

XII MATHEMATICS FORMULAS

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XII MATHEMATICS	ANEES HUSSAIN
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FORMULAE

CHAPTER: 1A

1. Every non empty subset of \mathbb{R} bounded above (resp. below) has least upper bound (l.u.b) (resp. greatest lower bound) (g.l.b).
2. An upper bound M^* of A is called l.u.b of A if $M^* \leq M$
3. A lower bound m^* of A is called g.l.b of A if $m \leq m^*$
4. A function $f : A \rightarrow B$ is said to be "one-one" (or injective) if distinct elements of A have distinct images.
5. A function $f : A \rightarrow B$ is said to be "onto" (or surjective), if the range of 'f' is B .
6. A function $f : A \rightarrow B$ is said to be "one-one onto" (or bijective) if 'f' is both "one-one" and "onto" B
7. Let $f : A \rightarrow B$ and $g : B \rightarrow C$ be functions. Then the function $h : A \rightarrow C$, defined by $h(x) = g(f(x)) \forall x \in A$ is called composite function of 'f' and 'g' denoted by $g \circ f$
8. If $g \circ f = I_A$ and $f \circ g = I_B$ then g is called the "inverse of" denoted by f^{-1} .
9. A function $f : X \rightarrow \mathbb{R}$ is called "even" if $f(-x) = f(x)$ for all x in X .
10. A function $f : X \rightarrow \mathbb{R}$ is called "odd" if $f(-x) = -f(x)$ for all x in X .

CHAPTER: 1B

A sequence is a function.

For given sequences $\{a_n\}$ and $\{b_n\}$ the sum, difference, product and scalar multiplication are defined as

- $\{a_n\} + \{b_n\} = \{a_n + b_n\}$
- $\{a_n\} - \{b_n\} = \{a_n - b_n\}$
- $\{a_n\}\{b_n\} = \{a_n b_n\}$
- $c\{a_n\} = \{c a_n\}$, $c \in \mathbb{R}$

If a sequence is monotonic increasing, it's divergent. (I.e. when it returns a value ∞)

If a sequence returns an integer value it's convergent

Prepared By: Ahsan Abdullah Patel

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FORMULAE

CHAPTER: 2

CARTESIAN AND POLAR COORDINATE SYSTEM'S RELATIONSHIP

- $x = r \cos \theta, y = r \sin \theta$
- $r = \sqrt{x^2 + y^2}$
- $\theta = \tan^{-1}(y/x)$
- $P(x, y) = (r, \theta)$

DISTANCE BETWEEN TWO POINTS (OR A POINT AND LINE):

- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- $d = \sqrt{r_1^2 + r_2^2 - 2r_1r_2 \cos(\theta_2 - \theta_1)}$
- $d = \left| \frac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}} \right|$

[(x_1, y_1) are coordinates of point & a, b, c are coefficients]

DIVISION POINT:

- Internal division:

$$D(x, y) = \left(\frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2} \right)$$

- External division:

$$D(x, y) = \left(\frac{m_1x_2 - m_2x_1}{m_1 - m_2}, \frac{m_1y_2 - m_2y_1}{m_1 - m_2} \right)$$

- Mid point:

$$M(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

- Centroid:

$$G(x, y) = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

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