

 (3) All the 5 digit numbers and 6 digit numbers are greater than 3000. Therefore, number of 5 digit numbers = ⁶P₅ - ⁵P₅ = 600. 	ANSWER	KEYS		74. monhongo	7% methongo	W. mothongo	7%. methenge	74. Incliningo 7
(3) All the 5 digit numbers and 6 digit numbers are greater than 3000. Therefore, number of 5 digit numbers = $^6P_5 - ^5P_5 = 600$. [Since the case that fl will be at ten thousand place should be subtracted]. Similarly, number of 6 digit numbers 6! = 5! = 600. Now, the numbers of 4 digit numbers which are greater than 3000, having 3, 4 or 5 at first place, this can be done in 3 ways and remaining 3 digit may be from remaining 5 digits i.e. required number of 4 digit numbers are $^5P_5 \times 3 = 180$. Hence, total numbers = $600 + 600 - 180 = 1380$ 2 (2) Number of ways of choosing 2 candidates = $^{10}C_1$ Number of ways of choosing 2 candidates = $^{10}C_2$ Number of ways of choosing 4 candidates = $^{10}C_3$ Number of ways of choosing 4 candidates = $^{10}C_3$ Total number of ways of choosing 4 candidates = $^{10}C_3$ Total number of ways of choosing 4 candidates = $^{10}C_3$ Number of 900 and 10	. (3)	2. (2)	3. (3)	4. (4)	5. (3)	6. (3)	7. (1)	8. (2)
(Since the case that 0 will be at ten thousand place should be subtracted). Similarly, number of 6 digit numbers 6! = 5! = 600. Now, the numbers of 4 digit numbers which are greater than 3000, having 3, 4 or 5 at first place, this can be done in 3 ways and remaining 3 digit may be from remaining 5 digits is. required number of 4 digit numbers are \$^3P_5 \times 3 = 180. Hence, total numbers = 600 + 600 + 180 = 1380 (2) Number of ways of choosing 2 candidates = $^{10}C_1$ Number of ways of choosing 3 candidates = $^{10}C_2$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways are choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways of choosing 4 candidates = $^{10}C_1$ Number of ways and choosing 4 candidates = $^{10}C_1$ Number of ways and choosing 4 c	. (4) ^{matho}	10. (4) athong						
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Number of ways of choosing 3 candidates = ${}^{10}C_3$ Number of ways of choosing 4 candidates = ${}^{10}C_4$ Number of ways of choosing 4 candidates = ${}^{10}C_4$ Total number of ways of choosing 4 candidates = ${}^{10}C_4$ = ${}^{10}C_1 + {}^{10}C_2 + {}^{10}C_3 + {}^{10}C_4$ and the second of the property of the	Number	of ways of choosing 1	candidate $={}^{10}C_1$					
= $^{10}C_1 + ^{10}C_2 + ^{10}C_3 + ^{10}C_3 + ^{10}C_4$ = $^{10}10 + 45 + 120 + 210$ = 385 . (3) Out of 6 novels, 4 novels can be selected in $^{6}C_4$ ways. Also out of 3 dictionaries, 1 dictionary can be selected in $^{3}C_1$ ways. Since the dictionary is fixed in the middle, we only have to arrange 4 novels which can be done in 4! ways. Then the number of ways $^{6}C_4 \cdot ^{3}C_1 \cdot 4! = \frac{95}{2} \cdot 3 \cdot 24 = 1080$ (4) Odd numbers are 1, 3, 5, 7 We have to fill up four places like Units place can be occupied in 4 ways by 1, 3, 5, 7. Thousands place can be occupied is 5 ways (i.e. 1, 2, 3, 5, 7) remaining two positions can be fill ways each . By fundamental principle of counting. Required no. of ways are $= 5 \cdot 6^{2} \times 4$ $= 720$ (3) In word MATHEMATICS M, A, T - occurs twice 5 letters can be placed on 3 places in $^{5}C_3$ ways. Again even places $2^{16} \cdot 8 \cdot 4^{10}$ position can be filled by the three letter M , $A \cdot T$ $^{5}C_1$ ways (2) Choose 2 letter from 3 given letters M , $A \cdot T$ and arrange them in 2! ways $^{5}C_1 \times 2!$ ways Required number of ways $= ^{5}C_3 \times 9 = 540$ ways. (3) 6 particular players are always to be included and 4 are always excluded so total no. of selection, now, 4 players out of 12, hence number of ways $= ^{10}C_1 \times 10^{10}C_1$	Number	of ways of choosing 3	candidates = $^{10}C_3$					
3) Out of 6 novels, 4 novels can be selected in 6C_4 ways. Also out of 3 dictionaries, 1 dictionary can be selected in 3C_1 ways. Also out of 3 dictionaries, 1 dictionary can be selected in 3C_1 ways. Since the dictionary is fixed in the middle, we only have to arrange 4 novels which can be done in 4! ways. Then the number of ways 6C_4 3C_1 · 4! $= \frac{6\pi}{3} \cdot 3 \cdot 24 = 1080$ (4) Odd numbers are 1, 3, 5, 7 We have to fill up four places like Units place can be occupied in 4 ways by 1, 3, 5, 7. Thousands place can be occupied is 5 ways (i.e. 1, 2, 3, 5, 7) remaining two positions can be fill ways each By fundamental principle of counting. Required no. of ways are $= 5 \times 6^2 \times 4$ $= 720$ (3) In word MATHEMATICS one mathons m	$={}^{10}C_1$	$+\ ^{10}C_{2}+\ ^{10}C_{3}+\ ^{10}C_{4}$						
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By fundamental principle of counting. Required no. of ways are $= 5 \times 6^2 \times 4$ $= 720$. (3) In word MATHEMATICS once an authorized with mathonized wit	Units pla	ace can be occupied in		Thousands place can be managed	be occupied is 5 wa	ys (i.e. 1, 2, 3, 5, 7) remaining two pos	itions can be filled in
Required no. of ways are $= 5 \times 6^2 \times 4$ mathons $= 720$. (3) In word MATHEMATICS once what mathons $= 80$. $= 100$ M, $= 100$ mathons $= 80$ mathons $=$	•		counting.					
In word MATHEMATICS once we mathong we we were well as a second well as	-	d no. of ways are $= 5$	$ imes 6^2 imes 4$ mathong					
H, E, C, I and S - without repetition M, A, T - occurs twice S letters can be placed on S places in S aways. Again even places S and S - without repetition S and S - without S - withou	. (3)							
M, A, T - occurs twice 5 letters can be placed on 3 places in 5C_3 ways. Again even places $2^{\rm nd}$ & $4^{\rm th}$ position can be filled by the three letter M, A & T mathons M mathon								
Even places can be filled in two ways (1) Choose 1 letter from 3 given letters M , $A \& T$ 3C_1 ways (2) Choose 2 letter from 3 given letters M , $A \& T$ and arrange them in 2! ways $^3C_1 \times 2!$ ways Total ways $^3C_1 + ^3C_1 \times 2! = 9$ ways Required number of ways $= ^5C_3 \times 9 = 540$ ways. (3) 6 particular players are always to be included and 4 are always excluded so total no. of selection, now, 4 players out of 12, hence number of ways $= ^1$	M, A, T	'- occurs twice 5 letters	s can be placed on 3 p		& T mathongo			
3 C_1 ways mathong m	_	_		the three letter 111, 11	<u></u>			
$^3C_1 \times 2!$ ways mathons with mathon wit	(1) Choons 3C_1 way	ose 1 letter from 3 give	en letters $M, A \& T$					
Required number of ways = ${}^5C_3 \times 9 = 540$ ways. (3) 6 particular players are always to be included and 4 are always excluded so total no. of selection, now, 4 players out of 12, hence number of ways = 1 mathongo ${}^{1/2}$								
(3) 6 particular players are always to be included and 4 are always excluded so total no. of selection, now, 4 players out of 12, hence number of ways = 1 mathongo m								
					1 6 1			1 6 12 0
	. (3) 6 par	ticular players are alwa	ays to be included and	l 4 are always excluded	l so total no. of sele	ection, now, 4 players	out of 12, hence nu	mber of ways $=^{12} C_4$.



Answer Keys and Solutions

7.								
	(1)athongo /// mathongo							
	Consider triangle without vertex	A.						
	We can choose 2 vertices from li							
	We can choose 2 vertices from li							
	As anyone of the above can be d $= \frac{m(m-1)}{2}n + \frac{n(n-1)}{2}m$ $= \frac{mn(m+n-2)}{2}.$							
	2							
	Consider triangles with vertex A							
	As one vertex is A, we can choose	se one vertex from AC	and one from AB t	he possibilities are 1	$\times m \times n = mn$.			
	Number of triangles when A may	y be included is $= mr$	$n + \frac{mn(m+n-2)}{2} = \frac{n}{2}$	$\frac{mn(m+n)}{2}$				
	Therefore, ratio is $\frac{m+n-2}{m+n}$.		_	_				
8.	(2) Given word is HAVANA (3							
	Total number of ways arranging	the given word						
	$=\frac{6!}{3!}=120$							
	$= \frac{6!}{3!} = 120$ Total number of words in which	N & V are together						
	$=\frac{5!}{3!}\times 2!=40$	8						
	J.	20 40 - 80						
	∴ Required number of ways= 12							
9.	(4) Total number of ways in which							
	When particular boy and particul							
	:. Required number of ways =	1152 - 504 = 648.						
10.	(4)							
	` '							
	Given word is MISSISSIPPI. Here, $I=4$ times, $S=4$ times,	D = 2 times M = 1	///. mathongo					
		I = 2 times, $M = 1$	tillie					
	_M_I_I_I_P_P_	71						
	So, MIIIIPP can be arranged in	$\frac{1}{4!\times 2!}$ mathongo						
	So there are 8 gaps among the le	tters of the words Wil	IIIPP, in which 4S	can be filled.				
	\therefore Required number of words = 8	$C_4 imes rac{7!}{4!2!}$						
	$= {}^8C_4 imes rac{7 imes 6!}{4!2!}$ mathongo							
	$=7\cdot {}^{8}C_{4}\cdot {}^{6}C_{4}$							
	* **							