MARKING GUIDE FOR PEAS
MOCK EXAMINATIONS

456/2 MATHEMATICS PAPER 2.

SET ONE

	SOLUTION	MARKS	COMMENTS
1.	2 | 252 | 294 | 546 3 | 126 | 147 | 273 7 | 42 | 49 | 91 6 | 7 | 13	M1 M1	for first column all correct. for all other columns correct
	H.C.F. = $2 \times 3 \times 7$ $= 42$	M1 A1	
		04	
2.	$n(\varepsilon) = 53$ $n(F) = 39$, $n(V) = 27$ $39-x$, x, $27-x$, 0	B2	B_2 for all regions correct B_1 for 2-3 regions correct
	$39-x+x+27-x = 53$ $66-x = 53$ $-x = -13$ $x = 13$	M1 A1	
		04	
3.	let $y = \frac{3x-5}{7}$ $7y = 3x-5$ $7y+5 = 3x$ $\frac{7y+5}{3} = x$		
	$\therefore f^{-1}(x) = \frac{7x+5}{3}$	B_2	
	$f^{-1}(4) = \frac{(7\times4)+5}{3} = \frac{33}{3}$ $= 11$	M1 A1	
		04	
4.	Gradient of AB = $2-(-3)$	M1	accept $\frac{-3-2}{}$

	MARK	
$\therefore 2 = \left(\frac{5}{2} \times -6\right) + c$ or equiv.	M1✓	M1✓ for his $\left(\frac{5}{2}\right)$
$2 = -15 + c$		
$17 = c$		
$\therefore$ equation is $y = \frac{5}{2}x + 17$	A1	accept $2y = 5x + 34$.
OR:		
$\frac{y-2}{x-(-6)} = \frac{5}{2}$ or equiv.	M1✓	M1✓
$y - 2 = \frac{5}{2}(x+6)$		
$y - 2 = \frac{5}{2}x + 15$		
$y = \frac{5}{2}x + 17$	A1	accept $2y = 5x + 34$
	04	

5. Surface area of box is

	M1	for $(2 \times 4 \times 0.5)$
$(2 \times 4 \times 0.5) + (2 \times 2 \times 0.5) + (2 \times 4 \times 2)$	M1	for $(2 \times 2 \times 0.5)$
	M1	for $(2 \times 4 \times 2)$
$4 + 2 + 16$		
$= 22\,m^2$	A1	
	04	

6. $\underset{\sim}{p} = 3\begin{pmatrix}13\\8\end{pmatrix} - 2\begin{pmatrix}4\\-6\end{pmatrix}$ M1

$= \begin{pmatrix}39\\24\end{pmatrix} - \begin{pmatrix}8\\-12\end{pmatrix}$

$= \begin{pmatrix}27\\36\end{pmatrix}$ A1

$|\underset{\sim}{p}| = |\sqrt{27^2 + 36^2}|$ M1✓ M1✓ for his $\begin{pmatrix}27\\36\end{pmatrix}$.

		MARKS	
7.	$\log_{10}\left(\frac{7}{56}\times 800\right)$	M1	
	$\log_{10}\left(\frac{5600}{56}\right)$	M1	
	$\log_{10} 100$	A1	
	$\log_{10} 10^2 = 2\log_{10} 10$		
	$= 2$	A1	
		04	
8.	$A = P(1+r)^n$		Alt.; $I = PRT$
	$A = 500,000\left(1+\frac{18}{100}\right)^2$	M1	1st year, $\frac{500000\times 18\times 1}{100}$
	$A = 500,000\times(1.18)^2$		$= 90,000 \mid =$
	$A = 500,000\times 1.3924$		2nd year,
	$A = 696,200 \mid =$	A1	$\frac{590,000\times 18\times 1}{100}$
	$I = A - P$	M1A1	$I = 106,200 \mid =$
	$= 696,200 - 500,000$		$I = 90,000 + 106,200$
	$= 196,200 \mid =$	A1	$= 196,200 \mid =$
		04	
9.	$L.S.F. = \frac{H}{h} = \frac{18}{6}$		
	$L.S.F. = 3$	B1	for 3 seen.
	$V.S.F. = (L.S.F.)^3$		
	$= 3^3$		
	$= 27$	B1	for 27 seen.
	$V.S.F. = \frac{V_{Big}}{V_{small}}$		
	$\therefore V_{Big} = 50\times 27$	M1	
	$= 1350$	A1	

	MARKS	
$x = 540,000$	A1	
b) Angle representing transport $t + 152° + 95° + 70° = 360°$ $t = 360° - 317°$ $t = 43°$		
$\frac{43}{360} \times 540,000$	M1√	M1√ for his (540,000)
$= \text{shs. } 64,500$	A1	
	04	

11. a) $10x = 24.666...$
$-x = 2.466...$ } or equiv. B1

$9x = 22.2$ M1 for correct subtraction

$\frac{9x}{9} = \frac{22.2}{9}$

$x = \frac{22.2}{9} \times \frac{10}{10}$

$x = \frac{222}{90}$ A1

$x = \frac{37}{15}$. A1

b) $\frac{6\sqrt{7}}{(\sqrt{7}-\sqrt{5})} \frac{(\sqrt{7}+\sqrt{5})}{(\sqrt{7}+\sqrt{5})}$ M1

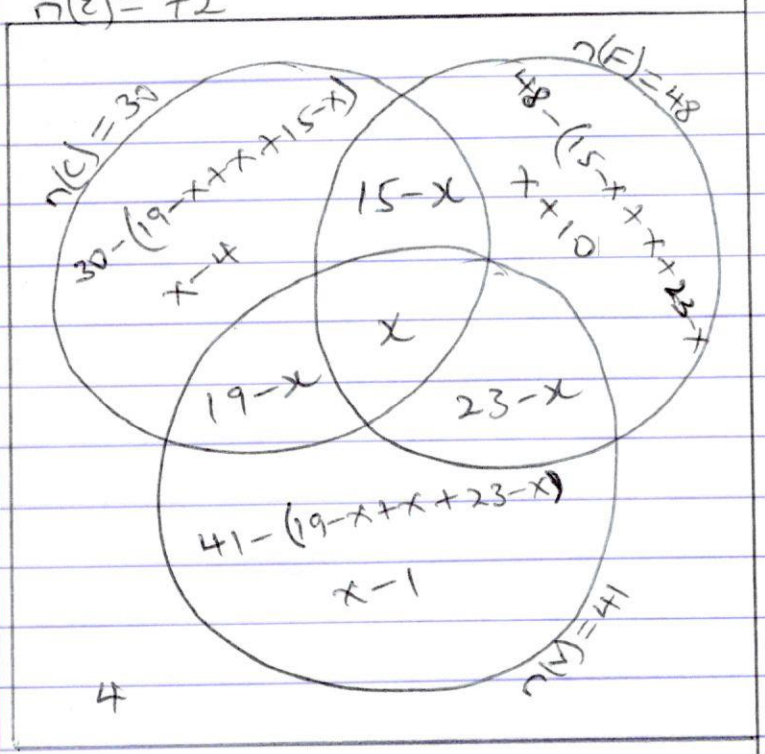
$\frac{(6 \times 7) + 6\sqrt{35}}{(\sqrt{7})^2 - (\sqrt{5})^2}$

$\frac{42 + 6\sqrt{35}}{7 - 5}$ M1

$\frac{42 + 6\sqrt{35}}{2}$

c)	$m = \frac{b^2 + 3ut}{b}$		
	$mb = b^2 + 3ut$	M1	for multiplying through by b.
	$mb - b^2 = 3ut$	M1	for collecting like terms.
	$\frac{mb - b^2}{3t} = \frac{3ut}{3t}$	M1	for dividing thru by 3t.
	$u = \frac{mb - b^2}{3t}$	A1	
		12	

12.



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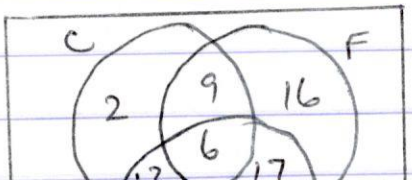
		B8	B1 for each correct region.
(i)	$30 + x + 10 + 23 - x + x - 1 + 4 = 72$	M1	or equivalent
	$66 + x = 72$		
	$x = 6$	A1	

(c)



	MARK	
13. a) $x^2+8x-65$		
$x^2+8x+16-16-65$	M1	
$x^2+8x+16-81$		
$(x+4)^2-81$	A1	
solving for $x^2+8x-65=0$		
$\therefore (x+4)^2-81=0$	M1	
$(x+4)^2=81$	M1	
$x+4=\pm 9$	M1	
$x=-4\pm 9$		
$x=-13$ or $x=+5$	A1	for both values of x correct
(b) $f(x)=\frac{x+5}{2}$, $g(x)=\frac{1-3x}{3}$		
$fg(x)=f[g(x)]=f\left(\frac{1-3x}{3}\right)$		
$=\frac{\frac{1-3x}{3}+5}{2}$		
$=\frac{1-3x+15}{6}=\frac{16-3x}{6}$	M1	for obtaining $fg(x)$
$\frac{16-3x}{6}=\frac{x^2+2x-20}{6}$	M1	for equating the two equations.
$16-3x=x^2+2x-20$		
$x^2+5x-36=0$	M1	
$x^2+9x-4x-36=0$		
$x(x+9)-4(x+9)=0$		
$(x-4)(x+9)=0$ or equiv.	M1	
$x-4=0$ or $x+9=0$		
$x=4$ $\quad x=-9$	A1, A1	A1 for each value of x.

MARKS

$\overrightarrow{AD} = \overrightarrow{AB} + \overrightarrow{BD}$

$= \underset{\sim}{c} + \frac{1}{2}\overrightarrow{BC}$

$= \underset{\sim}{c} + \frac{1}{2}(\underset{\sim}{b} - \underset{\sim}{c})$ M1

$= \underset{\sim}{c} + \frac{1}{2}\underset{\sim}{b} - \frac{1}{2}\underset{\sim}{c}$

$= \frac{1}{2}\underset{\sim}{b} + \frac{1}{2}\underset{\sim}{c}$ or $\frac{1}{2}(\underset{\sim}{b} + \underset{\sim}{c})$ A1

(ii) $\overrightarrow{AE} = \frac{2}{3}\overrightarrow{AD}$, $\overrightarrow{ED} = \frac{1}{3}\overrightarrow{AD}$

$\overrightarrow{BE} = \overrightarrow{BA} + \overrightarrow{AE}$

$= -\underset{\sim}{c} + \frac{2}{3}\overrightarrow{AD}$

$= -\underset{\sim}{c} + \frac{2}{3}(\frac{1}{2}\underset{\sim}{b} + \frac{1}{2}\underset{\sim}{c})$ M1

$= -\underset{\sim}{c} + \frac{1}{3}\underset{\sim}{b} + \frac{1}{3}\underset{\sim}{c}$

$= \frac{1}{3}\underset{\sim}{b} + -\frac{2}{3}\underset{\sim}{c}$ or $\frac{1}{3}(\underset{\sim}{b} - 2\underset{\sim}{c})$ A1

(iii) $\overrightarrow{BF} = \overrightarrow{BA} + \overrightarrow{AF}$ M1

$= -\underset{\sim}{c} + \frac{1}{2}\underset{\sim}{b}$ or $\frac{1}{2}(\underset{\sim}{b} - 2\underset{\sim}{c})$ A1

(b) $\overrightarrow{BE} : \overrightarrow{BF}$

$\frac{1}{3}\underset{\sim}{b} - \frac{2}{3}\underset{\sim}{c} : \frac{1}{2}\underset{\sim}{b} - \underset{\sim}{c}$ or equiv. M1

$\frac{1}{3}(\underset{\sim}{b} - 2\underset{\sim}{c}) : \frac{1}{2}(\underset{\sim}{b} - 2\underset{\sim}{c})$

$2(\underset{\sim}{b} - 2\underset{\sim}{c}) : 3(\underset{\sim}{b} - 2\underset{\sim}{c})$ or equiv. M1

	MARK	
15. a) Correct labelling of both axes.	B1	
Correct scales used on both axes.	M1	
Correct line drawn for journey of the car.	M1A1	
Correct line drawn for journey of the YY coach	M1A1	
(b) (i) coach overtakes the car at 9:20 a.m ± 4mins	A1	(9:16 to 9:24) a.m.
(ii) Distance from Kampala at which YY coach overtakes car is 200 km ± 4 km	A1	(196 to 204) km
(iii) Time when YY coach arrives in Soroti is 10:44 am ± 4min	A1	(10:40 to 10:48) a.m.
(iv) Time when car arrives in Soroti is 11:40 p.m. ± 4min	A1	(11:36 to 11:44) p.m.
(v) Time taken by the YY coach driver to wait for driver of car is		
11:40 − 10:44	M1	
= 56 mins ± 8 min	A1	(48 min to 64 min)
	12	

OR:

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(To be fastened together with other answers to paper)

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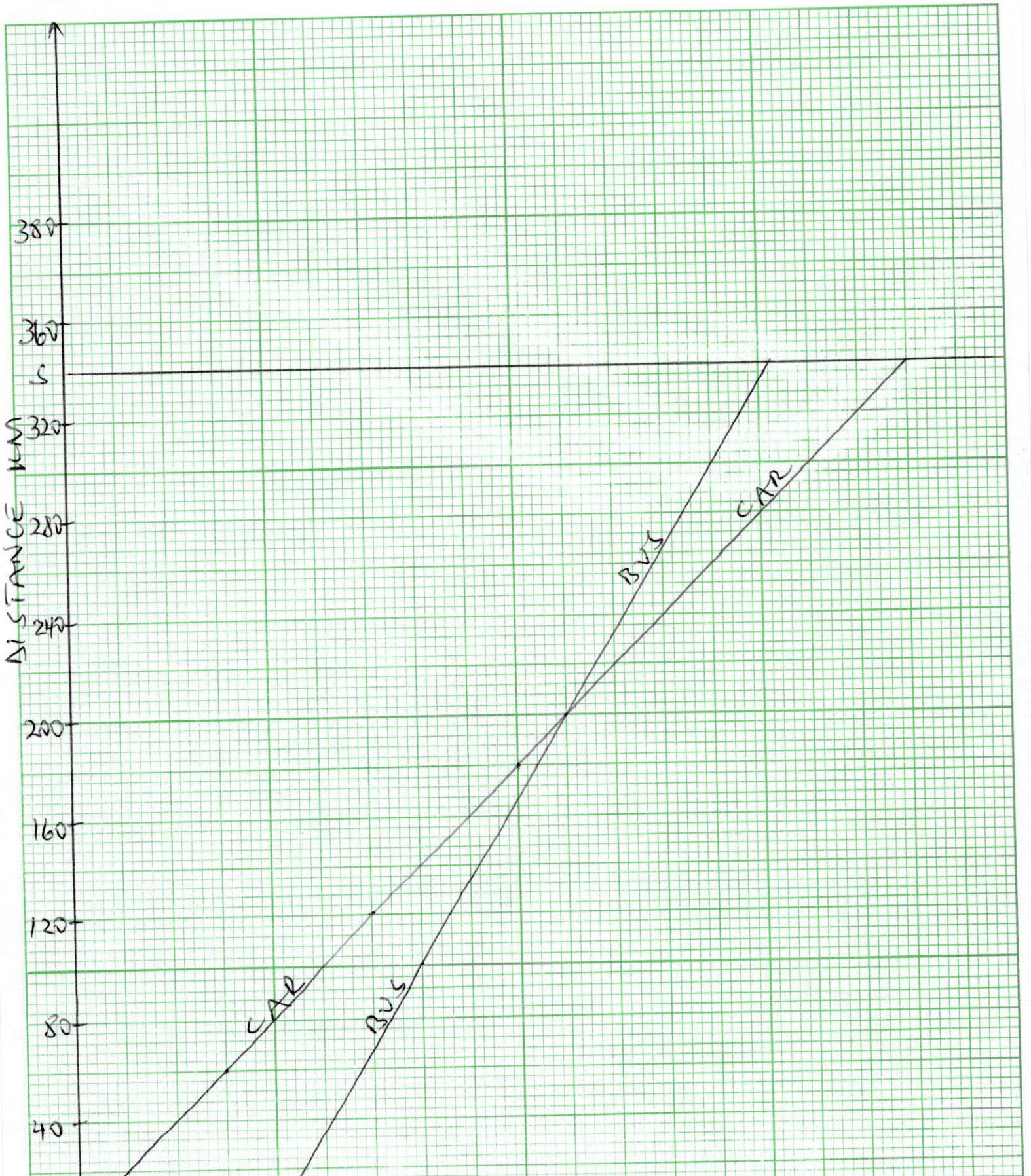
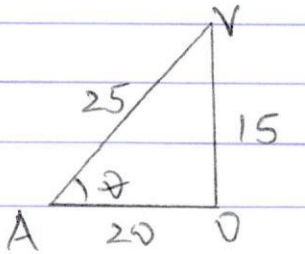
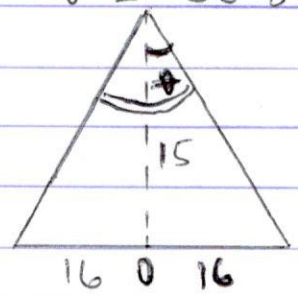
Signature .....



	MARK	
$\overline{OC} = \frac{1}{2} \times 40 = 20$ cm	B1	B1 for 20 seen.
$\overline{OV} = \sqrt{25^2 - 20^2}$	M1	
$\overline{OV} = \sqrt{625 - 400}$		
$\overline{OV} = \sqrt{225}$		
$\overline{OV} = 15$ cm	A1	
(b) Volume $= \frac{1}{3} \times$ base area $\times$ height		
$= \frac{1}{3} \times 32 \times 24 \times 15$	M1	
$= 3840$ cm^3	A1	
(c) 		
$\tan\theta = \frac{15}{20}$ or equiv.	M1	$\sin\theta = \frac{15}{25}$, $\cos\theta = \frac{20}{25}$
$\tan\theta = 0.75$		
$\theta = 36.87°$	A1	Accept 36.9°
(d) 		
$\tan\theta = \frac{16}{15}$	M1	
$\theta = \tan^{-1}(1.0667)$		
$\theta = 46.85°$	A1	Accept 46.8°

	MARK	
17. (a) Taxable income is		
shs. 890,000 − 130,000	M1	
= shs. 760,000	A1	
(b) First sh. 50,000		760,000
Tax = $\frac{9.5}{100} \times 50,000$ = sh. 4,750	M1	− 50,000
Next sh. 50,000		710,000
Tax = $\frac{16.5}{100} \times 50,000$ = sh. 8,250	M1	− 50,000
Next sh. 100,000		660,000
Tax = $\frac{20}{100} \times 100,000$ = sh. 20,000	M1	− 100,000
Next sh. 200,000		560,000
Tax = $\frac{25}{100} \times 200,000$ = sh. 50,000	M1	− 200,000
Next sh. 360,000 or above 400,000	B1	360,000
Tax = $\frac{30}{100} \times 360,000$ = sh. 108,000	M1	
Monthly income tax paid is		
4,750 + 8,250 + 20,000 + 50,000 + 108,000	M1	
= shs. 191,000	A1	
(c) % = $\frac{191,000}{890,000} \times 100$	M1	
= 21.46%	A1	Accept 21.5%
	12	