SUGGESTED ANSWER MAT112 – SET 3

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>$\frac{149}{50}$ B1</td><td>2.98 B1</td><td>298 %</td></tr>
<tr><td>$\frac{9}{40}$</td><td>0.225</td><td>22.5% B1</td></tr>
</table>
</td><td>3</td></tr>
<tr><td>1b i)</td><td>$2x-5=-3(x-4)$
$2x-5=-3x+12$ M1
$2x+3x=5+12$
$5x=17$ M1
$x=\frac{17}{5}$ A1</td><td>3</td></tr>
<tr><td>1b ii)</td><td>$\frac{y-5}{4}=2(y+3)-1$
$\frac{y-5}{4}=2y+5$ M1
$y-5=4(2y+5)$
$y-5=8y+20$ M1
$y-8y=20+5$
$-7y=25$ M1
$y=-\frac{25}{7}$ A1</td><td>4</td></tr>
<tr><td>2a)</td><td>$a=100,\ d=12$

$T_n=a+(n-1)d$
$T_{15}=100+(15-1)(12)$ M1
$T_7=\text{RM}268$ A1</td><td>2</td></tr>
</table>

2b i)	$S_5 : 125 = \frac{5}{2}[2a + (5-1)d]$ $125 = 5a + 10d \quad \ldots\ldots\ldots (1)$ **M1** $S_{10} : 400 = \frac{10}{2}[2a + (10-1)d]$ $400 = 10a + 45d \quad \ldots\ldots\ldots (2)$ **M1** $(1) \times 2 : \quad 250 = 10a + 20d \quad \ldots\ldots\ldots (3)$ $(2) - (3) : \quad 400 = 10a + 45d$ $250 = 10a + 20d$ **M1** $150 = 25d$ $d = 6$ **A1** $d = 3$ into $(1) : \quad 125 = 5a + 10d$ $125 = 5a + 10(6)$ **M1** $5a = 65$ $a = 13$ **A1**	6
2b ii)	$T_n = a + (n-1)d$ $T_{20} = 13 + (20-1)(6)$ **M1** $T_{20} = 127$ **A1**	2
2c)	$T_n = ar^{n-1} : \quad T_9 = 4r^{9-1}$ $26244 = 4r^8$ **M1** $\frac{26244}{4} = r^8$ **M1** $r^8 = 6561$ $r = \sqrt[8]{6561}$ **M1** $r = 3$ **A1**	4

2d i)	$T_n = ar^{n-1}$ $\frac{2368}{8019} = \left(\frac{37}{11}\right)\left(\frac{2}{3}\right)^{n-1}$ **M1** $\frac{64}{729} = \left(\frac{2}{3}\right)^{n-1}$ $\log\left(\frac{64}{729}\right) = \log\left(\frac{2}{3}\right)(n-1)$ **M1** $\frac{\log\left(\frac{64}{729}\right)}{\log\left(\frac{2}{3}\right)} = n-1$ **M1** $n = 7$ **A1**	4
2d ii)	$S_n = \frac{a(r^n - 1)}{r-1}$ $S_7 = \frac{\left(\frac{37}{11}\right)\left(\left(\frac{2}{3}\right)^7 - 1\right)}{\frac{2}{3} - 1}$ **M1** $S_7 = 9.5003$ **A1**	2