SUGGESTED ANSWER MAT112 – SET 1

QUIZ - 10% (OCTOBER 2022)

<table>
<tr><th>No.</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1a)</td><td>
<table>
<tr><th>Fraction</th><th>Decimal</th><th>Percentage (%)</th></tr>
<tr><td>$\frac{2571}{50}$ B1</td><td>51.42</td><td>5142 % B1</td></tr>
<tr><td>$\frac{183}{400}$</td><td>0.4575 B1</td><td>45.75 %</td></tr>
</table>
</td><td>3</td></tr>
<tr><td>1b i)</td><td>$7(y-3)=2+3(2-3y)$
$7y-21=2+6-9y$ M1
$7y+9y=8+21$
$16y=29$ M1
$y=\frac{29}{16}$ A1</td><td>3</td></tr>
<tr><td>1b ii)</td><td>$\frac{5}{4}-\frac{1}{2}(4y-3)=\frac{2}{5}(y-1)$
$\frac{5}{4}-2y+\frac{3}{2}=\frac{2}{5}y-\frac{2}{5}$ M1
$-2y-\frac{2}{5}y=-\frac{2}{5}-\frac{5}{4}-\frac{3}{2}$ M1
$-\frac{12}{5}y=-\frac{63}{20}$ M1
$y=\frac{21}{16}$ A1</td><td>4</td></tr>
<tr><td>2a)</td><td>$a=22,\ d=-7$

$T_n=a+(n-1)d$
$T_7=22+(7-1)(-7)$ M1
$T_7=-20$ A1</td><td>2</td></tr>
</table>

2b i)	$T_3 : -11 = a+(3-1)d$ $-11 = a+2d \quad \ldots\ldots\ldots (1)$ **M1** $T_{15} : \ 25 = a+(15-1)d$ $25 = a+14d \quad \ldots\ldots\ldots (2)$ **M1** $(1)-(2): \quad -11 = a+2d$ $\underline{25 = a+14d}$ **M1** $-36 = -12d$ $d = 3$ **A1** $d=3$ into $(1): \quad -11 = a+2d$ $-11 = a+2(3)$ **M1** $a = -17$ **A1**	6
2b ii)	$S_{25} = \frac{n}{2}[2a+(n-1)d]$ $= \frac{25}{2}[2(-17)+(25-1)(3)]$ **M1** $= 475$ **A1**	2
2c)	$T_n = ar^{n-1} : \quad T_{10} = 7r^{10-1}$ $3584 = 7r^9$ **M1** $\frac{3584}{7} = r^9$ **M1** $r^9 = 512$ $r = \sqrt[9]{512}$ **M1** $r = 2$ **A1**	4

2d i)	$T_n = ar^{n-1}$ $\frac{1215}{32} = \left(\frac{40}{27}\right)\left(\frac{3}{2}\right)^{n-1}$ **M1** $\frac{6561}{256} = \left(\frac{3}{2}\right)^{n-1}$ $\log\left(\frac{6561}{256}\right) = \log\left(\frac{3}{2}\right)(n-1)$ **M1** $\frac{\log\left(\frac{6561}{256}\right)}{\log\left(\frac{3}{2}\right)} = n-1$ **M1** $n = 9$ **A1**	4
2d ii)	$S_n = \frac{a(r^n-1)}{r-1}$ $S_9 = \frac{\left(\frac{40}{27}\right)\left(\left(\frac{3}{2}\right)^9-1\right)}{\frac{3}{2}-1}$ **M1** $S_9 = 110.9433$ **A1**	2