FORM FOUR CLUSTERKCSE MODEL 6

MATHEMATICS PAPER 1 ANSWERS

SECTION 1 (50 Marks)

ANSWER ALL QUESTIONS

1	$\frac{11}{5}+\frac{2}{3}\times\frac{15}{4}-\frac{25}{6}$ $=\frac{66+75-125}{30}=\frac{16}{30}$ $=\frac{5}{4}-\frac{9}{4}+\frac{15}{4}=\frac{16}{5}$ $=\frac{16}{30}\times\frac{5}{16}=\frac{1}{6}$	M1 M1 A1	

$2y=-3x+11$ $y=\frac{-3}{2}x+\frac{11}{2}$ $M_1=\frac{-3}{2}$ $M_2=\frac{2}{3}$ $\frac{x+4}{x+3}=\frac{2}{3}$ $3y+12=2x+6$ $.3y=24-6$ $\therefore x$ int *ercept* $3(0)=2x-6$ $2x=6$ $x=3 \quad : A(3,0)$ Y intercept, 3 y=0-6 y= -2 B(0, -2) $\lvert AB \rvert=\sqrt{(0-3)^2+(-2,-0)^2}$ $=\sqrt{9+4}=\sqrt{13}=6.606$	B1 B1 B1

Solve the inequalities:

$x-5 \leq 3x-8$

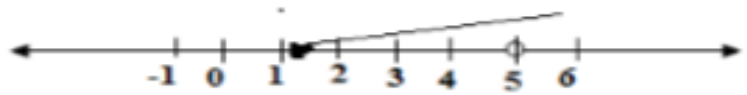
$-2x \leq -3$

$x \geq \frac{3}{2}$

$3x-8 < 2x-3$

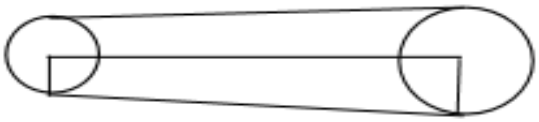
$x < 5$

Number line



$\begin{pmatrix}3\\1\end{pmatrix}+\vec{1}=\begin{pmatrix}8\\-1\end{pmatrix}$ $T=\begin{pmatrix}5\\-1\end{pmatrix}$	B1

$\begin{pmatrix}-2\\7\end{pmatrix}+\begin{pmatrix}5\\-2\end{pmatrix}=\begin{pmatrix}3\\5\end{pmatrix}$ $A^1\ (3,5)$	M1 A1



Length of tangent $= 2\times\sqrt{18^2\times 3^2}$	
$=2\times\sqrt{315}=35.5$	M1
$\frac{3}{18}=\cos\theta$	
$\theta = 80.41^0$	
$\frac{160.82}{360}\times 2\times\frac{22}{7}\times 6=16.85$	
$\frac{199.18}{360}\times 2\times\frac{22}{7}\times 9=31.30$	M1
$Total\ \ length = 35.5+31.30+16.85$	M1
$=83.68cm$	A1

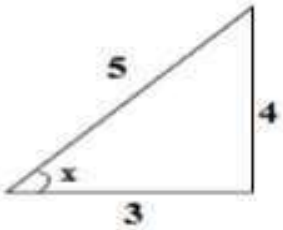
$\frac{1}{34.52}+\sqrt[3]{0.787}+(0.934)^3$	M1
$0.2897\times10^{-1}+9.233\times10^{-1}+\left(9.34\times10^{-1}\right)^3$ 814.8×10^{-3}	M1
$=0.02897+0.9233+0.8148$	
$=1.76707$	A1

$8^{(2y-1)} \times 32^{y} = 16^{(y+1)}$ $2^{2(2y-1)} \times 2^{5y} = 2^{4(y+1)}$ $3(2y-1)+5y = 4(y+1)$ $= 6y-3+5y = 4y+4$ $1+y-3 = 4y+4$ $11y-4y = 4+3$ $y = 1$	M1 M1 A1

Find the value of x in $\sqrt{x}+\sqrt{x+9} = 9$ $\sqrt{x+9} = 9-\sqrt{x}$ $x+9 = 81-18\sqrt{x}+x$ $18\sqrt{x} = 72$ $\sqrt{x} = 4$ $x = 16$	

$\frac{65,000}{45,000} = 13:9$ $\frac{65,000-45,000}{45,000} \times 100$ $\frac{20,000}{45,000} \times 100$ $= 44.4\%$	B1 M1 M1 A1

$GCD = 3^{1}$ $LCM = 2^{4} \times 3^{2} \times 7^{1}$ $48 = 2^{4} \times 3$ $72 = 2^{3} \times 3^{2}$ $3^{rd} \quad NO = 3 \times 7 = 21$ *Or* 3×1008 $\frac{LCM \times GCD}{72} = 42 \quad or \quad 21 \times 2 = 42$	M1 M1 A1



$h^2 = 4^2 + 3^2 = 25$

$h = \sqrt{25}$

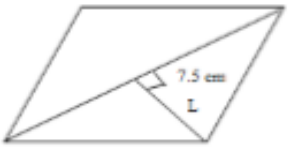
$h = 5$

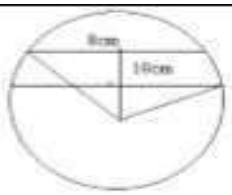
$Sin^2\ x = \left(\frac{4}{5}\right)^2 = \frac{16}{25}$ M1

$\cos\ x = \frac{3}{5}$

$\frac{16}{25} + \frac{3}{5} = \frac{16}{25} + \frac{15}{25}$ M1

$= \frac{31}{25} = 1\frac{6}{25}$ A1





$r^2 = (2+x)^2 + 4^2 \quad or \quad r^2 = x^2 + 5^2$

$= (2+x)^2 + 4^2 = x^2 + 5^2$

$= 4 + 4x^2 + 16 = x^2 + 25$ M1

$4x + 20 = 25$

$4x = 5$

$x = 1.25cm$

$R = 5.2\ cm$

$Or \quad R = (1.25)^2 + 5^2$

$r = \sqrt{1.56^{25} + 25}$ M1

$r = 5.1538$

$r = 5.2$ A1

$\log\ y^4 + \log_4 y = 2.5$

$\log_{y^4} + \frac{1}{\log\ y^4} = \frac{5}{2}$

$Let \quad {}^{10}y^4 \quad be\ t$

$= t + \frac{1}{t} = \frac{5}{2}x^2$

$2t + \frac{2}{t} = 5 \Rightarrow 2t^2 + 2 = 5t$

$2t^2 - 5t + 2 = 0$ M1

$2t^2 - 4t - t + 2 = 0$

$2t(t-2) - 1(t-2)$

$(2t-1)(t-2) = 0$ M1

$t = \frac{1}{2} \qquad t = 2$

$Let \quad \log_y 4 = 2 \ or \ \log_x 4 = \frac{1}{2}$

$y = 2 \ or \ y = 16$ B1

$M:n=7:-3$ $\underset{\sim}{OQ}=\frac{-3}{4}\begin{pmatrix}0\\7\end{pmatrix}+\frac{7}{4}\begin{pmatrix}2\\3.8\end{pmatrix}$ $=\begin{pmatrix}\frac{0+3.5}{4}\\\frac{-21+26.6}{4}\end{pmatrix}=\begin{pmatrix}3.5\\1.4\end{pmatrix}$ $\therefore Q(3.5,1.4)$	M1 M1 B1

$12x+12y+7=0$ $4x-3y-7=0$ $12x+12y=7\times3$ $12x-12y=-7$ $12x-9y=21$ $21y=-28$ $y=\frac{-4}{3}=-1\frac{1}{3}$ $4x=3y+7$ $4x=3\left(\frac{-4+7}{4}\right)=\frac{3}{7}$ $x=\frac{3}{4}\quad and\quad y=-1\frac{1}{3}$	 M1 A1 A1

SECTION 2 (50 Marks)

ANSWER ANY FIVE (5) QUESTIONS IN THIS SECTION

SECTION B(50 MARKS) $P=\begin{bmatrix}4&7\\5&8\end{bmatrix}\qquad Let\quad 32-35=-3$ (a) $P^{-1}=\frac{1}{-3}\begin{bmatrix}8&7\\-5&4\end{bmatrix}$ (b) Cost matrix	M1A1

(a) Area $= \frac{1}{2} \times 20(30+60) = 90m^2$ $V = 45 \times 10 = 900m^2$ $= 450 \times 10^3$ $= 90{,}000l$	M1
(b) Calculate the total internal surface area of the pool.	
$AB = \sqrt{20^2 + 3.0^2}$	A1
$= \sqrt{400+9}$ $= 20.2237m$	
$Perimeter = DA + AB + DC$ $= 20.2237 + 3.0 + 6.0$ $= 29.22$	M1
$S.A = (29.22 \times 10) + 2(90)$	M1
$= 29.22 + 180$	A1
$= 472.2$	M1
(c) Find the angle at which the bottom of the pool inclines.	
$\tan\theta = \frac{3.0}{20} = 0.3$	A1
$= 9.478^0$	
	A1