

Name: Olo Kubba Adeyinka Opeyemi

Department: Anatomy

19/mhs 03/08

Maths 101

1) Arithmetic progression

Let the three terms be

$x$ ,  $x+d$  and  $x+2d$

where  $T_1 = x$

$$T_2 = x + 2d$$

$$T_3 = x + 2d$$

$$T_1 + T_2 + T_3 = 18$$

$$x + (x+d) + (x+2d) = 18$$

$$3x + 3d = 18, \quad x + d = 6$$

$$\therefore d = 6 - x \quad \text{--- (i)}$$

$$T_1^2 + T_2^2 + T_3^2 = 206$$

$$x^2 + (x+d)^2 + (x+2d)^2 = 206$$

$$x^2 + (x^2 + 2dx + d^2) + (x^2 + 4dx + 4d^2) =$$

206

$$x^2 + x^2 + 2dx + d^2 + x^2 + 4dx + 4d^2 =$$

206

$$3x^2 + 6x + 5d^2 = 206 \quad \text{--- (ii)}$$

substitute eqn (i) into eqn (ii)

$$3x^2 + 6x(6-x) + 5(6-x)^2 = 206$$

$$3x^2 + 36x - 6x^2 + 5(36 - 12x + x^2) =$$

206

$$3x^2 + 36x + 6x^2 + 180 - 60x + 5x^2$$

= 206

$$2x^2 - 24x - 26 = 0$$

$$x^2 - 12x - 13 = 0$$

$$x^2 - 13 + x - 13 = 0$$

$$x(x-13) + 1(x-13) = 0$$

$$(x-13)(x+1) = 0$$

$$x-13=0 \quad \text{or} \quad x+1=0$$

$$x=13 \quad \text{or} \quad x=-1$$

Put  $x=13$  or  $x=-1$  into eqn (1)

$$\text{When } x=13$$

$$d=6-13$$

$$d=-7$$

$$\text{When } x=-1$$

$$d=6-(-1)$$

$$d=7$$

Therefore

using  $x=13$  and  $d=-7$

$$T_1 = 13$$

$$T_2 = 13 - 7 = 6$$

$$T_3 = 13 + 2(-7) = 13 - 14 = -1$$

$\therefore$  The terms are 13, 6, -1

2) For a GP

let the three terms be  $T_1, T_2$   
and  $T_3$

$$\text{where } T_1 = a$$

$$T_2 = ar$$

$$T_3 = ar^2$$

$$T_1 + T_2 + T_3 = 28$$

$$a + ar + ar^2 = 28 \quad \text{--- (1)}$$

$$T_1 \times T_2 \times T_3 = 512$$

$$a \times ar \times ar^2 = 512$$

$$a^3 r^3 = 512 \quad \text{--- (iii)}$$

$$(ar)^3 = 512$$

$$(ar)^3 = 2^9 \quad , \quad (ar)^3 = (2^3)^3$$

$$ar = 8 \quad \text{--- (iii)}$$

$$a = 8/r \quad \text{--- (iv)}$$

put equation (iv) into equation (i)

$$a(1+r+r^2) = 28$$

$$\frac{8(1+r+r^2)}{r} = 28$$

$$8 + 8r + 8r^2 = 28r$$

$$8r^2 + 8r - 28r + 8 = 0$$

$$8r^2 - 20r + 8 = 0$$

$$2r^2 - 5r + 2 = 0$$

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

$$2r(r-2) - 1(r-2) = 0$$

$$(r-2)(2r-1) = 0$$

$$(r-2)(2r-1) = 0$$

$$(r-2)(2r-1) = 0$$

$$r-2 = 0$$

$$\text{or } 2r-1 = 0$$

$$r = 2$$

$$\text{or } 2r = 1$$

$$r = 2 \quad \text{or } r = 1/2$$

substitute  $r=2$  or  $r=1/2$

into equation (iv)

$$a = 8r$$

$$\rightarrow r = 2$$

$$a = \frac{8}{2}$$

$$a = 4$$

$$\rightarrow r = 1/2$$

$$a = 8 / (1/2)$$

$$a = 16$$

$\therefore$  when  $r = 2$ ,  $a = 4$

$$T_1 = 4$$

$$T_2 = 4 \times 2 = 8$$

$$T_3 = 8 \times 2 = 16$$

The terms are 4, 8, 16, ...