



## K.C.S.E 1995 MATHEMATICS PAPER 121/2 MARKING SCHEME

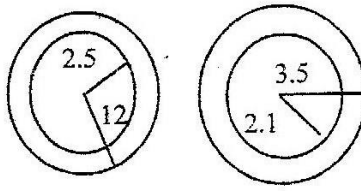
SOLUTION	MARKS	ALTERNATIVE METHOD
<p>1. <math>x \log x</math></p> $(0.7284)^2 \cdot 2.8623 \times 2 = 3.7246$ $3\sqrt[3]{0.06/195} \cdot 2.7921 + 34 = 1.5974$ $\Rightarrow \underline{\underline{2.1272}}$ $\Rightarrow 0x = 0.01341$	ml M1  ml A1 4 marks	Apply Mt - 2 if a candidate was square root All two logs Multiplication & division of his log Subtraction of logs Alternative Accept standard form
<p>2. <math>y = 2x - 3</math></p> $x^2 - x(2x - 3) = -4$ $(x+1)(x-4) = 0$ $= x = -1 \text{ or } x = 4$ <p>and <math>y = -5</math> or <math>y = 5</math></p>	ml ml ml  A1	Equation in one unknown Correct simplification and equation Factorization of this equation  Substitution in the formula
<p>3. <math>(65 + 50 + 50) : 3</math>  <math>(50 + 50 + 45) : 3, (50 + 45 + 45) : 3</math>  <math>(45 + 45 + 45) : 3, (45 + 45 + 40) \text{ and } \}</math>  <math>(45 + 40 + 40) : 3</math>                      moving av 55, 48, 47, 45, 43, 42</p>	ml  ml  A1 3 marks	
<p>4. x- section area = <math>\frac{1}{2} \times 3 \times 3 \sin 60^\circ</math></p> $\frac{1 \times 3 \times 3 \times 0.8660}{2}$ <p>Volume = <math>\frac{1}{2} \times 3 \times 3 \times 0.866 \times 0.25</math></p> $= 97.43(97.425)$	ml  ml  A1 3 marks	or $45(45 - 3)(45 - 3)(45 - 3)$ $3.875 \times 25$
<p>5. <math>7^{2(x-1)} + 7^{2x} = 350</math></p> $49 \times 7^{2x} + 7^{2x} = 350$ $50 \times 7^{2x} = 350$ $7^{2x} = 7$ $= 2x = 1$ $x = \frac{1}{2}$	ml  ml  ml A1 4 marks	$49 \times 1 + 49x = 350$ $49 \times 49x + 49x = 350$ $50 \times 49x = 350$ $49x = 7$ $49x = 49^{1/2}$  if logs used follow through
<p>6. <math>\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -1 \\ 2 \end{pmatrix} + \begin{pmatrix} 1 \\ 2 \end{pmatrix} = \begin{pmatrix} -2 \\ 0 \end{pmatrix}</math></p> $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -3 \\ 3 \end{pmatrix} + \begin{pmatrix} -2 \\ 0 \end{pmatrix} = \begin{pmatrix} -1 \\ -3 \end{pmatrix}$ <p><math>= (x^1 y^1) = (-1, -3)</math></p>	B1  B1 2 marks	Allow for sketch of the translation vector  Do not accept final answer in vector form
<p>7. V.S.F. = <math>3^3 : 5^3 = 27.125</math></p> <p>Vol of larger tank = <math>\frac{8.1 \times 125}{27}</math></p> $37.5 \text{ m}^3$	ml ml  A1 3 marks	Revision K.C.S.E Maths 1995-2005



SOLUTION	MARKS	ALTERNATIVE METHOD
8. $\frac{3x^2 - 1 - (2x + 1)(x - 1)}{x^2 - 1}$  $= \frac{x^2 + x}{x^2 - 1}$ $= \frac{x(x + 1)}{(x - 1)(x + 1)} = \frac{x}{x - 1}$	ml ml  A1 3 marks	Correct expression under one denominator
9. $\sin \theta = \frac{9}{27} = 0.333$ $\Rightarrow \theta = 19^\circ 28' (19.47^\circ)$ $= 19^\circ 28' + 90$ $= 109^\circ 28' (109.47^\circ)$	ml ml  A1 3 marks	$\cos x = 0.333$ $= 70^\circ 32' (70.53^\circ)$ $180 - 70^\circ 32'$
10. $ar = 16, ar^4 = 2$ $\frac{ar}{ar^4} = \frac{2}{16} \Rightarrow r^3 = \frac{1}{8}$ $\Rightarrow r = 1/2$ and $a = 32$	ml A1 A1 3 marks	or $16 r^4 = 2$ $\frac{16}{r}$ Cao
11. $\angle PCB = 40^\circ$ or $\angle DCQ = 40^\circ$ or $\angle BCD = 140^\circ$ $\therefore \angle BAD = 40^\circ$	B1 B1 2 marks	Allow B1B1 for $\angle PCQ = 140^\circ$ $= \angle BAD = 40^\circ$
12. $BA = 3i + 4j - (8i - j) = -5i + 5j$  $CA = \frac{3}{5}(-5i + 5j) = -3i + 3j$  $DC = 2(-8i + j) = -16i + 2j$ $DA = 2(-8i + j) + (-3i + 3j)$ $= -19i + 5j$	ml  ml  ml  A1 4 marks	or equivalent $BA = a - ab$ $CA = \frac{3}{5}(a - b)$ $DA = -2b + \frac{3}{5}a - \frac{3}{5}b$ $BA = a - b$ $CA = \frac{3}{5}(a - b) = \frac{3}{5}a - \frac{3}{5}b$ $DC = -2b$ $DA = -2b + \frac{2}{5}a - \frac{3}{5}b$ ml $= \frac{12}{5}b + \frac{3}{5}a$ ml $= \frac{12}{5}(8i - j) + \frac{12}{5}(3i + 4j)$ ml $= -19i + 5j$ A1
13. $\log(x^3 \times 5x) = \log\left(\frac{2^5 \div 2}{5}\right)$  $x^4 \times 5x = \frac{2^5 \div 2}{5}$ $5x^4 - 80 \Rightarrow x^4 = 16$ $\Rightarrow x = 2$	ml  ml  A1 3 marks	$3 \log x \times \log 5x = 5 \log 2 \log 2$ $4 \log 5$ ml $4 \log x - 4 \log 2$ ml $x = 2$ ml

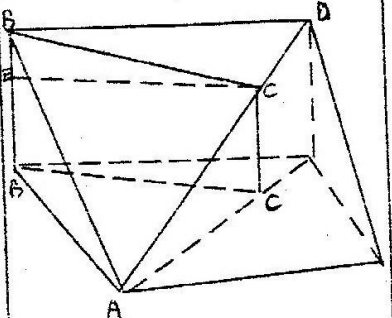
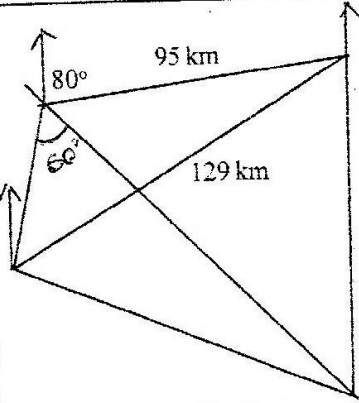




SOLUTION		MARKS ALTERNATIVE METHOD																					
14. $\frac{4}{3} \times \frac{22}{7} \times r^3 = \frac{22}{7} \times 11^2 \times 50$ $r^3 = \frac{121 \times 50 \times 3}{4}$ $r = \sqrt[3]{4537.5} = 16.56$	ml A1 2 marks	Substitutions and equating																					
15. $500 = 16a = b/6 \Rightarrow 500 = 16a + 4b$ $800 = 25a + b, 25 \Rightarrow 800 = 25a + 5b$ $2500 - 80a + 20b$ $3200 - 100a + 20b$ $700 = 20a$ $= a = 35$ and $b = -15$ $= p = 35L - 15/L$	B1 B1 ml A1 B1 5 marks	Attempt to eliminate one variable from variation Must come from correct variations Given if A0 lost but ml must be correct.																					
16. Area = $2(8 + 6.5 + 5.6 + 6 + 6.4 + 4.7)$ $= 2(8+6.5 + 5.6 + 6 + 6.4 + 4.7) \times 25$ $= 2 \times 37.2 \times 25 \times 100$ or equivalent $= 186000$ ha	ml ml A1 4 marks	At least 4 reading within 10.1 For conversion to Km <sup>2</sup> or km to hectares																					
17. a) Area of path = $\frac{22 \times 49^2}{7} - \frac{22 \times 35^2}{7}$ $= 3696m^2$ Area of slab = $\frac{22 \times 352 - 4 \times 4 \times 3}{7} = 3850 - 48 = 3802m^2$ Total cost = $3696 \times 300 + 3850 \times 400$ $= 2629600$ Amount not spent $\frac{20}{100} \times \frac{115}{100} \times 2629600$ $= 604808$ b) Actual expenditure $= \frac{80}{100} \times \frac{115}{100} \times 2629100 = 2419232$	ml A1 ml ml A1 B1 8 marks	 cao must not loose any of A above																					
18. <table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td>UCL</td> <td>19.5</td> <td>39.5</td> <td>59.5</td> <td>79.5</td> <td>99.5</td> <td>119.5</td> <td>139.5</td> <td>159.5</td> <td>179.5</td> </tr> <tr> <td>cf</td> <td>9</td> <td>28</td> <td>50</td> <td>68</td> <td>8</td> <td>92</td> <td>97</td> <td>99</td> <td>100</td> </tr> </table> a) Cumulative frequency Linear scale Plotting Smoothing & complete of CF curve b) (i) Upper quartile = 90 Lower quartile = 36 Range = 90 - 36 = 54 (ii) No. of days = 100 - 93 = 7	UCL	19.5	39.5	59.5	79.5	99.5	119.5	139.5	159.5	179.5	cf	9	28	50	68	8	92	97	99	100	B1 S1 P1 C1 B1 B1 B1 B1 8 marks	For cf all Must accommodate all date Reading within 1sq Must identify both quarterly Reading within 1 sq must be a CT curve	
UCL	19.5	39.5	59.5	79.5	99.5	119.5	139.5	159.5	179.5														
cf	9	28	50	68	8	92	97	99	100														
19. P (both alive) = $0.7 \times 0.9 = 0.63$ P (neither alive) = $0.3 \times 0.1 = 0.03$ P (one alive) = $0.7 \times 0.1 + 0.9 \times 0.3 = 0.34$ P (at least one alive) = $0.7 \times 0.1 + 0.9 \times 0.3 + 0.7 \times 0.9$ $= 0.7 \times 0.1 + 0.9 \times 0.3 + 0.7 \times 0.9$ $= 0.07 + 0.27 + 0.63$	ml A1 ml A1 ml A1 ml ml A1 8 marks	or equivalent $1 - 0.08 = 0.92$ can be 1 p (neither Revision K.C.S.E Maths 1995-2005																					





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<p>20. (a) <math>BB^1 = 800 \sin 30^\circ</math>  <math>= 800 \times 0.5</math>  <math>= 400</math></p> <p>(b) (i) <math>AD = \frac{800}{\cos 60} = \frac{800}{0.5}</math>  <math>\therefore AC = \frac{3}{4} AD = \frac{3}{4} \times \frac{800}{0.5}</math>  <math>= 1200 \text{ m}</math></p> <p>(ii) <math>CB^2 = 800^2 + 1200^2 - 2 \times 800 \times 1200 \cos 60^\circ</math>  <math>= 800^2 + 1200^2 - 2 \times 800 \times 1200 \times 0.5</math>  <math>= 640000 + 1440000 - 960000</math>  <math>\therefore CB = \sqrt{1120000} = 1058</math></p> <p>(iii) <math>\frac{3}{4} BB = EB1 = \frac{3}{4} \times 400 = 300</math>  <math>\therefore \sin \theta = \frac{400 - 300}{1058} = 0.945</math>  <math>\Rightarrow \theta = 5^\circ 25' (5.42^\circ)</math></p>	<p>m1 A1</p> <p>m1 A1</p> <p>m1 A1</p> <p>8 marks</p>	
<p>21. <math>\triangle ABD</math> constructed  <math>\triangle ABP</math> constructed          (i) <math>AD = 4.5 + 0.1 \text{ CM}</math>          Distance A to D = <math>4.5 \times 10 = 45 \text{ km}</math>          (ii) Bearing D from B = <math>241 + 1</math>          (iii) Bearing P from D = <math>123 + 2</math>          (iv) <math>DP = 12.9 + 0.2 \text{ CM}</math>          Distance D to P = <math>12.9 \times 10 = 129 \text{ km}</math></p>	<p>B1 B1 B1 B1 B1 B1 B1 B1 B1</p> <p>8 marks</p>	
<p>22. <math>\angle ABC = 105^\circ</math> or <math>\angle BAD = 75^\circ</math>          complete // gram constructed          const. of locl : <math>AP &lt; 6 \text{ cm}</math>          Area // gram = <math>7 \times 10 \sin 105^\circ</math>  <math>= 7 \times 10 \times 0.9659</math>  <math>= 67.61 \text{ cm}^2</math></p> <p>Total area of sectors  <math>\frac{75 \times \frac{22}{7} \times 42 + 105 \times \frac{22}{7} \times 6^2}{360}</math>  <math>= 10.48 + 33 = 43.48</math></p> <p>Required area = <math>67.61 - 43.48</math>  <math>= 24.13</math></p>	<p>B1 B1 B1</p> <p>m1</p> <p>m1 A1</p> <p>8 marks</p>	<p>Construction marks must be seen  <math>AB = 10 + 0.1 \text{ cm}</math> &amp; <math>BC = 7 + 0.1 \text{ cm}</math>          Must be drawn inside his // gram          or <math>10 \times 6.7 + 0.1</math> (from height measured) = 67</p> 