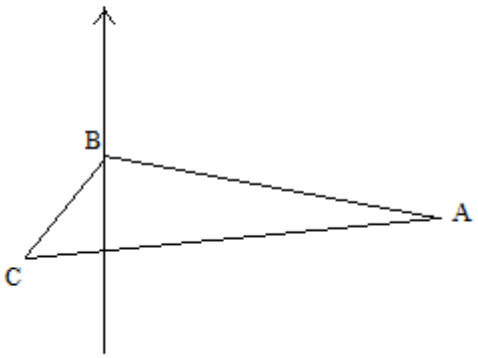
Kenya Certificate of Secondary Education
MATHEMATICS Alt. A

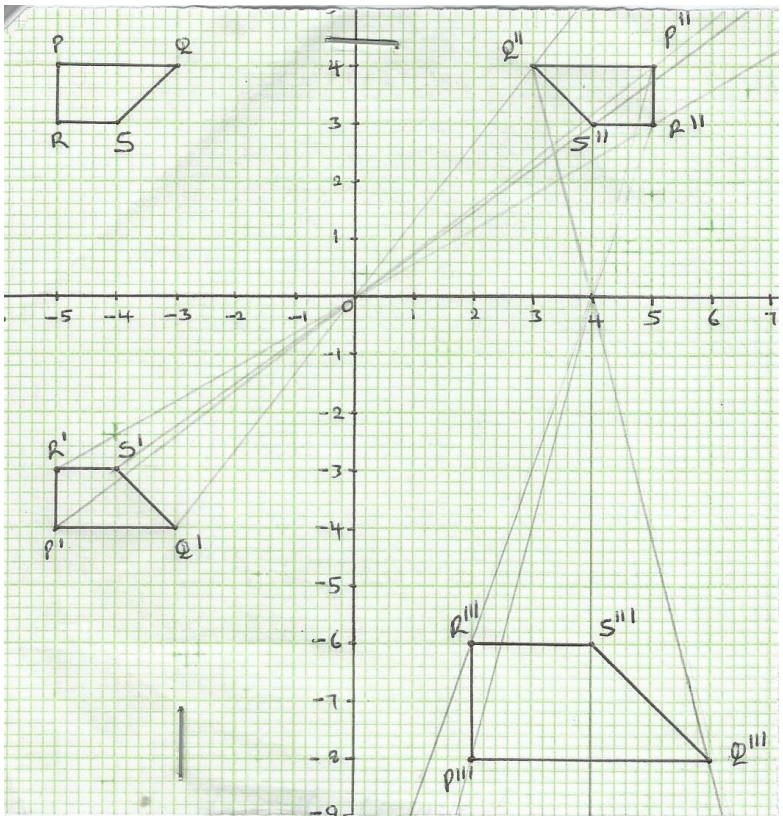
MARKING SCHEME

No.	Calculations	Marks	Remarks
1.	Numerator -18 + 2 -14 Denominator 18 + -11 7 -14/7 -2	B1 B1 B1	For -14 For 7 For -2 evidence of the operation must be seen
		3	
2.	Fraction walked = 1 – ¼ = ¾ Actual distance walked = ¾ x $^{32}/_{5}$ = $\frac{24}{5}$ = 4 $^{4}/_{5}$ km	M1 M1 A1	
		3	
3.	1st commission $^{2}/_{100}$ x 200 000 4 000 2nd commission $^{4}/_{100}$ x (600 000 – 200 000) 16 000 Total 20 000 + 4 000 16 000 Sh. 40 000	 M1 M1 A1	 Process of getting the two commissions For process of getting total pay CAO
		3	

4		B1 B1 B1	All lines 01 ✓ ly drawn to be actual length. No use of scale All angles 01 ✓ 1y drawn ✓shape of net
		3	
5	$2^{3y+3} - 2^{3y+1} = 48$ $2^{3y}(2^3 - 2) = 48$ $2^{3y} = {}^{48}/_{6}$ $2^{3y} = 8$ $2^{3y} = 2^3$ $y = 1$	M1 M1 A1	Index form Equating 2^{3y} to 8 accept equivalent
6	Numerator $12x^2 - 8ax + 9ax - 6a2$ Denominator $(3x + 2a)(3x - 2a)$ $\frac{(3x - 2a)(4x + 3a)}{(3x + 2a)(3x - 2a)}$ $\frac{4x + 39}{3x + 29}$	 M1 M1 A1	 Factorising num ✓ 1y Factorizing den correctly Must be extracted
		3	
7	Gradient of Q = 1/3 $\frac{Y - 6}{X - 3} = \frac{1}{3}$ $3y = x + 15$ $Y = {}^{1}/_{3}x + 5$	B1 M1 A1	 Must be in the form Y=mx + c
		3	

8.	$\frac{1}{1-\frac{1}{\sqrt{2}}} = \frac{1}{\sqrt{2-1}}$ $= \frac{\sqrt{2}(\sqrt{2}+1)}{(\sqrt{2}-1)(\sqrt{2}+1)}$ $= \frac{2+\sqrt{2}}{2-1}$ $= 2+\sqrt{2}$	M1 M1 A1	Replacing π 45 with 2 Rationalizing CAO
		3	
9	$b^2 = 6^2 + 11^2 - 2 \times 6 \times 11 \times \cos 100^0$ $b^2 = 179.92$ $b = 179.92$ $= 13.41$	M1 M1 A1	Substituting in cosine rule
		3	
10.	V = ½ x 4 x 6 x 20 = 240 M = 240 x 1.25 = 300	M1 M1 A1	
		3	
11	Total time taken = 90 + 15 + 5 = 110 minutes = 1hr 50 minutes 1500h + 1h 50min 1650h	M1 M1 A1	
		3	
12	$X \geq -4$ $Y + x \leq 0$ $Y - {}^3/_4 x > -6$	B1 B1 B1	
		3	
13	L (l – 16) = 132 L2 – 16L – 132 = 0 (L – 22) (L + 6) = 0 L^2 = 22 or L = -6 (Impossible) L = 22M P = 2(22 + 6) = 56	M1 M1 Al B1	Attempt to get equation Attempt to solve for L Evidence of discrimination seen

		4	
14	 CB = 1.2 x 20 = 24km	B1 B1 B1 B1	Locating C ✓ly Locating B ✓ ly Locating A ✓ly Form 24km
		4	
15	a) ½ 2 -4 = 1 -1 -3 7 -3/2 7/2 b) 1 -1 7 4 x = 1 -1 14 -3/2 7/2 3 2 y -3/2 7/2 8 X = 6 Y 7 X = 6 Y = 7	B1 M1 A1	Premultiplying Both values of x and y. must be extracted
		3	
16	0.6511 x 1/10 + 3 (0.7656) 0.06511 + 2.3058 2.37091 1.5398	M1 M1 A1	
		3	

17.		B1 B1B1 B2 B2	VPQRS P'Q'R'S Located P"Q"R'S ✓ located P"'Q"'R"'S"' ✓ located
	c) i) P'Q'R'S' and P"Q" R" S" are directly cogent ii) Oppositely congment PQRS and P'Q'R'S' PQRS and P" Q"R"S"	B1 B1 B1	
		10	
18	a) $\frac{x}{x+12} = \frac{5}{10}$ $10x = 5x + 60$ $5x = 60$ $X = 12$ $L = 24^2 + 102 = 26$ $1/26 = 5/10$ $L = 13$ Slant height 26 – 13 = 13	 M1 M1 A1	 When 13 is seen

	b) Curved area of the frustum S.A = πRL - π rl = π (260 – 65) = 612.6 c) Volume of the frustrum 1/3 π (R2H – r^{2h}) = 1/3 π (2400 – 300) = 1/3 π (2100) = 2200 cm^2	M1 M1 A1 M1M1M1 A1	Both reas correct ✓ -
	Total marks	10	
19	i) 1 1/2 x 80 = 120km ii) 120 – 50 = 40 iii) Time taken 120 40 = 3hrs 8.300 + 3 11.30cm iv) 3 x 120 = 360km v) 600 – 360 = 240km	M1 A1 M1 A1 M1 A1 B1 M1 A1 B1	 For 11.30am For 240
	Total marks	10	

20								

Class	Tally	Frequency	Mid point	Fx	Cf
145 – 149	11	2	147	294	2
150 – 154	1	1	152	152	3
155 – 159	1	11	157	1727	14
160 – 164		5	162	810	19
165 – 169	11	7	167	1169	26
170 – 174	11	7	172	1204	33
175 - 179	111	3	177	531	36
				Fx^2 5887	

B1 ✓ classes

B1 ✓ frequencies (all rallies)

B1 ✓ Fx (frequency)

X midpoints

B1 ✓ Cumulative Frequency (c.f)

b) i) $\frac{5887}{36}$

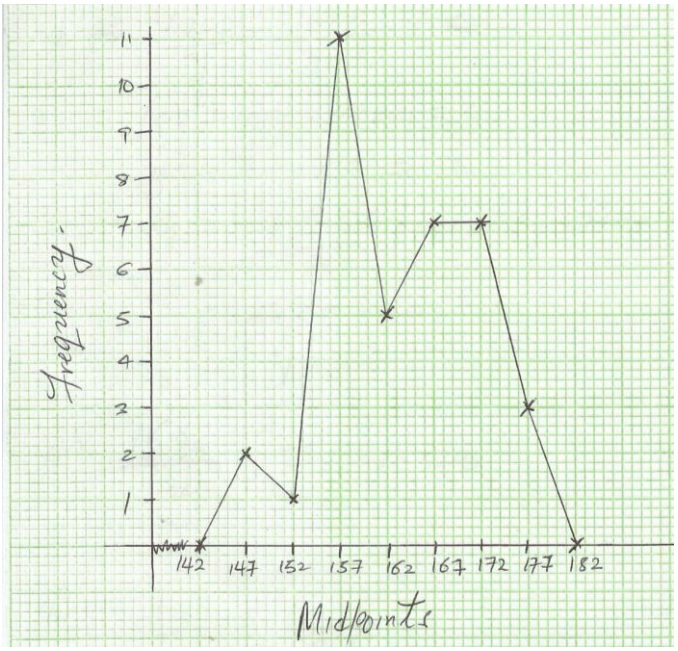
$= 163.53$ A1

ii) $159.5 \left(\frac{36}{2} - 14\right) \times \frac{5}{11}$ M1

$= 159.5 + 1.8182$

$= 161.32$

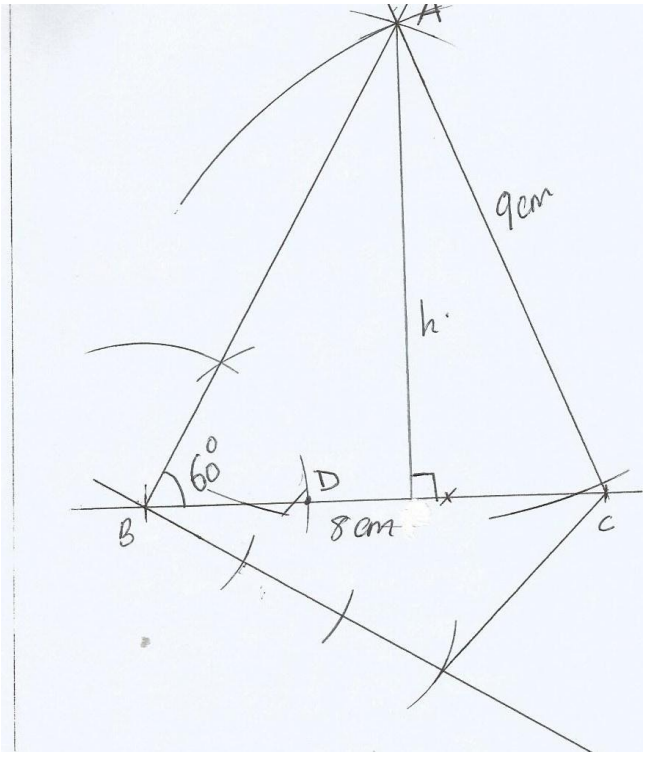
d) Graph A1



B1 ✓Plotting
B1 ✓ curve
(No hanging curve. Not drawn by use of free hand)

	Total marks	10	

21	. a) i) $\frac{16200}{Y}$	B1	
	ii) $\frac{16\,200}{y+3}$ or $\frac{16\,200}{y} - 60$	B1	
	b) i) $\frac{16\,200}{y} - \frac{16\,200}{y+3} = 60$	M1	
	$60y^2 + 180y - 48\,600 = 0$ $Y2 + 3y - 810 = 0$	M1	Simplifying and removing brackets
	$Y = -3 + 57\ 0\ (y + 30)\ (y - 27) = 0$	M1	Factors equated to zero
	$= 27$ or -30 $= y = 27$	A1	Evidence of discrimation of -30 seen
	ii) $\frac{16200}{30}$ = Ksh 540	M1A1	
	iii) $\frac{15}{100} \times \frac{16\,200}{27}$	M1	
	= Ksh 90	A1	
	Total marks	10	

22		B1 B1 B1 B1 B1 B1 M1A1	600 ✓ constructed locating point A Dropping a Length the 8.2 + 0.1 For a line at an angle to BC For joining C to the last point For locating point D (following through)
	Total marks	10	

23	a) I) BN = BA + AN = -a + 5/6 b = 5/6b – a ii) CM = -b + r cm = b + r ($^{2}/_{5}$a - b) i) AX = b + rcm = b – rb + $^{2}/_{3}$ra = (1 – r) b + $^{2}/_{5}$ ar Ax = a + K ($^{5}/_{6}$b – a) A – ka + $^{5}/^{6}$kb ii) (1 – r) b + $^{2}/_{5}$ar = (1 + k) a + ^{5}/6kb $^{5}/_{6}$K = 1 – r – (i) $^{2}/_{5}$r = 1 – k -- (11) K = $^{6}/_{5}$ – $^{6}/_{5}$r 2/5 = 1- ($^{6}/_{5}$ – $^{6}/_{5}$r) = 1 – $^{6}/_{5}$ + $^{6}/_{5}$r -4r = -1 = 7 r = ¼ $^{5}/_{6}$K = ¾ K = $^{9}/_{10}$	B1 B1 M1 M1 M1 M1 Al	Equating two values of AX. Two equations extracted
		10marks	
24a) b)	S = t (t^2 – t – 2t + 2) = t^3 – $3t^2$ + 2t ds = $3t^2$ – 6 (2) + 2 dt V = 3 (4) - 6 (2) + 2 V = 2m/s $\frac{dv}{dt}$ = 0 $\frac{dv}{dt}$ = 6t – 6	 B1 M` A1 M1	

	$6t - 6 = 0$ $t = 1$ $= 3(1)^2 - 6(1) + 2$ $= -1m/s$		M1 A1
c)	$3t2 - 6t + 2 = 0$ $T = 6 + (-6)^2 - 4(3)(2)$ $T = 6 + 3.464$ $T = 1.577$ or 0.4227		M1 A1
d)	$a = 6(3) - 6 = 12m/s^2$		B1
	Total marks	10	

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