### **Q1. If A=[1234]A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}A=[13​24​], then det⁡(A)\det(A)det(A) is:**

a) -2  
 b) -1  
 c) 2  
 d) 10

**Answer:** a) -2

### **Q2. The series ∑n=1∞1n2\sum\_{n=1}^{\infty} \frac{1}{n^2}∑n=1∞​n21​ converges to:**

a) π2/6\pi^2/6π2/6  
 b) 1  
 c) ∞\infty∞  
 d) ln⁡(2)\ln(2)ln(2)

**Answer:** a) π2/6\pi^2/6π2/6

### **Q3. The derivative of f(x)=xxf(x) = x^xf(x)=xx is:**

a) xxx^xxx  
 b) xx(1+ln⁡(x))x^x (1 + \ln(x))xx(1+ln(x))  
 c) xx−1x^{x-1}xx−1  
 d) ln⁡(x)\ln(x)ln(x)

**Answer:** b) xx(1+ln⁡(x))x^x (1 + \ln(x))xx(1+ln(x))

### **Q4. The Laplace transform of eate^{at}eat is:**

a) 1s−a\frac{1}{s-a}s−a1​  
 b) 1s+a\frac{1}{s+a}s+a1​  
 c) as\frac{a}{s}sa​  
 d) s−as-as−a

**Answer:** a) 1s−a\frac{1}{s-a}s−a1​ (for s>as>as>a)

### **Q5. If P(A)=0.4,P(B)=0.5,P(A∩B)=0.2P(A) = 0.4, P(B) = 0.5, P(A \cap B) = 0.2P(A)=0.4,P(B)=0.5,P(A∩B)=0.2, then P(A∪B)P(A \cup B)P(A∪B) is:**

a) 0.9  
 b) 0.7  
 c) 0.6  
 d) 1.0

**Answer:** b) 0.7

### **Q6. Which of the following is an eigenvalue of [2003]\begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}[20​03​]?**

a) 1  
 b) 2  
 c) 5  
 d) -3

**Answer:** b) 2 (and also 3, but only one option is correct)

### **Q7. The integral ∫0πsin⁡(x)dx\int\_0^\pi \sin(x) dx∫0π​sin(x)dx equals:**

a) 0  
 b) 1  
 c) 2  
 d) π/2\pi/2π/2

**Answer:** c) 2

### **Q8. The solution to the differential equation dydx=y\frac{dy}{dx} = ydxdy​=y is:**

a) y=ln⁡(x)y = \ln(x)y=ln(x)  
 b) y=exy = e^xy=ex  
 c) y=Cexy = Ce^xy=Cex  
 d) y=x2y = x^2y=x2

**Answer:** c) y=Cexy = Ce^xy=Cex

### **Q9. The rank of the zero matrix of order 3×33 \times 33×3 is:**

a) 0  
 b) 1  
 c) 2  
 d) 3

**Answer:** a) 0

### **Q10. If z=3+4iz = 3 + 4iz=3+4i, then ∣z∣|z|∣z∣ is:**

a) 5  
 b) 7\sqrt{7}7