



Greenfields Public School

Dilshad Garden, GTB Enclave, Delhi-110093.

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COMPETENCY ASSIGNMENT

SUBJECT: Mathematics

GRADE:XI

CHAPTER: PERMUTATIONS AND COMBINATION

S.NO	QUESTIONS	MARKS
1.	The number of possible outcomes when a coin is tossed 6 times is (i) 36 (ii) 64 (iii) 12 (iv) 32	1
2	A room has 9 doors. A man enter the room through one door and comes out through a different door. Then total number of ways equal to (i) 72 (ii) 2 (iii) 1 (iv) 81	1
3	How many 3 digit even numbers can be formed from the digits 1, 2, 3, 4, 5, 6 if the digits can be repeated? (i) 108 (ii) 112 (iii) 12 (iv) 45	1
	Directions for Q4: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d.Assertion (A) is false but reason (R) is true.	
4	Assertion : if a coin is tossed 3 times then the number of possible outcomes is 6. Reason : when a coin is tossed once, there are two possible outcomes.If a coin is tossed n times then outcomes are 2^n .	1
5	Assertion : if an event can happen in 3 ways and other event in 2 ways then total ways of happening both the events is 6. Reason : if one event can happen in m ways followed by other event in n ways, then total ways of	1

	simultaneous happening of both events is $m \cdot n$.	
6	How many 4 digit numbers can be formed using the digits 0,1,2,3,4,5 no digit being repeated ?	2
7	Ten students compete in a race, in how many ways can the first three places be taken ?	2
8	In how many ways n different books be arranged such that two particular books are never together ?	3
9	In how many of distinct permutations of the letters in MISSISSIPPI do the four I's not come together ?	5
10	Case based question : out of 7 boys and 5 girls a team of 7 students is to be formed. (i) Find the number of ways, if team contains at least 3 girls. (ii) Find the number of ways, if team contains at most 3 girls. (iii) Find the number of ways, if team contains exactly 3 girls .	4



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COMPETENCY ASSIGNMENT

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CHAPTER: BINOMIAL THEOREM

S.NO.	QUESTIONS	MARKS
1.	The total number of terms in the expansion of $(x + a)^{51} - (x - a)^{51}$ after simplification is (i) 102 (ii) 25 (iii) 26 (iv) none of these	1
2.	Number of terms in the expansion of $(x - 2y)^{10}$ are (i) 10 (ii) 12 (iii) 20 (iv) 11	1
3.	In the expansion of $(1 + x)^n$ coefficient of 3 rd term in increasing order of x is (i) n_{C2} (ii) n_1C (iii) n_3C (iv) n_nC	1
	Directions for Q4: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	1
4.	Assertion : In the binomial expansion of $(x + y)^n$, the coefficients of the terms equidistant from beginning and end are equal. Reason : ${}^n_rC = {}^{n-r}_rC$	1
5.	Assertion: Fifth term in the expansion of $\left(x + \frac{1}{x}\right)^{10}$ is ${}^{10}_5C x^5 \left(\frac{1}{x}\right)^5$ Reason : coefficients of second term in the expansion of $(x + y)^n$ is n_1C .	1
6.	Find the value of $(9)^3$ using binomial theorem.	2
7.	Expand using binomial expansion $(1 - x + x^2)^4$.	2
8.	Expand $\left(ax - \frac{b}{x}\right)^6$ using binomial expansion.	3
9.	Show that $2^{4n} - 15n - 1$ is divisible by 225.	5

10.	Case Study Question	4
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	<p>During preparation for exam friends are relaxing and discussing different aspects of different concepts, one of the friends suddenly wrote and expression.</p> $(x - 3y)(x - 3y)(x - 3y)(x - 3y)(x - 3y)$ <p>And asked some questions to friends and asked then to answer.</p> <ul style="list-style-type: none">(i) How many terms are in the above expansion?(ii) What is third term in the expansion in decreasing order of x ?(iii) What is pascal's coefficients o 4th term in above expansion ?	
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COMPETENCY ASSIGNMENT

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CHAPTER: LINEAR INEQUALITIES

S.NO.	QUESTIONS	MARKS
1.	If $ x - 1 > 5$, then (i) $x \in (-4, 6)$ (ii) $x \in [-4, 6]$ (iii) $x \in (-\infty, -4) \cup (6, \infty)$ (iv) $x \in [-\infty, -4] \cup [6, \infty)$	1
2.	If $5x - 3 < 7$, then (i) $x < 2$ (ii) $x > 4$ (iii) $x \geq 3$ (iv) $x \geq 5$	1
3.	If $3x - 7 > 5x - 1$ then (i) $x < -3$ (ii) $x > 3$ (iii) $x \geq 4$ (iv) $x \geq 3$	1
4.	If $3x - 2 < 2x + 1$ then (i) $x < 3$ (ii) $x \geq 5$ (iii) $x > 6$ (iv) $x > 4$	1
	Directions for Q5: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	
5.	Assertion: If $-x < -7$, then $x < 7$. Reason : for inequality $a < b$, $ma > mb$, for $m < 0$.	1
6.	Solve the system of inequations, $2x - 1 > x + \frac{7-x}{3}$, $4x + 7 > 15$, $x \in \mathbb{R}$.	2
7.	Solve the inequality $\frac{x+8}{x-2} \geq 0$.	2
8.	Solve for x, $(3x - 1)(2x + 3) < 0$.	3
9.	Solve the given inequality and show the graph of the solution on number line: $\frac{x}{2} \geq \frac{5x-2}{3} - \frac{7x-3}{5}$	5
10.	Case Study Question	4

The three sides of a triangle are given by $(2x+3)$ cm, $(4x-1)$ cm and 14 cm on the basis of this answer the following :

(i) If the perimeter of triangle is at least 34 cm, then what is the minimum value of x ?

(ii) If the perimeter of triangle is at most 82 cm, then what is the maximum value of x ?

(iii) Find x if sum of first two sides of triangle is more than the third side at least by 6 cm.



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CHAPTER: SEQUENCE AND SERIES

S.NO.	QUESTIONS	MARKS
1.	The various numbers occurring in a sequence are called (i) Series (ii) terms (iii) general term (iv) none of these	1
2.	Third term of the sequence $\{a_n\}$, whose nth term is $a_n = \frac{n+\frac{1}{2}}{n}$, is (i) 3 (ii) 5/4 (iii) 9/8 (iv) 7/6	1
3.	Given G.P. 1, 0.12, 0.0144,..... the common ratio is (i) 1 (ii) 12 (iii) 1.2 (iv) 0.12	1
4.	The next two terms of the geometric sequence 1, -1/2, 1/4, -1/8,..... is (i) -1/12 (ii) -1/16 (iii) 1/16 (iv) 1/12	1
	Directions for Q5: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	
5.	Assertion: for natural numbers 1, 2, 3, 4, 5 the numbers 2, 3, 4 are three arithmetic means between 1 and 5. Reason : in any sequence the term in between the extreme values are called AM's .	1
6.	Assertion : GM between 0.008 and 0.2 is 0.04 . Reason : If x, y, z are in GP, then y is GM between x and y.	1
7.	Find the value of k for which -2/7, k, -7/2 are in GP .	2
8.	Find the first two terms of the sequence whose nth term is given by $a_n = \frac{n+2}{n+1}$	2
9.	The 4 th , 7 th and 10 th terms of a GP are a, b and c respectively. Show that $b^2 = ac$.	3
10.	The product of three terms in GP is 1000. If 6 and 7 are added to second and third terms respectively, the terms form an AP, find the GP.	5

11.	Case Study Question	4
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	With all round development in infrastructure METRO plays an important role in producing transport as well as beautifying the city. If we look around, different designs	
	<p>Of pillars have been erected between two stations. As class XI student I can consider two stations as two numbers and pillars erected at equal distances as means in sequence. Let us take the positions of two stations A and B as 1 km stone and 3 km stone and 14 pillars have been erected between two stations.</p> <p>Answer the following :</p> <p>(i) If station A is considered first terms then station B will be which term with respect to 14 pillars?</p> <p>(ii) What is difference between two consecutive means?</p> <p>(iii) What is the position of third pillar?</p>	



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COMPETENCY ASSIGNMENT

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GRADE: XI

CHAPTER: COMPLEX NUMBER

S.NO.	QUESTIONS	MARKS
1.	For the complex number $-3i + 6$, $\text{Re}(-3i + 6)$ is (i) 6 (ii) -3 (iii) -6 (iv) $-3i$	1
2.	The conjugate of complex number $7i - 3$ is (I) $7 - 3i$ (ii) $-7i - 3$ (iii) $7i + 3$ (iv) $3 + 7i$	1
3.	Conjugate of complex number $(-a, b)$ is (i) $(-a, b)$ (ii) (a, b) (iii) $(-a, -b)$ (iv) $(a, -b)$	1
4.	Which of the complex number is lie on y-axis (i) $2i$ (ii) $4 - 3i$ (iii) 5 (iv) $1 + i$	1
	Directions for Q5: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	
5.	Assertion: for the complex number $7i - 5$, real part is 7. Reason : $\text{Re}(a + ib) = a$	1
6.	Assertion : If $2x + 3i = 5 - y + iy$, then x is 1. Reason : if two complex number are equal, then their corresponding real and imaginery parts are equal.	1
7.	Write an example of purely imaginery complex number .	2
8.	Express $i^9 + i^{19}$ in the form of $a + ib$.	2
9.	Solve for x and y, $(1 + i)y^2 + (6 + i) = (2 + i)x$	3
10.	If $\frac{(1+i)^3}{1-i} - \frac{(1-i)^3}{1+i} = x + iy$. Find $x + y$.	5

11.	Case Study Question	4
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	During physical education period, students are also taught about different positions	
	<p>for yoga and their importance. During one such period a class is made to sit on the ground arranged in rows and columns. Positions of 5 students, A, B,C, D are shown below . Taking horizontal line along x – axis and vertical line along y-axis answer the following</p> <p>(i) What is position of B as a complex number ?</p> <p>(ii) What is position of D as a complex number ?</p> <p>(iii) What is conjugate of a complex number represented by E + A ?</p>	



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CHAPTER : RELATION AND FUNCTIONS

S.NO.	QUESTIONS	MARKS
1.	If $R = \{ (x, y) : x, y \in Z, x^2 + y^2 \leq 4 \}$ is a relation on Z , then domain of R is (i) $\{0, 1, 2\}$ (ii) $\{0, -1, -2\}$ (iii) $\{-2, -1, 0, 1, 2\}$ (iv) none of these	1
2.	If the set A has p elements, B has q elements, then the number of elements in $A \times B$ is (i) $P+q$ (ii) $p+Q+1$ (iii) pq (iv) p	1
3.	The range of the function $f(x) = \frac{x-3}{ x-3 }$ is (i) R (ii) $[-1, 1]$ (iii) $\{-1, 1\}$ (iv) $\{-1, 0, 1\}$	1
4.	Range of $f(x) = \frac{1}{1-2\cos x}$ is (i) $[1/3, 1]$ (ii) $[-1, 1/3]$ (iii) $(-\infty, -1] \cup [1/3, \infty)$ (iv) $[-1/3, 1]$	1
	Directions for Q5: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	
5.	Assertion: Let $A = \{1, 2, 3, 4, 5, 6\}$, then the number of ordered pairs in any relation on A cannot exceed 64. Reason: A relation on set A is a subset of A .	1
6.	Assertion : the ordered pair with entries 7 and a is $(7, a)$. Reason : for ordered pair (a, b) a represents first entry and b represents second entry.	1
7.	If $A \times B = \{ (a, 1), (b, 3), (a, 3), (b, 1), (a, 2), (b, 2) \}$, find A and B .	2
8.	Let R be the relation on the set N of natural numbers defined by $R = \{ (a, b) : a + 3b = 12, a \in N, b \in N \}$. Find R and Domain of R .	2

9.	Let R be a relation on Q defined by $R = \{(a, b) : a, b \in Q \text{ and } a-b \in Z\}$. Show that (i) $(a, a) \in R$ for all $a \in Q$ (ii) $(a, b) \in R \Rightarrow (b, a) \in R$ (iii) $(a, b) \in R$ and $(b, c) \in R \Rightarrow (a, c) \in R$	3
10.	Let $f : R \rightarrow R$ be given by $f(x) = x^2 + 3$. Find (i) $\{x : f(x) = 28\}$ (ii) the preimages of 39 and 2 under f .	5
11.	Find domain and range of $f(x) = \frac{x-2}{x-1}$	5
12.	Case Study Question	4

	<p>Let $A = \{x : x < 5, x \in N\}$ and $B = \{x : x \leq 2, x \in W\}$. based on the above information, answer the questions:</p> <p>(i) Write $A \times B$ as a set of ordered pairs .</p> <p>(ii) Find $(A \cup B) \times (A \cap B)$</p> <p>(iii) A relation R from A to B is defined by $R = \{(x, y) : x + y = 4, x \in A, y \in B\}$. Find R.</p>	
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CHAPTER: TRIGONOMETRY

S.NO.	QUESTIONS	MARKS
1.	Which of the following is incorrect ? (I) $\sin \theta = \frac{1}{5}$ (ii) $\cos \theta = 1$ (iii) $\sec \theta = \frac{1}{2}$ (iv) $\tan \theta = 20$	1
2.	If $\alpha + \beta = \frac{\pi}{4}$, then the value of $(1 + \tan \alpha)(1 + \tan \beta)$ is equal to (i) 1 (ii) 2 (iii) -2 (iv) not defined	1
3.	If $\cos P = \frac{1}{7}$ and $\cos Q = \frac{13}{14}$, where P and Q both are acute angles. Then, the value of P - Q is (i) $\frac{\pi}{6}$ (ii) $\frac{\pi}{3}$ (iii) $\frac{\pi}{4}$ (iv) $\frac{5\pi}{12}$	1
4.	The value of $\tan x \sin(\frac{\pi}{2} + x) \cos(\frac{\pi}{2} - x)$ is (i) 1 (ii) -1 (iii) $\frac{1}{2} \sin 2x$ (iv) none of these	1
	Directions for Q5: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	
5.	Assertion: if $\sec x + \tan x = k$, then $\sec x - \tan x = \frac{1}{k}$ Reason: $\sec^2 x - \tan^2 x = 1$	1
6.	Assertion : $\tan(3\pi - \theta) = \tan \theta$ Reason: $\tan(\pi - \theta) = -\tan \theta$ and $\tan(2\pi + A) = \tan A$	1
7.	Represent 20 degree as radian measure .	2
8.	A wheel makes 270 revolutions in one minute. Through how many radians does it turn in one second?	2

9	Find in degree the angle subtended at the centre of a circle of diameter 60 cm by an arc of length 22 cm.	3
10.	Prove that : $\frac{\sin (A+B)+\sin (A-B)}{\cos (A+B)+\cos (A-B)} = \tan A$	5
11.	Prove that $\sin 5A = 5\sin A - 20\sin^3 A + 16 \sin^5 A$	5
12.	Case Study Question	4

	<p>Given: $\sin x - \sin y = a$ and $\cos x - \cos y = b$. Based on the above information, answer the following questions :</p> <p>(i) find the value of $\cos (x - y)$.</p> <p>(ii) Find the value of $\tan \left(\frac{x+y}{2}\right)$</p> <p>(iii) Find the value of $\sin (x + y)$.</p>	
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COMPETENCY ASSIGNMENT

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CHAPTER: SETS

S.NO.	QUESTIONS	MARKS
1.	Which set is empty ? $A = \{ x : x^2 - 3 = 0 \text{ and } x \text{ is rational} \}$ $B = \{ x : x \text{ is an even prime number} \}$ $C = \{ x : 4 < x < 5, x \in N \}$ $D = \{ x : x^2 = 25, \text{ and } x \text{ is odd integer} \}$	1
2.	If A and B are two sets, then $A \cap (A \cup B)$ equals (i) A (ii) B (iii) \emptyset (iv) $A \cap B$	1
3.	If $A = \{ 1, 3, 5, B \}$ and $B = \{ 2, 4 \}$, then (i) $4 \in A$ (ii) $\{ 4 \} \subset A$ (iii) $B \subset A$ (iv) none of these	1
4.	Let A and B be two sets such that $n(A) = 16$, $n(B) = 14$, $n(A \cup B) = 25$. Then, $n(A \cap B)$ is (i) 30 (ii) 50 (iii) 5 (iv) none of these	1
	Directions for Q5: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	
5.	Assertion: If $A \subset B$, then $A - B = \emptyset$ Reason: If A and B are disjoint sets, then $n(A \cup B) = n(A) + n(B)$	1
6.	Assertion : In a set of prime numbers, any two elements are coprime. Reason : HCF of two coprime numbers is 1.	1
7.	Describe sets in set builder form : $A = \{ 10, 11, 12, 13, 14, 15 \}$	2
8.	Write the set of all positive integers whose cube is odd.	2
9.	Write the following subsets of R as intervals : (I) $\{ x : x \in R, -4 < x \leq 6 \}$ (ii) $\{ x : x \in R, -12 < x < -10 \}$ (Iii) $\{ x : x \in R, 0 \leq x < 7 \}$	3

10.	Prove that : $A \subseteq B, B \subseteq C$ and $C \subseteq A \Rightarrow A = C$	5
11.	Case Study Question	4

	<p>In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee.</p> <p>(i) The number of students taking at least one drink, is ?</p> <p>(ii) The number of students taking tea only, is ?</p> <p>(iii) The number of students taking coffee only, is?</p>	
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