MWAKICAN TER 2016
FORM 3 MATHEMATICS P1 MARKING SCHEME

SN	WORKING	
1	$(13824)^{\frac{1}{3}} = (2^9 \times 3^3)^{\frac{1}{3}}$ $= 2^3 \times 3$ ✓	M1
	$\frac{(2^3 \times 3) - 4}{3 + (4 \div 2) - (5 \times 7)} = \frac{24 - 4}{3 + 2 - 35}$ ✓	M1
	$= \frac{20}{5 - 35}$ $= \frac{20}{-30}$ = $= -\frac{2}{3}$ ✓	A1
2	Monday hrs ⇒ 19hrs 15min Tue, Wed & Thur ⇒ 24 × 3 = 72hrs. Friday hrs ⇒ 18hrs 45min. 19 : 15 72 : 00 + 18 : 45 110hrs ✓	M1
	Total Time Lost = $\frac{110 \times 30}{60}$ = 55min ✓	M1
	Time on the watch. 18 : 45 − 55 17 50 hrs OR 5:50 P.M.	A1

MWAKICAN TERM 2, 2016
FORM 3 MATHEMATICS P1 MARKING SCHEME

S/N	WORKING	
3.	$\left(2^5 \times 5^4 \times 7^3\right) \times \left(2 \times 5^2\right)$	
	$2 \times 5^2 = 50$ ✓	M1
	$\left(2^6 \times 5^6 \times 7^3\right)^{\frac{1}{3}} = 2^{6\div3} \times 5^{6\div3} \times 7^{3\div3}$ ✓	M1
	$= 2^2 \times 5^2 \times 7$	
	$= 700$ ✓	A1
4.	Bus $\rightarrow \frac{4}{5}x$	
	Matatu $\rightarrow \frac{2}{3} \times \frac{1}{5}x = \frac{2}{15}x$	
	Walking $\rightarrow 1 - \left(\frac{4}{5} + \frac{2}{15}\right)$	
	$= \frac{1}{15}x$ ✓	
	$\frac{4}{5}x = \frac{1}{15}x + 55$ ✓	
	$\frac{11}{15}x = 55 \Rightarrow x = \frac{55 \times 15}{11}$	
	$= 75\text{km}$ ✓	
5	Amount in Ksh.	
	$5600 \times 77.43 = \text{Ksh. } 433,608$	M1
	Remainder after spending	
	$433608 - 201376 = \text{Ksh. } 232,232$	M1
	S.A. Rand $\frac{232232}{9.51} = 24\,419.80$ RAND.	A1

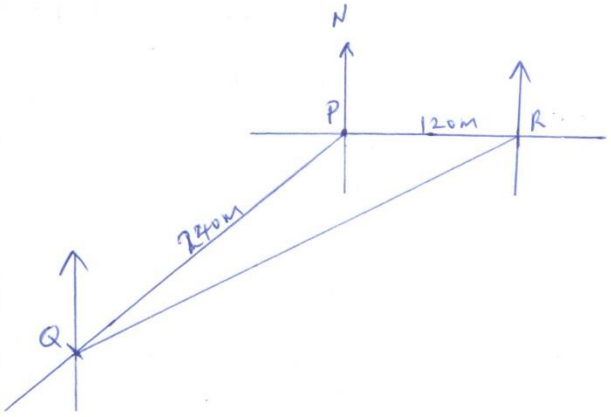
SN	WORKING.	
6.	$3x + (x-20) = 180^\circ$ $4x = 200$ $x = 50^\circ$ ✓	M1
	Exterior Angle $= 50 - 20^\circ$ $= 30^\circ$ ✓	M1
	No. of sides $= \frac{360^\circ}{30}$ $= 12$ sides ✓	A1
7.	$\frac{1}{15.79} = \frac{1}{1.579 \times 10}$ $= \frac{1}{1.579} \times \frac{1}{10}$ ✓ $= 0.6333 \times 0.1$ $= 0.06333$ ✓	M1 M1
	$(\text{Cos } 73.61)^2 = (0.2822)^2$ $= 0.0796$ ✓	M1
	$0.06333 - 0.0796 = -0.01627$ ✓	A1
8.	$(x + 20^\circ) + (2x + 25) = 90^\circ$ ✓ $3x + 45 = 90$ $3x = 45^\circ$ $x = 15^\circ$ ✓	M1 M1
	$\text{Tan } 15^\circ = 0.2679$ ✓	A1

SN	WORKING	
9.	$x(x+4) = 12$ $x^2 + 4x = 12.$ $x^2 + 4x - 12 = 0$ ✓	M1
	$x^2 + 6x - 2x - 12 = 0$ $x(x+6) - 2(x+6) = 0$ $(x-2)(x+6) = 0$ Either $x - 2 = 0 \Rightarrow x = 2$ OR $x + 6 = 0 \Rightarrow x = -6$ ✓	M1
	Width = 2M Length = 2+4 = 6M. ✓	A1
10.	V.s.f $= \frac{800g}{2700g}$ $= \frac{8}{27}$	M1
	L.s.f $= \sqrt[3]{\frac{8}{27}} = \frac{2}{3}$ A.s.f $= \left(\frac{2}{3}\right)^2 = \frac{4}{9}$	M1
	$\frac{4}{9} = \frac{120}{A} \Rightarrow A = 120 \times \frac{9}{4}$ $= 270cm^2$	A1
11.	$x^2 + 8x = -9$ $x^2 + 8x + (4)^2 = -9 + (4)^2$ $(x+4)^2 = 7$ $x + 4 = \sqrt{7}$ $x + 4 = \pm 2.65$ $x = -4 \pm 2.65$	
	Either $x = -4 + 2.65$ $= -1.35$ ✓ OR. $x = -4 - 2.65$ $= -6.65$ ✓	

SN	WORKING -	
12.	Numerator -	
	$\frac{3}{4} + \left(\frac{9}{7} \div \frac{3}{4} \times \frac{7}{3}\right)$	
	$\frac{3}{4} + \left(\frac{9}{7} \times 1\right) = \frac{3}{4} + \frac{9}{7}$	
	$= \frac{21+36}{28}$	
	$= \frac{57}{28}$ ✓	M1
	Denominator	
	$\frac{2}{3} \times \left(\frac{9}{7} - \frac{3}{8}\right) = \frac{2}{3} \times \left(\frac{72-21}{56}\right)$	
	$= \frac{2}{3} \times \frac{51}{56}$	
	$= \frac{17}{28}$ ✓	M1
	$\frac{57}{28} \times \frac{28}{17} = 3\frac{6}{17}$	A1
13	$9t^2 - 25a^2 = (3t+5a)(3t-5a)$ ✓	M1
	$6t^2 + 19at + 15a^2 = 6t^2 + 9at + 10at + 15a^2$	
	$= 3t(2t+3a) + 5a(2t+3a)$	
	$= (3t+5a)(2t+3a)$ ✓	M1
	$\frac{(3t+5a)(3t-5a)}{(3t+5a)(2t+3a)}$	
	$\frac{3t-5a}{2t+3a}$ ✓	A1

S/N	WORKING.	
14.	B.P = 300kg x ksh 30 = 9000/= ✓	M1
	Remainder = $300 \times \frac{80}{100}$ = 240kg ✓	
	S.P. = $9000 \times \frac{120}{100}$ = sh. 10,800 ✓	M1
	S.P. Per kg = $\frac{10\,800}{240}$ = sh. 45	A1
15.	$x - 8y - 2 = 0$ $x - 2 = 8y$ $\Rightarrow y = \frac{1}{8}x - \frac{1}{4}$ $\Rightarrow M = \frac{1}{8}$ $\frac{y-3}{x-2} = \frac{1}{8}$ $8y - 24 = x - 2$ $y = \frac{1}{8}x + \frac{22}{8}$	
16.	2 | 308 | 228 2 | 154 | 114 77 | 57 G.C.D = 2 x 2 = 4M	

17. (a)

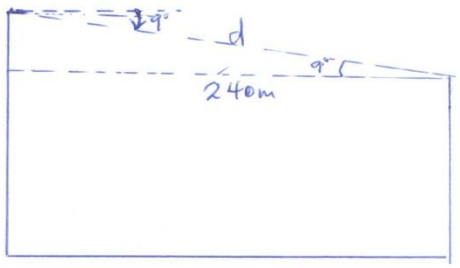


(b) (i) $RQ = 8.5\text{cm} \times 40\text{m}$ ✓

$= 340\text{ Km}$ ✓

(ii) Bearing $= 065°$ ✓

(c) (i)



$\cos 9° = \frac{240}{d}$ ✓

$d = \frac{240}{\cos 9°}$

$= 243\text{M}$ ✓

(ii) $\text{Speed} = \frac{\text{distance}}{\text{Time}}$

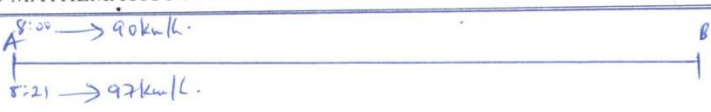
$= \frac{243\text{M}}{18\text{sec}}$

$= 13.5\text{m/s}$ ✓

$\frac{13.5 \times 60 \times 60}{1000}$

48.6Km/h ✓

18. (a)



Distance travelled by Tom for 21min

$D = S \times T$

$= 90\text{km/h} \times \frac{21}{60}\text{h}$ ✓

$= 31.5\text{km}$. ✓

Relative speed $= 97\text{km/h} - 90\text{km/h}$.

$= 7\text{km/h}$. ✓

Time taken by John to catch up.

$t = \frac{d}{s}$

$= \frac{31.5\text{km}}{7\text{km/h}} = 4\text{hrs } 30\text{min}$ ✓

8:21 a.m.
4:30
12:51 P.m ✓

(b) $d = s \times t$

$= 97\text{km/h} \times 4\frac{1}{2}\text{hrs}$ ✓

$= 436.5\text{km}$. ✓

(C) Distance travelled by Paul from B.

$D = s \times t$

$= 80\text{km/h} \times 2\frac{1}{2}\text{hrs}$

$= 200\text{km}$ ✓

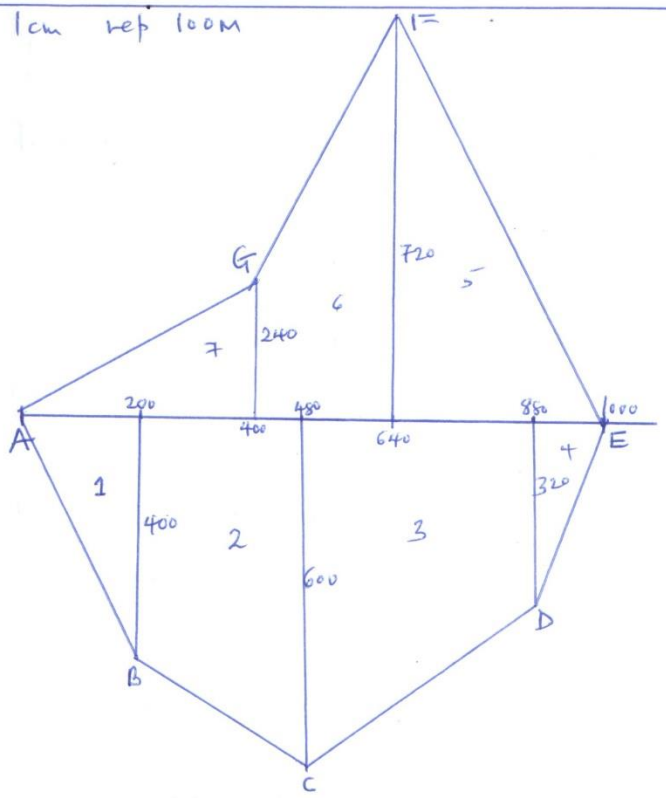
Distance travelled by Tom by 11:10 a.m

$D = 90\text{km/h} \times 3\frac{1}{6}\text{hrs}$.

$= 285\text{km}$. ✓

Distance AB $= 285 + 200 = 485\text{km}$ ✓

19. 1cm rep 100M



Area 1 $= \frac{1}{2} \times 400 \times 200 = 40\,000 m^2$

Area 2 $= \frac{1}{2} \times 280 \times (400 + 600) = 140{,}000$

Area 3 $= \frac{1}{2} \times 400 \times (600 + 320) = 184{,}000$

Area 4 $= \frac{1}{2} \times 120 \times 320 = 19\,200$

Area 5 $= \frac{1}{2} \times 360 \times 720 = 129{,}600$

Area 6 $= \frac{1}{2} \times 240 \times (240 + 720) = 115\,200$

Area 7 $= \frac{1}{2} \times 400 \times 240 = 48\,000$

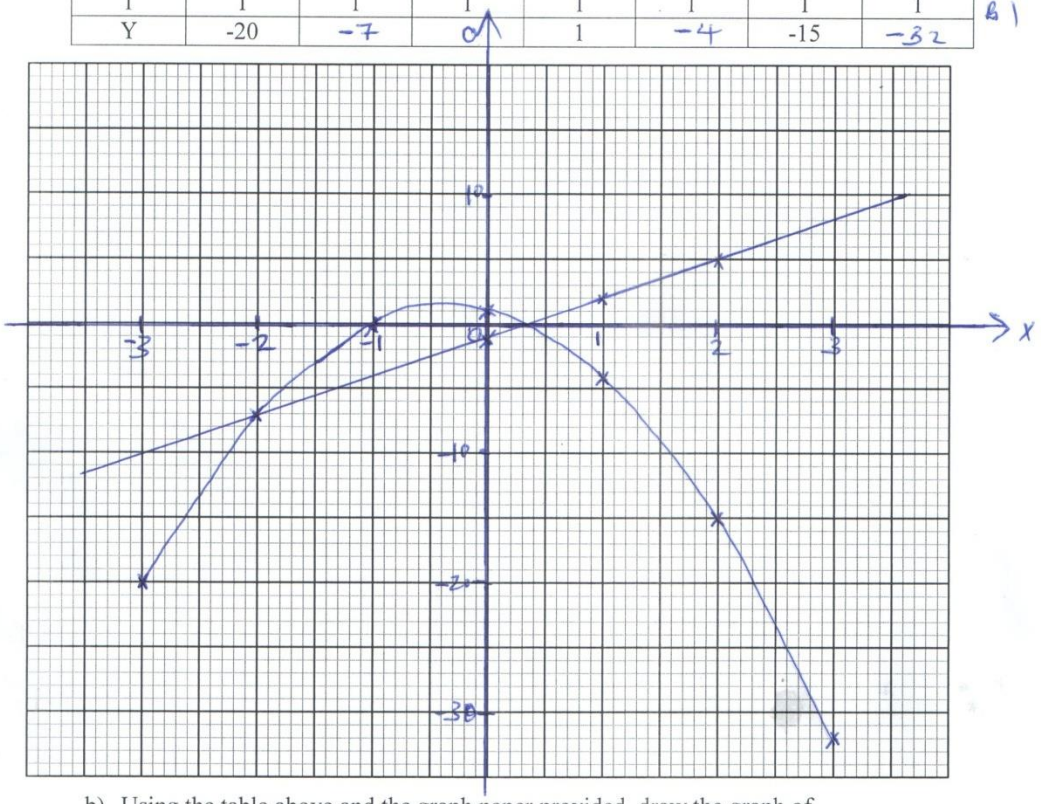
TOTAL $= 676\,000 m^2$

Area in ha $= \frac{676\,000}{10\,000} = 67.6$ ha.

20. Complete the table for the function $y = 1 - 2x - 3x^2$ in the range $-3 \leq x \leq 3$ (2mks)

X	-3	-2	-1	0	1	2	3
$-3x^2$	-27	-12	-3	0	-3	-12	-27
-2x	6	4	2	0	-2	-4	-6
1	1	1	1	1	1	1	1
Y	-20	-7	0	1	-4	-15	-32

B1 B1



b) Using the table above and the graph paper provided, draw the graph of $y = 1 - 2x - 3x^2$ (4mks)

c) Use the graph in (b) above to solve

i) $1 - 2x - 3x^2 = 0$ (2mks)

$x = -1$

or

$x = 0.3$

ii) $2 - 5x - 3x^2 = 0$ (2mks)

$y = 1 - 2x - 3x^2$

$0 = 2 - 5x - 3x^2$

$y = -1 + 3x$

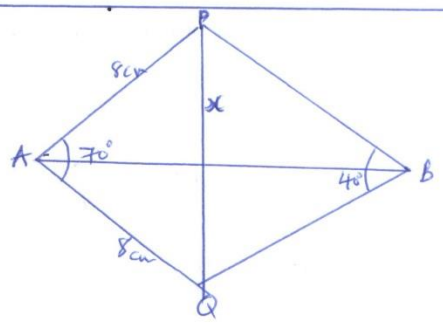
$y = 3x - 1$

$x = -2$

or

$x = 0.3$

21 (a)



$\sin 35^\circ = \frac{x}{8}$ M1

$\Rightarrow x = 8\sin 35^\circ$ ✓

$= 4.59\text{cm}$. A1

$PQ = 2 \times 4.59$

$= 9.18\text{cm}$ ✓

(b) $\sin 20^\circ = \frac{4.59}{PB}$ ✓ M1

$\Rightarrow PB = \frac{4.59}{\sin 20^\circ} = 13.42\text{cm}$. ✓ A1

(c) Area of Segment $= \left(\frac{70}{360} \times \frac{22}{7} \times 8^2\right) - \left(\frac{1}{2} \times 8^2 \times \sin 70^\circ\right)$ M1

$= 39.1 - 30.1\text{cm}$

$= 9\text{cm}^2$ A1

Area of segment 2 $= \left(\frac{40}{360} \times \frac{22}{7} \times 13.42^2\right) - \left(\frac{1}{2} \times 13.42^2 \times \sin 40^\circ\right)$ M1

$= 62.89 - 57.88$.

$= 5.01\text{cm}^2$. A1

Area of APBQ $= \left(\frac{1}{2} \times 8^2 \times \sin 70^\circ\right) + \left(\frac{1}{2} \times 13.42^2 \times \sin 40^\circ\right)$

$= 30.1 + 57.88$

$= 87.98\text{cm}^2$ ✓ A1

Area of shaded R $= 87.98 - (9 + 5.01)$

$= 73.97\text{cm}^2$ A1

22. (a) Area of R $= \frac{1}{2} \times 5 \times 3$ ✓

$= 7.5$ square units ✓

(b) (i) Equation of L_1

$y = 0$ ✓

Inequality $y > 0$ ✓

(ii) Equation of L_2 (6,0) and (0,5)

$M = \frac{5-0}{0-6} = -\frac{5}{6}$ ✓ M1

$\frac{y-5}{x-0} = \frac{5}{6}$

$6y - 30 = 5x$

$5x + 6y = 30$ ✓ M1

$5x + 6y \leq 30$ ✓ A1

(ii) Equation of L_3. (3,0) and (0,5)

$M = \frac{5-0}{0-3} = -\frac{5}{3}$ ✓ M1

$\frac{y-5}{x-0} = -\frac{5}{3}$ ✓ M1

$3y - 15 = -5x$

$5x + 3y = 15$

$5x + 3y \geq 15$ ✓ A1

23 (a) $\frac{40}{100} \times 1,350,000 = \text{sh. } 540,000$

(b) Bela : Joan : Trinity $= 112,000 : 128,000 : 210,000$

$= 56 : 64 : 105$

Amount shared Equally $= \frac{30}{100} \times 1,350,000 = 405,000$

sh. 135,000 Each. Partner.

Trinity's share $= 135000 + \left(\frac{105}{225} \times 405000\right)$

$= 135000 + 189000$

$= \text{sh. } 324,000$ ✓

Bela $= 135000 + \left(\frac{56}{225} \times 405,000\right)$

$= 135000 + 100800$

$= \text{sh. } 235800$ ✓

Difference $= 324000 - 235800 = \text{sh. } 88,200$ ✓

(c) Joan's share $= 135000 + \left(\frac{64}{225} \times 405000\right)$

$= 135000 + 115,200$

$= \text{sh. } 250,200$ ✓

% of the total Amount $= \frac{250200}{810,000} \times 100\%$

$= 30.8\%$

24.

(a) $PRQ = 90^\circ - 30^\circ$

$= 60^\circ$

(b) $RPQ = 90^\circ - 60^\circ$

$= 30^\circ$

(c) $SOR = 2RPS$

$= 2 \times 35^\circ$

$= 70^\circ$

55

(d) $RTQ = 180 - 90 - 30$

$= 60^\circ$

(e) $PRS = 90 - 35$

$= 55^\circ$ ✓

$PVS = 180 - 55$

$= 125^\circ$ ✓