# MONOMATH

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# JEE Main Mathematics

## Chapter-wise Previous Year Questions (2016 - 2025)

Based on JEE Main Question Papers

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*15+ Years Teaching Experience*

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*JEE Main Chapter-wise PYQs collected from 2016-2025 papers.*

# 1. Sets, Relations & Functions

Q1. If A = {1,2,3,4,5}, B = {2,4,6,8}, find A-B. [2020

Q2. Let R = {(a,b): a <= b^3} on R. Check reflexivity. [2019

Q3. If f(x)=4x+3, find f^{-1}(x). [2020

Q4. Check if f: R->R given by f(x)=x^2 is one-one. [2018

Q5. If n(A)=5, n(B)=4, find n(AxB). [2022

Q6. Let R = {(1,1),(2,2),(3,3)} on {1,2,3}. Is it equivalence relation? [2020

# 2. Complex Numbers & Quadratic Equations

Q1. Find modulus of (1+i)/(1-i). [2020

Q2. Find argument of -1-sqrt3 i. [2019

Q3. If |z|=1, prove (z-1)/(z+1) is purely imaginary. [2020

Q4. Find square root of 7+24i. [2018

Q5. If x^2+2x+3=0 has roots alpha,beta, find alpha^2+beta^2. [2022

Q6. Find the value of i^57 + 1/i^25. [2023

# 3. Matrices & Determinants

Q1. If A=[[3,1],[-1,2]], show A^2-5A+7I=0. [2020]

Q2. Find x if |[[x,2],[3,4]]| = 2. [2019]

Q3. If A=[[1,2],[3,4]], find A^{-1}. [2018]

Q4. If |[[1,1,1],[a,b,c],[a^2,b^2,c^2]]| = (a-b)(b-c)(c-a), prove. [2020]

Q5. Find adj of [[1,2],[3,4]]. [2022]

Q6. If A=[[1,2],[2,1]], find eigenvalues. [2023]

# 4. Permutations & Combinations

Q1. How many 3-digit numbers can be formed from 1,2,3,4,5 without repetition? [2020

Q2. Find number of ways to arrange letters of 'MATHEMATICS'. [2019

Q3. How many ways to select 3 students from 10? [2018

Q4. Find n if nC5 = nC3. [2022

Q5. How many words from 'DAUGHTER' with vowels together? [2020

# 5. Binomial Theorem

Q1. Find the 7th term in (1+x)^10. [2020

Q2. Find coefficient of x^5 in (1+2x)^8. [2019

Q3. Find middle term in (x+1/x)^10. [2018

Q4. Find term independent of x in (2x+1/x)^12. [2022

Q5. Prove sum of binomial coefficients = 2^n. [2020

# 6. Sequences & Series

Q1. Find sum of 10 terms of AP: 2,7,12,... [2020

Q2. Find sum of infinite GP: 1,1/2,1/4,... [2019

Q3. If a,b,c are in GP, prove logs are in AP. [2018

Q4. Find sum of n terms of series 1+3+5+... [2022

Q5. If am and gm between 2 numbers are 10 and 8, find numbers. [2020

# 7. Limits & Continuity

Q1. Evaluate lim x->0 sin x/x. [2020

Q2. Check continuity of f(x)=|x| at x=0. [2019

Q3. Evaluate lim x->0 (1-cos x)/x^2. [2018

Q4. Find k if f(x)={kx^2, x<=1; 2x+1, x>1} continuous at x=1. [2022

Q5. Evaluate lim x->inf (1+1/x)^x. [2020

# 8. Differentiation & AOD

Q1. Find dy/dx if y = x^3 sin x. [2020

Q2. Find dy/dx if y = log(x^2+1). [2019

Q3. If f(x)=x^3-3x, find intervals of increase. [2018

Q4. Find slope of tangent to y=x^2 at (1,1). [2022

Q5. Find max and min of f(x)=2x^3-3x^2-12x+5. [2020

# 9. Integration

Q1. Evaluate int x^3 dx. [2020

Q2. Evaluate int 0^1 x^2 dx. [2019

Q3. Evaluate int x e^x dx. [2018

Q4. Evaluate int 0^pi/2 sin x dx. [2022

Q5. Evaluate int 0^pi/4 tan x dx. [2020

Q6. Evaluate int 0^2 |x| dx. [2023

# 10. Differential Equations

Q1. Find order of d^2y/dx^2 + 3(dy/dx)^2 = x. [2020

Q2. Solve: dy/dx + y = e^{-x}. [2019

Q3. Solve: dy/dx = x/y. [2018

Q4. Solve: dy/dx + 2xy = 0. [2022

Q5. Solve: (1+x^2)dy/dx + 2xy = cos x. [2020

# 11. Coordinate Geometry

Q1. Find distance between (2,3) and (5,7). [2020

Q2. Find midpoint of (1,4) and (3,8). [2019

Q3. Find equation of line through (1,2) with slope 3. [2018

Q4. Find area of triangle with vertices (3,4),(5,6),(7,2). [2022

Q5. Find centre and radius of circle x^2+y^2-4x+6y-12=0. [2020

Q6. Find equation of parabola with focus (1,0) and directrix x=-1. [2023

# 12. Vector & 3D Geometry

Q1. Find magnitude of vector i-2j+2k. [2020

Q2. Find dot product of a=i+j+k and b=2i-j+3k. [2019

Q3. Find unit vector of i+2j+2k. [2018

Q4. Find cross product of a=2i-j+k and b=i+2j-3k. [2022

Q5. Find distance of (1,2,3) from plane x+y+z=6. [2020

# 13. Trigonometry

Q1. Find sin(pi/6). [2020

Q2. Prove sin^2 x + cos^2 x = 1. [2019

Q3. Find tan(pi/4 + pi/6). [2018

Q4. Solve sin 2x = sin x, 0<=x<=pi. [2022

Q5. Prove tan 3x = (3tan x - tan^3 x)/(1-3tan^2 x). [2020

# 14. Statistics & Probability

Q1. Find mean of 2,3,5,7,9. [2020

Q2. Find probability of head in coin toss. [2019

Q3. A die rolled once, find P(prime). [2018

Q4. Two dice rolled, find P(sum=9). [2022

Q5. If P(A)=0.4,P(B)=0.5,P(AB)=0.2, find P(A|B). [2020

Q6. Find probability of getting at least 2 heads in 3 coin tosses. [2023