Name: …….. **Date: ……..**

Arithmetic Sequences & Series _ Exam Style Questions

1. [Maximum Marks: 5] **GDC**

The fifth term of an arithmetic sequence is 24 and the eighth term is 39. What is the 120th term?

$t_n = a+(n-1)d$

M1 $t_5 = a+(5-1)d = 24$

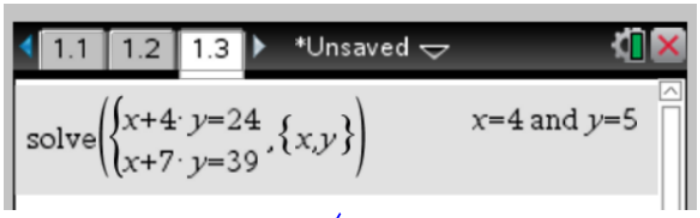
A1 $a+4d=24 \rightarrow (1)$

$t_8 = 39$

$t_8 = a+(8-1)d = 39$

$a+7d=39 \rightarrow (2)$

By using G.D.C



A1 $a=4$ $d=5$ A1

$t_{120} = 4+(120-1)5$

$= 4+(119)5$

$t_{120} = 599$ A1

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2. **[Maximum Marks: 6]** **GDC**

The first four terms of an arithmetic sequence are 3, 2p−q, p+2q+5, 3p−4q, where p and q are constants. Find the values of p and q.

t_1 t_2 t_3 t_4

3, 2p−q, p+2q+5, 3p−4q M1

$d = t_2-t_1 = t_3-t_2$

$(2p-q)-(3) = (p+2q+5)-(2p-q)$

$2p-q-3 = p+2q+5-2p+q$

$2p-q-3 = -p+3q+5$

$2p+p-3q-q-3-5=0$ A1

$3p-4q-8=0$

$3p-4q=8 \rightarrow (1)$

$d = t_3-t_2 = t_4-t_3$ M1

$(p+2q+5)-(2p-q) = (3p-4q)-(p+2q+5)$

$p+2q+5-2p+q = 3p-4q-p-2q-5$

$-p+3q+5 = 2p-6q-5$

$-p-2p+3q+6q+5+5=0$

$-3p-9q+10=0$

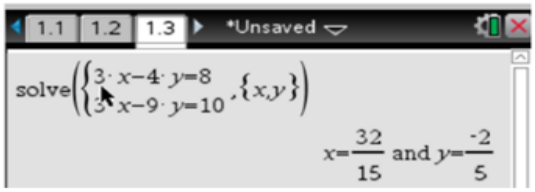
$-3p+9q=-10$

$3p-9q=10 \rightarrow (2)$ A1

By using G.D.C

$p=\frac{32}{15}$ $q=\frac{-2}{5}$

A1 A1



3. **[Maximum Marks: 6]** **GDC**

Consider the arithmetic series $-75+(-70)+(-65)+\ldots\ldots\ldots\ldots$

Find the **least number of terms** required so that the **sum of the series is greater than 1200**.

Given

$a = -75$; $d = 5$; $S_n > 1200$

$S_n = \frac{n}{2}[2a + (n-1)d]$ M1

$S_n = \frac{n}{2}[2(-75) + (n-1)(5)]$

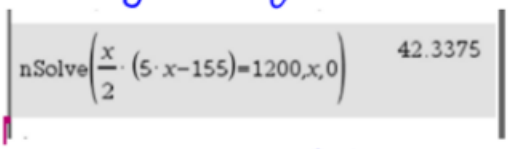
$S_n = \frac{n}{2}[-150 + 5n - 5]$ A1

$S_n = \frac{n}{2}[5n - 155]$

$S_n > 1200$ M1

$\frac{n}{2}[5n - 155] > 1200$ A1

By using G.D.C



$n \simeq 42.33$

Hence least integer is $n = 43$. A1

4. **[Maximum Marks: 6]** **GDC**

A pizza is cut into 10 slices such that the angles of the slices form an arithmetic sequence. The largest slice has an angle that is three times the smallest slice. Find the angle of the smallest slice.

Let the smallest angle be a and common difference is d.

$a,\ a+d,\ a+2d,\ \ldots\ a+9d$

Largest slice is $a+9d$ M1

$a+9d = 3a$

$9d - 2a = 0 \longrightarrow (1)$ A1

Sum of all angles of the pizza is 360°

$S_n = \frac{n}{2}[2a+(n-1)d]$ M1

$S_{10} = \frac{10}{2}[2a+(10-1)d]$

$S_{10} = 5[2a+9d]$

$5[2a+9d] = 360^\circ$

$2a+9d = 72 \longrightarrow (2)$ A1

By using G.D.C M1

$a = 18^\circ \quad d = 4$

A1

$\therefore$ Smallest slice of angle is 18°