|  | Topic:  |
|--|---|
|  | BY: AJAY MITTAL: 9891067390   |
|  |   |
|  | Chaptu: PMI (3rd class)   |
| •  | Time - C  |
|  | Typi: 3 Inequalities  |
| Ow1  | USing PMI, 8 how that (2n+7) < (n+3)2                               |
| Solr   | lu p(n): (2n+7) < (n+3)2  |
| =  | $g(1): 2+7 < (1+3)^2$   |
|  | 9 2 16  |
|  | cleany p(1) is the  |
|  |   |
|  | lu p(k) betwe   |
|  | $\frac{P(k): (2k+7) \prec (k+3)^2}{\text{T-p } P(k+1) \cdot a k u}$ |
|  | Tip p(k+1) a hu   |
|  | P(k+1): (2k+9) < (k+4) (ar) k2+8k+16                                |
|  | ( K 17) ( K 17) ( K 17)   |
|  | we hay (2k+7) < (k+3)2  |
| •  | addy 2 Compare  |
|  | $(2k+1)+2 < (k+3)^2+2$  |
|  | => (2K+9) < K2+6K+11 s  |
| *  | => (2x+9) / x2+64+11 < K2+8K+16                                     |
|  | (2) (2) (4)   |
|  | $\Rightarrow (2k+q) \leq k^2 + 8k+16$                               |
|  | $= (2k+9) < (k+4)^2$  |
|  | - P(41) es hu   |
|  | By pms, p(n) as her for all nEN                                     |
|  |   |
|  |   |
| AND THE STATE OF T | CLASSTIME*  |

| Topic:   |
|--|
| Show USIM DMT  |
| QN12 + 122 + n2 > n3 for all nEN.  |
| $S(n) = P(n) = P + 2^2 + n^2 > n^3$  |
| 3  |
| $P(1): 1^2 > 1^3$  |
| 1> = clear p(1) is hue   |
|  |
|  |
| $P(k) = \frac{1^2 + 2^2 + k^2 > k^3}{2}$   |
| Typus P(k+1) to hu   |
| P(k+1): 12+22+ k2+ (k+1)2 > (k+1)3 (01) K3+1+3k2   |
| +3K  |
| We hay 12+22+ k2 > k3  |
|  |
| (  |
| $\frac{1^{2}+1^{2}+k^{2}+(k+1)^{2}}{3}+(k^{*}+1)^{2}}$   |
| => 12+22+32 K2+(K+))2 = K3 +3K2+3+6K   |
| 1 1 2 1 3  |
| $=1^{2}+2^{2}+\cdot k^{2}+(k+1)^{2}>\frac{k^{3}+3k^{2}+3+6k}{3}$   |
| <b>5</b>   |
| $-1^{2}+2^{2}+k^{2}+(k+1)^{2}>\frac{k^{3}+1+3k^{2}+3k}{2}$   |
| 3  |
|  |
| $\frac{1}{2} + \frac{1}{2} + \frac{1}$ |
| :- P (641) et hu   |
|  |
|  |
|  |
| CLASSTIME"   |

| Topic:  |
|---|
| QNS 3 & Show USINg PMT                          |
| (suf $1+2+3n < (2n+1)^2$                        |
| 8   |
|   |
| ON. 4 to prove that (1+x) = (1+nx), when x > -1 |
| $\mathfrak{D}(n) = (1+x)^n \geq (1+nx)$         |
|   |
| P(1): 1+x 7 1+x : p(1) & hue                    |
| lu P(k) be fue                                  |
| 12(k): (1+x) > (1+kx)                           |
|   |
| 1.1 P(1+1) & me                                 |
| O(k+1)  |
| P(1+1)= (1+x) x) (1+(K+1)x) (a) (1+Kx+x)        |
| whan  |
| $= (1+x)^k > (1+kx)$                            |
| mushply by (1+7)                                |
| (1+x) K. (1+x) = (1+kx)(1+x)                    |
|   |
| - (1+x) x+1 = 1+x+kx2                           |
| = (1+x) (1+x+kx+2) = 1+kx+x                     |
|   |
| 2 (1+x) (+1) = 1+ Kx+x - 91 cm x = 0            |
| . 2   |
| $= (1+x)^{k+1} = 1+(k+1)x$                      |
| ip (kg) a hug                                   |
|   |
|   |
| CLASSTIME'                                      |

|       | Topic:  |
|-------|---|
| (sur) | + Using PMI show that 2">n for all nEN.                                       |
| (0)   | A. 180  |
| 0,4,0 | + Using PMI, snow that $(080. ca(20). ca(40) ca(2^{n-1}0) = sin(2^{n}0)$      |
|       | (30. ca(20). ca(40) ca(2''0) = sin(2''0)                                      |
| SU    | $f(n)$ : $cao \cdot ca(2a) ca(2^{n-1}a) = sin(2^na)$                          |
|       | P(1): $Cao = Sin(ao) = 2sphocao$  |
|       | 2 sina Asira  |
|       | => (a0=(a0 : p(1) 15 hue  |
|       | lu-p(k) before  |
|       | P(k)= [Cao-ca(20) Ca(2k-0)] = sin(2ko) 2ksin(2                                |
|       | $p(k+1)$ : $ca(20) ca(2^{k-1}0) \cdot ca(2^{k}0) = sin(2^{k+1}0)$             |
|       | 2 kt) 5m0   |
| 10    | (a) $a(20) a(2^{k-1}0)$ $a(2^k0)$   |
|       | = $Sin(2^k0) \cdot ca(2^k0)$<br>$a^k sin0$ $-\cdots \sqrt{2} sin0 \cdot caq)$ |
|       | 2K SINO 12 SINO-(aq)  |
|       | $=\frac{1}{2}\left(2\sin(2^{k}0)\cdot\cos(2^{k}0)\right)$                     |
|       | 2 K Sin Q   |
|       |   |
|       | $sin(\alpha \cdot \alpha^k \alpha) = sin(2^{k+1}\alpha)$ $= RM$               |
|       | 2 kt 1. 51n0 - 2 kt 151n0   |
|       | :- P(k+1) is her  |
|       | CLASSTIME"  |

|       | Topic:   |
|-------|--|
| ON. 7 | - Show Using PMI   |
|       | Sino + Sin(30) + sin(na) = sin(no). sin (n+1)0   |
|       |  |
|       | sin(0)   |
| Sop.  | lu P(h): 5m0 +5in (30) + sin (no) = sin (no). sin (n+1)0   |
|       | sin(9)   |
|       | D(1): Gn O = Cm / D : C / 1+1 \ 2  |
|       | P(1): Sin 0 = Sin (2): Sin (1+1)0 = Sin (20) = Sin 0   |
|       | Sing.  |
|       | in Pri) a hué  |
| li    | + p(k) be true   |
|       | (4): sno + sin(30) + sin(ka) = sin(ka). sin(k+1)0  |
|       | Sing - sin(30) +sin(24)  |
| p(n   | <u> </u>   |
|       | Sino + sin(30) + sin(k0) + sin(k+1)0 = sin(k+1)0. sin(k+2)0  |
|       | $\frac{1}{2} \frac{1}{2} \frac{1}$ |
|       | 3/n Z  |
| 145   | 51n0 + 51n(30) + 51n(k0) + 51n(k+1)0   |
|       |  |
|       | = $Sin(k0).sin(k+1)0 + sin(k+1)0$  |
|       | SIN(9)   |
|       |  |
|       | $= \left[\frac{\sin(k\alpha) \cdot \sin(k+1)0 + \sin(k+1)0 \cdot \sin(k)}{2}\right]$   |
|       | Sing   |
|       | = $25in(k0).5in(k+1)0 + 25i3(k+1)0.5ing$   |
|       | 2).))n (27) 0 + Q3/1 (X7) 0 ·3/ng  |
|       | 25ing  |
|       | = (08 \ \ \frac{k\pa}{2} - \left(\frac{k+1)\pa}{2} \right] - (08 \ \frac{k\pa}{2} + \left(\frac{k+1)\pa}{2} + \left(\frac{k+1)\pa-\pa}{2} - \pa\left(\frac{k+1)\pa+1}{2} + \left(\frac{k+1)\pa-\pa-\pa\right) - \left(\frac{k+1)\pa+1}{2} + \left(k+1)\pa-\pa-\pa-\pa-\pa-\pa-\pa-\pa-\pa-\pa-   |
| . ,   | 2 2 2 ( 9)   |
|       | 25m0   |
|       | CLASSTIME*   |

|         | Topic:  |
|---------|---|
|         |   |
|         | = $\cos(-\frac{\alpha}{2})$ - $\cos(2\kappa\alpha+\alpha)$ + $\cos(2\kappa\alpha+\alpha)$ - $\cos(2\kappa\alpha+3\alpha)$ |
|         | 25in(9)   |
|         | (a)   |
|         | = (0(Q) (0) (2KQ+3Q)  |
|         |   |
|         | a sin o   |
|         |   |
|         | $= \frac{-2\sin\left(9 + 2\kappa 0 + 30\right) \cdot \sin\left(9 - (2\kappa 0 + 30)\right)}{2}$                           |
|         | $\left(\frac{1}{2}\right)$  |
|         | 25mg)   |
|         |   |
|         | = - 25in (2ka+4a) · sin (= (2ka+20))  |
| 197     | Asing.  |
|         | 74-7-9  |
|         | = Sin ((k+2)0) - Sin ((k+1)0) = RM  |
| ,       | 2 / 2 / 1/4   |
|         | Sin B   |
| £)      |   |
|         | i. P(ke) to hu.   |
| *       |   |
| On. 8 - | Using PMI, show that  |
| (cell)  |   |
|         | Sind + sin(x+B) + · sin(x+(n-1)B) =   |
|         | $Sin(q+(n-1)\beta) \cdot sin(n\beta)$   |
|         | SIM(B)  |
| OM 9 +  | 7 10 11 112   |
| 7       | 8 10 +3.4 + ke is divisble by 9 for all NEW   |
|         | then find the least positive in regrae value of   |
|         | And k= 5  CLASSTIME   |
| No.     |   |