# ZENITH TUTORIALS MTH 101 PDF

1. If $\frac{{}^{n}P_{r}}{{}^{n}C_{r}} - 1 = 5$, find $r$ (a) 2 (b) 3 (c) 4 (d) 5 **Answer: B**
2. $\frac{{}^{n}C_{4}}{{}^{n}P_{2}} = \frac{1}{2}$, find $n$? (a) 2 (b) 3 (c) 4 (d) 6 **Answer: D**
3. Express in terms of $x$ and $y$ $1 - 3\log_{10} y = \log_{10} x$ (a) $x^2y^2 = 5$ (b) $xy^3 = 10$ (c) $y^3x^4 = 15$ (d) $x^3y^2 = 0$ **Answer: B**
4. $12, x, y, 324, 972$, find the sum of $x$ and $y$ (a) 144 (b) 52 (c) 75 (d) 109 **Answer: A**
5. The order of a matrix is determined by _____ (a) number of column × number of row (b) number of row × number of column (c) number of column ÷ number of row (d) none of the above **Answer: B**
6. In how many ways can the word MATHEMATICS be arranged (a) 3257128 (b) 4635285 (c) 4989600 (d) all of the above **Answer: C**
7. If $P = \begin{pmatrix} 2 & -1 \\ 4 & 3 \end{pmatrix}$ $Q = \begin{pmatrix} 1 & -3 \\ 0 & 3 \end{pmatrix}$ find $|QP - P|$ (a) 0 (b) 1 (c) 2 (d) 3 **Answer: A**
8. Find the determinant of $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 2 \\ 2 & 3 & 1 \end{pmatrix}$ (a) 6 (b) 11 (c) 13 (d) 15 **Answer: B**
9. $\log_{10} y + 2\log_{10} x = 3$, find $y$ in terms of $x$? (a) $y = \frac{10}{x^2}$ (b) $y = \frac{1000}{x^2}$ (c) $y = \frac{100}{x}$ (d) $y = 1000x$ **Answer: B**
10. Find the common ratio, if sum to infinity is $-\frac{1}{10}$ and first term is $-\frac{1}{8}$ (a) $-\frac{1}{2}$ (b) $-\frac{1}{4}$ (c) $-\frac{1}{8}$ (d) $-\frac{1}{16}$ **Answer: B**
11. Find the sum to infinity of the exponential sequence $a, \frac{a^3}{2b},$ (a) $\frac{2ab}{2b-a^2}$ (b) $\frac{ab}{a^2}$ (c) $\frac{2b-a^2}{2ab}$ (d) all of the above **Answer: A**
12. Evaluate ${}^{7}C_{3}$ (a) 32 (b) 33 (c) 34 (d) 35 **Answer: D**
13. Evaluate ${}^{9}C_{4}$ (a) 162 (b) 126 (c) 136 (d) 132 **Answer: B**
14. How many three digit numbers can be formed from 32564 without repeating any of the digits (a) 40 (b) 50 (c) 60 (d) 70 **Answer: C**
15. In how many ways can three sit be occupied if five people are willing to sit (a) 36 (b) 50 (c) 60 (d) 48 **Answer: C**
16. Find the values of $n$ if ${}^{n}P_{3} - 6({}^{n}C_{4}) = 0$ (a) 7 (b) 8 (c) 9 (d) 10 **Answer: A**
17. If ${}^{6}P_{r} = 6$, find the value of ${}^{6}P_{r+1}$ (a) 23 (b) 34 (c) 30 (d) 43 **Answer: C**
18. If $\frac{{}^{8}P_{x}}{{}^{8}C_{x}} = 6$, find $x$ (a) 4 (b) 3 (c) 7 (d) 5 **Answer: B**
19. If ${}^{6}P_{r+1} = {}^{6}P_{2}$, what is $r$ (a) 1 (b) 2 (c) 3 (d) 4 **Answer: A**
20. If ${}^{18}C_{r} - {}^{18}C_{r+2} = 0$, find ${}^{r}C_{5}$ (a) 55 (b) 47 (c) 46 (d) 56 **Answer: D**
21. Simplify $\frac{{}^{k}P_{7}}{{}^{k}C_{7}}$ (a) 5050 (b) 5070 (c) 5000 (d) 5040 **Answer: D**
22. If $\alpha$ and $\beta$ are the roots of the equation $2x^2 - 5x - 3 = 0$, find $\alpha^2 + \beta^2 - \alpha^2\beta^2$ (a) 5 (b) 6 (c) 7 (d) 8 **Answer: C**
23. If $\alpha$ and $\beta$ are the roots of the equation $2x^2 - 3x + 1 = 0$, find $(\alpha + 1) + (\beta + 1) + 2\alpha\beta$ (a) $\frac{7}{2}$ (b) $\frac{11}{2}$ (c) $\frac{9}{2}$ (d) $\frac{15}{2}$ **Answer: C**
24. If $\alpha$ and $\beta$ are the roots of the equation $3x^2 - 5x + 1 = 0$, find $\alpha^2 - \alpha\beta + \beta^2$ (a) $\frac{16}{9}$ (b) 1.88 (c) 1.90 (d) 1.27 **Answer: A**

# ZENITH TUTORIALS MTH 101 PDF

25. Simplify $\frac{1}{4}\left(\frac{{}^{n}P_5}{{}^{n}C_4}+100({}^{n}P_0)\right)$ (a) $6n+1$ (b) $6n+2$ (c) $6n-2$ (d) $6n+2$ **Answer: A**
26. Simplify $\frac{{}^{n}P_3}{{}^{n}C_2}+{}^{n}P_0$ (a) $2n-3$ (b) $2n+3$ (c) $n-3$ (d) $n+3$ **Answer: A**
27. Find the term independent of $y$ in the expansion of $\left(3y+\frac{2}{y}\right)^8$ (a) 90722 (b) 90720 (c) 90700 (d) 90710 **Answer: B**
28. Find the term independent of $a$ in the expansion of $\left(a^2-\frac{2}{a}\right)^9$ (a) 5300 (b) 5330 (c) 5376 (d) 5367 **Answer: C**
29. Find the term independent of $x$ in the binomial expansion of $\left(3x^2-\frac{1}{3x}\right)^{15}$ (a) $\frac{1010}{81}$ (b) $\frac{1100}{81}$ (c) $\frac{1001}{81}$ (d) $\frac{1110}{81}$ **Answer: C**
30. Find the constant term in the binomial expansion of $\left(2x-\frac{3}{x}\right)^8$ (a) 90722 (b) 90710 (c) 90720 (d) 90721 **Answer: C**
31. Find the coefficient of $x^2y^4$ in the expansion of $(x+2y)^6$ (a) 240 (b) 250 (c) 260 (d) 270 **Answer: A**
32. Find the coefficient of $x^2$ in the expansion of $(9+3x)^6$ (a) 885763 (b) 885735 (c) 885776 (d) 885375 **Answer: B**
33. Find the 4th term in the expansion of $(a-b)^6$ in the ascending power (a) $-20a^3b^3$ (b) $20a^4b^5$ (c) $20a^3b^2$ (d) $-20a^5b^3$ **Answer: A**
34. Find the sum of the coefficients of $x^3$ and $x^4$ in the expansion of $\left(1-\frac{1}{2}x\right)^6$ (a) $-\frac{25}{16}$ (b) $\frac{16}{25}$ (c) $\frac{18}{29}$ (d) $\frac{13}{15}$ **Answer: A**
35. What is the coefficient of the fifth term in $(3x-2y)^7$ (a) 25321 (b) 12015 (c) 15120 (d) 21630 **Answer: C**
36. Express in partial fraction $\frac{f(x)}{(ax^2+bx+c)(ax+b)^2}$ **Answer:** $\frac{A}{(ax+b)}+\frac{B}{(ax+b)^2}+\frac{Cx+D}{(ax^2+bxx+c)}$
37. $x^3+5x^2-2x-24=0$, if $(x+3)$ is a factor, find the other factors (a) $(x+1)(x+2)$ (b) $(x+4)(x-2)$ (c) $(x+3)(x-5)$ (d) $(x+1)(x+3)$ **Answer: B**
38. $\frac{A}{2(x^2+1)}+\frac{B}{2(x^2+x-2)}=\frac{1-2x^2}{(x^2+1)(x^2+3x-2)}$ find $A-B$ (a) 0 (b) $-1$ (c) 1 (d) 2 **Answer: A**
39. Find $X\Delta Y$ if $X=\{2,3,a,m\}$ and $Y=\{-2,-3,a,k\}$ **Answer:** $\{-2,-3,2,3,m,k\}$
40. Find $x$, $\frac{3^{-5x}}{9^{1-x}}=27^{x+1}$ (a) $\frac{2}{3}$ (b) $\frac{-5}{6}$ (c) $\frac{4}{9}$ (d) $\frac{3}{8}$ **Answer: B**
41. ${}^{3n}C_2=15$, find $n$ (a) 0 (b) 1 (c) 2 (d) 3 **Answer: C**
42. Find the coefficient of $x^2$ in $(1+3x)^5$ (a) 20 (b) 50 (c) 70 (d) 90 **Answer: D**
43. If the second term and fourth term of a G.P are 8 and 32. Find the sum of the first 10 terms (a) 2165 (b) 4092 (c) 8265 (d) 12378 **Answer: B**
44. Calculate the common ratio if the 4th term is 192 and the 9th term is 6 (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{1}{8}$ **Answer: C**
45. If $x^2-12K+K=0$ has equal roots, find $K$? (a) 20 (b) 25 (c) 36 (d) 48 **Answer: C**
46. What is ${}^{8}C_2+{}^{5}C_3$ (a) 10 (b) 28 (c) 32 (d) 38 **Answer: D**
47. The 3rd term of an exponential sequence is 360 and the 6th term is 1215. Find the first term of the sequence (a) 50 (b) 105 (c) 160 (d) 320 **Answer: C**

# ZENITH TUTORIALS MTH 101 PDF

48. If $(2k-5),(k-4),(10-3k)$ form a sequence of a G.P, find the value of $k$? (a) 0 (b) 1 (c) 2 (d) 3 **Answer: D**
49. $n!$ is equal to (a) $n(n-1)!$ (b) $n(n+1)!$ (c) $n^2$ (d) none **Answer: A**
50. $\mu=\{1,2,3,4,5,6,7,8,9,10,11,12\}, X=\{1,2,3\}, Y=\{2,4,6,8,10,12\}, Z=\{3,4,5,6,7\}$, find $(X\cup Y)\cap Z$? (a) $\{3,4,6\}$ (b) $\{1,3,6,8\}$ (c) $\{2,6,7,12\}$ (d) none **Answer: A**
51. If the root of $2x^2-7x+4=0$ are $\alpha$ and $\beta$, find $(\alpha\beta)^{-1}$ (a) $\frac{1}{2}$ (b) 2 (c) 4 (d) 8 **Answer: A**
52. In how many ways can the letter of the word TOTALITY be arranged? (a) 8251 (b) 3652 (c) 6720 (d) 2512 **Answer: C**
53. Find the root of the equation $2x^2+\frac{2}{x^2}+x+\frac{1}{x}=-3$ **Answer: $\frac{1+\sqrt{-3}}{2}$ and $\frac{1+\sqrt{-15}}{4}$**
54. In how many ways can 3 prefects be chosen out of 8 prefects (a) 20 (b) 28 (c) 36 (d) 56 **Answer: D**
55. If $\alpha$ and $\beta$ are the roots of the equation $x^2+x-2=0$. Find the product of the roots (a) 0 (b) $-1$ (c) $-2$ (d) 2 **Answer: C**
56. $3\log a+5\log a-6\log a=\log 64$, find $a$? (a) 5 (b) 6 (c) 7 (d) 8 **Answer: D**
57. $\begin{vmatrix}5 & 3\\ k & 2\end{vmatrix}=\begin{vmatrix}3 & 5\\ 4 & 5\end{vmatrix}$, find the value of $k$? (a) 5 (b) 3 (c) 2 (d) 1 **Answer: A**
58. Find the truth set of equation $\left(\frac{1}{4}\right)^{3x^2+1}=(128)^x$ (a) $\frac{3}{2},\frac{1}{2}$ (b) $\frac{-2}{3},\frac{-1}{2}$ (c) $\frac{\frac{5}{2}3}{2}$ (d) $\frac{4}{3},\frac{1}{2}$ **Answer: B**
59. The term $160x^2$ in the expansion of $(1+4x)^5$ refers to the (a) 1st term (b) 2nd term (c) 3rd term (d) 4th term **Answer: C**
60. Solve for $x$ in $\log_8(x^2-8x+18)=\frac{1}{3}$ (a) 2 (b) 3 (c) 4 (d) 5 **Answer: C**
61. Solve for $x$ in $3^{2x}-4(3^{x+1})+27=0$ (a) (1, 2) (b) (2, 3) (c) (4, 1) (d) 3, 5) **Answer: A**
62. In resolving partial fraction $\frac{2x^2+3x+10}{(x-1)(x+2)}=P+\frac{Q}{(x+1)}-\frac{R}{(x+2)}$. Find $P$ and $R$ (a) $2,-4$ (b) $-4,2$ (c) $2,3$ (d) $1,0$ **Answer: A**
63. Find the value of $\begin{vmatrix}0 & 3 & 2\\ 1 & 7 & 8\\ 0 & 5 & 4\end{vmatrix}$ (a) 0 (b) $-2$ (c) $-3$ (d) 4 **Answer: B**
64. If $P=\begin{pmatrix}6 & 4\\ 5 & 7\end{pmatrix}$ then the value of $|P^T|$ is? (a) 15 (b) 18 (c) 20 (d) 22 **Answer: D**
65. Simplify ${}^nP_r\div{}^nC_r$ (a) $(r-1)!$ (b) $r!$ (c) $(n-1)!$ (d) $n!$ **Answer: B**
66. The coefficient of $x^4$ in $(1-3x)^6$ is (a) 1362 (b) 1215 (c) 1278 (d) 2160 **Answer: B**
67. Express $3\log_{10}x-\frac{1}{2}\log_{10}y+1$ as a single logarithm (a) $\log_{10}\left(\frac{10x^3}{y^{\frac{1}{2}}}\right)$ (b) $\log_{10}\left(\frac{y^2x}{10}\right)$ (c) $\log\left(\frac{10y^2}{x}\right)$ (d) none **Answer: A**
68. When $x^3-2x^2+mx+4$ is divided by $x-3$, remainder is $-2$, find $m$ (a) $-2$ (b) $-3$ (c) $-4$ (d) $-5$ **Answer: D**
69. In the equation $T_r=\frac{(-1)^r(m+r-1)i}{(m-1)!r!}b^r$ what is $T_r$ when $m=3, r=3, b=\frac{5}{7}x$ (a) 0.2183 (b) 0.5148 (c) 0.0114 (d) 0.3512 **Answer: C**
70. If $A=\{-1,0,10\},\ B=\{0,5,6,8\},\ C=\{1,9,10\}$, what is $(A-C)\cup(A-B)$ (a) $\{2,0,10\}$ (b) $\{-1,0,5\}$ (c) $\{-1,0,10\}$ (d) $\{0,-1,-5\}$ **Answer: C**
71. Solve for $x$ if $\frac{1}{2}\log_x 64=16$ (a) 0.56 (b) 1.14 (c) 2.73 (d) 2.5 **Answer: B**
72. The number of elements in the power set of $A=\{a,b,c,d\}$ is (a) 8 (b) 5 (c) 4 (d) none **Answer: D**

# ZENITH TUTORIALS MTH 101 PDF

73. Find $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$ (a) 0 (b) 2 (c) 3 (d) 4 **Answer: A**

74. $\begin{vmatrix} 4 & t \\ 5 & 3 \end{vmatrix} = 32$, Find $t$? (a) $-1$ (b) $-2$ (c) $-3$ (d) $-4$ **Answer: D**

75. $\frac{{}^{n}P_{r}}{{}^{n}C_{r}}$ simplify (a) $r!$ (b) $(r-1)!$ (c) $n!$ (d) $(n-1)!$ **Answer: A**

76. The transpose of the cofactor of a square matrix is (a) adjoint (b) minor (c) determinant (d) order **Answer: A**

77. If $\alpha + \beta = 5$ and $\alpha\beta = 2$, find $\alpha^{-2} + \beta^{-2}$ (a) 2.38 (b) 4.56 (c) 5.21 (d) all **Answer: C**

78. If $K = \begin{pmatrix} 1 & 1 \\ 2 & 1 \end{pmatrix}$, find $K^2 + K$ (a) $\begin{pmatrix} 4 & 3 \\ 6 & 4 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 0 \\ 1 & 6 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 2 \\ 3 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 1 \\ 6 & 8 \end{pmatrix}$ **Answer: A**

79. If $\log_x 5 = y$ and $\log_y 5 = x$, find $\frac{x}{y}$ (a) 0 (b) 1 (c) 2 (d) 3 **Answer: B**

80. Sum $n^2 + 5n$ up to 3rd term (a) 15 (b) 20 (c) 44 (d) 48 **Answer: C**

81. Find the coefficient of $x^2$ in $(2 + 3x)^6$ (a) 1150 (b) 6218 (c) 2160 (d) 3810 **Answer: C**

82. $\log_2 x = 2.25$, find $x$ (a) 4.76 (b) 9.25 (c) 11.56 (d) 18.29 **Answer: A**

83. The sum of the first $n$ terms of a finite G.P whose ratio is greater than one is (a) $a\left(\frac{r^n-1}{r-1}\right)$ (b) $a\left(\frac{1-r^n}{r-1}\right)$ (c) $\left(\frac{r^n+1}{n^2-1}\right)$ (d) none **Answer: A**

84. Solve $5^x + 5^{2-x} = 26$ (a) 0 (b) 1 (c) 2 (d) 3 **Answer: C**

85. A matrice in which all elements are zero except the leading element is called _____ (a) diagonal matrice (b) singular matrix (c) null matrix (d) square matrix **Answer: A**

86. If $a\sqrt{5} + b\sqrt{2}$ is a square root of $95 - 30\sqrt{10}$, find the value of $'a'$and $'b'$ (a) 2, 5 (b) 5, $-3$ (c) $-3, 5$ (d) 0, 2 i **Answer: C**

87. Find the sum of the coefficient of $x^3$ and $x^4$ in the expansion of $\left(1 - \frac{1}{2}x\right)^6$ (a) $\frac{11}{16}$ (b) $\frac{-25}{16}$ (c) $\frac{-33}{16}$ (d) $\frac{27}{16}$ **Answer: B**

88. For what value of $K$ will the equation $x^2 - 14x + K$ have equal roots (a) 7 (b) $-7$ (c) $-49$ (d) none of the above **Answer: D**

89. Find the 4th term in $(2x - y)^6$ (a) $169x^2y^3$ (b) $-160x^3y^3$ (c) $160x^3y^2$ (d) $-160x^2y^2$ **Answer: B**

90. Find the 10th term of $(x + y)^{13}$ (a) $715x^4y^9$ (b) $715x^5y^7$ (c) $715x^9y^4$ (d) $715x^5y^5$ **Answer: A**

91. Find the 5th term of the binomial expansion $(3 + x)^7$ (a) $905x^5$ (b) $945x^7$ (c) $954x^4$ (d) $945x^4$ **Answer: D**

92. Find the 6th term in $(2a - b)^8$ (a) $-448a^2b^3$ (b) $-445a^3b^5$ (c) $448a^5b^3$ (d) $-448a^3b^5$ **Answer: D**

93. Find the coefficient of $x^3y^4$ term in the expansion of $(x + y)^7$ (a) 36 (b) 35 (c) 30 (d) 32 **Answer: B**

94. Find the coefficient of $x^4y^2$ term in the expansion of $(2x - y)^6$ (a) 240 (b) 230 (c) 250 (d) 220 **Answer: A**

95. Find the value of $a$ if $x^2 - 2ax + a + 2 = 0$ has equal root. (a) $2\ or -2$ (b) $1\ or -3$ (c) $2\ or -1$ (d) $-2\ or -1$ **Answer: C**

96. Find the value of $k$ for which the quadratic equation $x^2 - (k + 1)x + 5k = 19$ has equal roots (a) 7 or 12 (b) 11 or 10 (c) 11 or 7 (d) 11 or $-12$ **Answer: C**

# ZENITH TUTORIALS MTH 101 PDF

97. Find the quadratic equation whose roots are $-3-\sqrt{3}$ and $3+\sqrt{3}$ (a) $x^2-12-6\sqrt{3}=0$ (b) $x^2+12-6\sqrt{3}=0$ (c) $x^2-12+\sqrt{3}=0$ (d) $x^2+12+\sqrt{3}=0$ **Answer: A**
98. Find the quadratic equation whose roots are $5-2\sqrt{3}$ and $5+2\sqrt{3}$ (a) $x^2+10x+13=0$ (b) $x^2-10x-13=0$ (c) $x^2-10x+13=0$ (d) $x^2+10x-13=0$ **Answer: C**
99. Find the quadratic equation whose roots are $-\frac{2}{3}$ and $\frac{4}{5}$ (a) $12x^2+x-8=0$ (b) $15x^2-2x-8=0$ (c) $13x^2+2x+10=0$ (d) $15x^2+x-10=0$ **Answer: B**
100. Find the quadratic equation whose roots are $\frac{3}{7}$ and $\frac{2}{7}$ (a) $x^2-40x+16=0$ (b) $49x^2-30x+60=0$ (c) $49x^2-35x+6=0$ (d) $49x^2-25x+10=0$ **Answer: C**
101. Find the quadratic equation whose roots are 3 and $-4$ (a) $x^2-x-12=0$ (b) $x^2-2x+10=0$ (c) $x^2+12x-1=0$ (d) $x^2+x-12=0$ **Answer: D**
102. If $\alpha$ and $\beta$ are the roots of the equation $5x^2-16x-25=0$, which of the following statements is or are correct (i) $\alpha+\beta=-\frac{16}{5}$ (ii) $\alpha+\beta=\frac{16}{5}$ (iii) $\alpha+\beta=5$ (iv) $\alpha\beta=-5$ (a) I and II (b) ii and iv (c) iii only (d) iii and iv **Answer: B**
103. If $\alpha$ and $\beta$ are the roots of the equation $x^2+px+q=0$, express $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$ in terms of $p$ and $q$ (a) $\frac{p-q}{q^2}$ (b) $\frac{p^2-2q}{q^2}$ (c) $\frac{p^2-2q}{2q^2}$ (d) $\frac{p^2+2q}{2q}$ **Answer: B**
104. The roots of the equation $x^2+bx+11=0$ are $\alpha$ and $\beta$ where $b$ is a constant and $\alpha^2+\beta^2=27$. Find the value of $b$ (a) 4 (b) 6 (c) 5 (d) 7 **Answer: D**
105. If one of the roots of a quadratic equation $27x^2+ax+8=0$ is known to be the square of the other, find the value of $a$ (a) $-39$ (B) $-29$ (c) $-30$ (d) $-40$ **Answer: C**
106. If a quadratic function $y=x^2-6x+11$ is written in the form $y=a(x-h)^2+k$, find the value of $a+h+k$ (a) 6 (b) 5 (c) 4 (d) 3 **Answer: A**
107. If $f(x)=3x^2-x-6$ find $2a-h+3k$ (a) $\frac{153}{12}$ (b) $\frac{147}{12}$ (c) $\frac{149}{12}$ (d) $\frac{151}{12}$ **Answer: C**
108. If $y=2-4x-x^2$ is transformed, what is $2a-h-k$ (a) 12 (b) $-12$ (c) $-6$ (d) 6 **Answer: C**
109. If $f(x)=5-x-2x^2$ is transformed to $f(x)=a(x-h)^2+k$, find the value of $a+h+k$ (a) $\frac{20}{8}$ (b) $\frac{23}{8}$ (c) $\frac{21}{8}$ (d) $\frac{22}{8}$ **Answer: B**
110. If $f(x)=x^2-2x-3$, find $f(A)$ if $A=\begin{pmatrix}2&-1&-1\\1&2&-1\\-1&-1&2\end{pmatrix}$ (a) $\begin{pmatrix}-3&-1&-1\\3&-3&-3\\-3&-1&-1\end{pmatrix}$ (b) $\begin{pmatrix}-3&0&1\\1&3&-2\\-1&1&-4\end{pmatrix}$ (c) $\begin{pmatrix}2&1&7\\-2&0&1\\3&-2&-5\end{pmatrix}$ (d) $\begin{pmatrix}2&3&4\\1&0&-7\\6&2&-5\end{pmatrix}$ **Answer: A**
111. Let $A=\begin{pmatrix}1&0&0\\1&1&1\\4&1&2\end{pmatrix}$, find $A^{-1}$ (a) $\begin{pmatrix}0&-1&4\\3&1&0\\-2&1&5\end{pmatrix}$ (b) $\begin{pmatrix}1&0&-1\\4&-1&-2\\3&2&-3\end{pmatrix}$ (c) $\begin{pmatrix}1&0&0\\2&2&-1\\-3&-1&1\end{pmatrix}$ (d) $\begin{pmatrix}1&0&1\\2&1&-2\\2&-3&1\end{pmatrix}$ **Answer: C**
112. Let $A=\begin{pmatrix}1&0&0\\1&1&1\\4&1&2\end{pmatrix}$, find $f(A)$ if $f(x)=x^2+\frac{6}{x}+10$ (a) $\begin{pmatrix}17&0&0\\18&24&-3\\-5&-3&21\end{pmatrix}$ (b) $\begin{pmatrix}2&1&17\\0&-1&14\\2&0&5\end{pmatrix}$ (c) $\begin{pmatrix}2&4&-3\\0&-1&4\\1&0&3\end{pmatrix}$ (d) no answer **Answer: A**

# ZENITH TUTORIALS MTH 101 PDF

113. Sum the series: $S = 2 + \frac{5}{2} + \frac{8}{2^2} + \frac{11}{2^3} + \cdots \ldots \ldots \ldots$ (a) 8 (b) 10 (c) 12 (d) 14 **Answer: A**
114. If $T_n$ is the nth term of a linear sequence, then the common difference $(d)$ can be written as? (a) $T_{n-1} - T_n$ (b) $T_{n-1} + T_n$ (c) $T_n - T_{n-1}$ (d) $\frac{T_n}{T_{n-1}}$ **Answer: C**
115. If $T_n$ is the nth term of an exponential sequence, then the common ratio $(r)$ can be written as (a) $T_{n-1} - T_n$ (b) $T_{n-1} + T_n$ (c) $T_n - T_{n-1}$ (d) $\frac{T_n}{T_{n-1}}$ **Answer: D**
116. Find the rank of the coefficient matrix and the augmented matrix from the system of equations $x + y = 1, x + 2y + z = 1, x + y + z = 2$ (a) 2, 3 (b) 3, 3 (c) 1, 3 (d) 3, 2 **Answer: B**
117. Let $A = \begin{pmatrix} 2 & -1 \\ 1 & 3 \end{pmatrix}$, find $f(A)$ if $f(A) = x^2 - 2x + 3$ (a) $\begin{pmatrix} 2 & -3 \\ 3 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & -3 \\ 3 & 5 \end{pmatrix}$ (c) $\begin{pmatrix} 0 & -1 \\ 4 & 3 \end{pmatrix}$ (d) none of the above **Answer: B**
118. Given the 1st four terms of a series $\frac{3}{5} - \frac{5}{5^2} + \frac{7}{5^3} - \frac{9}{5^4} + \ldots \ldots \ldots \ldots \ldots \ldots$, the nth term is? (a) $1^n . \frac{2n+1}{5^n}$ (b) $-(-1)^n . \frac{2n+1}{5^n}$ (c) $1^n . \frac{5n+1}{2^n}$ (d) $(-1)^n . \frac{2n+1}{7^n}$ **Answer: B**
119. Given the 1st four terms of a series $\frac{3}{5} - \frac{5}{5^2} + \frac{7}{5^3} - \frac{9}{5^4} + \ldots \ldots \ldots \ldots$, the finite sum as $n$ grows to infinity is (a) $\frac{9}{16}$ (b) $\frac{16}{25}$ (c) $\frac{4}{9}$ (d) $\frac{4}{5}$ **Answer: C**
120. The sum of the first 6 terms of the exponential sequence 18, 6, 2……. Is (a) $\frac{728}{27}$ (b) $\frac{727}{28}$ (c) $\frac{728}{28}$ (d) $\frac{729}{27}$ **Answer: A**
121. Sum the series: $S = 1 + \frac{2}{2^1} + \frac{3}{2^2} + \frac{4}{2^3} + \ldots \ldots \ldots \ldots$ (a) 2 (b) 4 (c) 6 (d) 8 **Answer: B**
122. Write 0.5 as proper fraction in its lowest term (a) $\frac{53}{98}$ (b) $\frac{53}{97}$ (c) $\frac{53}{96}$ (d) $\frac{53}{99}$ **Answer: D**
123. The sum of the 3rd and 7th terms of a linear sequence equals 6, their product is 8, find the sum of the first sixteen terms of the sequence (a) 76 or $-20$ (b) 67 or 12 (c) 16 or 7 (d) 61 or 17 **Answer: A**
124. Occasionally, G.P. is called (a) linear sequence (b) exponential sequence (c) geometric sequence (d) exponential ratio **Answer: B**
125. Given a sequence 2, 4, 6, 8…….. find the 22nd term and the sum of 30th terms respectively (a) 44, 933 (b) 42, 930 (c) 44, 930 (d) 40, 925 **Answer: C**
126. Five arithmetric means between $-3$ and 21 are (a) 1, 4, 7, 10, 13 (b) 0, 3, 6, 9, 12 (c) 1, 3, 5, 7, 9 (d) 1, 5, 9, 13, 17 **Answer: D**
127. Find the first four terms of the sequence whose general term is given by $7 \times 3^n$ (a) 21, 63, 189, 567 (b) 21, 61, 188, 567 (c) 21, 63, 189, 565 (d) 10, 63, 189, 567 **Answer: A**
128. How many subsets has the set $B = \{2, 3, 4, 5, 6, 7\}$ (a) 20 (b) 32 (c) 64 (d) 128 **Answer: C**
129. There are 100men in a club and each played at least on game, 21 played football only, 18 hockey only while 22 baseball only, 15 played all the games and an equal number played two games only, how many played football (a) 22 (b) 42 (c) 52 (d) 62 **Answer: C**
130. In a survey of 60 people, it was found that 25 read Newsweek magazine, 26 read time and 26 read fortune, also 9 read both Newsweek and Fortune, 11 read both Newsweek and Time, 8 read both Time and Fortune and 8 read no magazine at all. Find the number of people who read all the three magazines (a) 5 (b) 4 (c) 3 (d) 2 **Answer: C**
131. If $A = \{1, 2, 3, 4, 5\}$, find the power set of A? (a) 12 (b) 16 (c) 18 (d) 32 **Answer: D**

# ZENITH TUTORIALS MTH 101 PDF

132. If $P = \{1, 3, 5, 7, 9, 11\}$ and $Q = \{2, 4, 6, 8, 10, 12\}$ Determine the relationship between $P$ and $Q$ (i) Disjoint (ii) $P \cap Q = \{\}$ *or* $\phi$ (iii) $(P \cap Q) = 0$ (a) I only (b) ii only (c) I and ii only (d) I, ii and iii **Answer: C**
133. If $X =$ the set of all perfect squares less than 40, $Y =$ set of odd numbers from 1 to 15, what is $X \cap Y$ (a) $\{1, 4, 9\}$ (b) $\{1, 9\}$ (c) $\{2, 4, 25\}$ (d) $\{3, 8, 15\}$ **Answer: B**
134. Let $A$ and $B$ be set of real numbers, if the number of $n(A) = 23$, $n(B) = 12$ and $n(A \cup B) = 35$, then $A$ and $B$ are _____ sets (a) singleton (b) disjoint (c) equal (d) empty **Answer: B**
135. $P = \{x : 1 \leq x \leq 5\}, Q = \{(x + 1): 2 \leq x \leq 7\}$ where $x$ is an integer, $P$ and $Q$ are subsets of the universal set $\mu = \{x: 1 \leq x \leq 10\}$, find $(P \cap Q)^1$ and $P \cup Q$ (a) $\{1, 2, 3, 5, 7, 9, 10\}$ & $\{2, 3, 4, 5, 6, 7, 8, 10\}$ (b) $\{2, 7, 9, 10\}$ & $\{1, 4, 8\}$ (c) $\{1, 3, 7, 9\}$ & $\{2, 3, 6, 8, 10\}$ (d) none of the above **Answer: A**
136. Evaluate $\left(1 + \sqrt{2}\right)\left(1 - \sqrt{2}\right)$ (a) 0 (b) $-1$ (c) 1 (d) 2 **Answer: B**
137. If $\sqrt{32} + \sqrt{128} - \sqrt{18} + \sqrt{50} = K\sqrt{2}$, find $K$? (a) 10 (b) 12 (c) 14 (d) 16 **Answer: C**
138. Find the value of $y$ if $\sqrt{24} + \sqrt{96} - \sqrt{600} = y\sqrt{6}$ (a) $-2$ (b) $-3$ (c) 3 (d0 $-4$ **Answer: D**
139. Given that $\sqrt{3x} + \sqrt{18} - \sqrt{98} = \sqrt{50}$, find $x$? (a) 32 (b) 42 (c) 54 (d) 72 **Answer: C**
140. If $\left(3 + 4\sqrt{3}\right)\left(2 - a\sqrt{3}\right) = -18 + 2\sqrt{3}$, find $a$? (a) 0 (b) 1 (c) 2 (d) 4 **Answer: C**
141. In a sequence given by $T_n = a + bn$ the 7th and 15th terms are 19 and 43 respectively. Find the values of $a$ and $b$? (a) $-2$ & 3 (b) 2 & $-3$ (c) 0 & 2 (d) $-1$ & 3 **Answer: A**
142. $(x + 2)$, $(x + 3)$ and $(2x^2 + 1)$ are three consecutive terms of an A.P. Find the possible values of $x$? (a) $\frac{1}{2}$ and 3 (b) $-\frac{1}{2}$ and $\frac{3}{2}$ (c) $\frac{3}{2}$ and $-1$ (d) none of the above **Answer: C**
143. Find the sum of the multiple of 7 between 50 and 200 (a) 1082 (b) 1625 (c) 1570 (d) 2646 **Answer: D**
144. The second and sixth terms of a G.P ($r > 0$) are $\frac{8}{9}$ and $\frac{9}{2}$ respectively. Find the sum of the first 6th terms (a) $\frac{229}{38}$ (b) $\frac{665}{54}$ (c) $\frac{1028}{3}$ (d) $\frac{1651}{7}$ **Answer: B**
145. Find the number of elements in the power set of the set $\{1, 2, x, y, z\}$ (a) 5 (b) 25 (c) 120 (d) 32 **Answer: D**
146. A matrix which equals its transpose is called (a) symmetric matrix (b) transpose matrix (c) square matrix (d) none of the above **Answer: A**
147. The sum of the first $n$ terms of a finite G.P. whose ratio is less than one is (a) $a\left(\frac{1-r^n}{1-r}\right)$ (b) $a\left(\frac{r^n-1}{r-1}\right)$ (c) $a\left(\frac{1-r^n}{r-1}\right)$ (d) $a\left(\frac{r^n-1}{1-r}\right)$ **Answer: A**
148. If $S_n = n^2 - n + 1$, 12th term is (A) 22 (b) 26 (c0 18 (d) 16 **Answer: A**
149. Sum the integers between 1 and 1000 inclusive (a) 500600 (b) 500500 (c) 600500 (d) 500502 **Answer: B**
150. A sequence $U_1, U_2, U_3, U_4 \ldots \ldots \ldots \ldots$ is defined by the recurrence relation, $U_{n+1} = 2U_n + 5$, for all integers $n \geq 1$. If $U_1 = 2$, the value of $U_5$ is (a) 23 (b) 51 (c) 107 (d0 105 **Answer: C**
151. _____ is the root of an arithmetic number whose value cannot be obtained exactly (a) polynomial (b) surd (c) equation (d) expression **Answer: B**
152. Rationalize $\frac{3\sqrt{2}-5\sqrt{3}}{\sqrt{2}-\sqrt{3}}$ (a) $9 - 2\sqrt{6}$ (b) $5 + 2\sqrt{6}$ (c) $5 - 2\sqrt{6}$ (d) $9 + 2\sqrt{6}$ **Answer: D**
153. Rationalize the surd $\frac{2\sqrt{2}-\sqrt{3}}{\sqrt{2}+\sqrt{3}}$ (a) $7 + 3\sqrt{6}$ (b) $7 - 3\sqrt{6}$ (c) $3 - \sqrt{6}$ (d) $3 + \sqrt{6}$ **Answer: B**

# ZENITH TUTORIALS MTH 101 PDF

154. Find the square root of $7-2\sqrt{10}$ (a) $\pm(\sqrt{5}-\sqrt{2})$ (b) $\pm(\sqrt{7}-\sqrt{5})$ (c) $\pm(\sqrt{5}-\sqrt{7})$ (d) $\pm(\sqrt{2}-\sqrt{5})$ **Answer: A**
155. Find the square root of the conjugate of $7+2\sqrt{10}$ (a) $\pm(\sqrt{5}-\sqrt{2})$ (b) $\pm(\sqrt{7}-\sqrt{5})$ (c) $\pm(\sqrt{5}-\sqrt{7})$ (d) $\pm(\sqrt{2}-\sqrt{5})$ **Answer: A**
156. Find the square root of $5-2\sqrt{6}$ (a) $\pm(\sqrt{3}-2)$ (b) $\pm(\sqrt{3}-\sqrt{2})$ (c) $\pm(\sqrt{2}-\sqrt{3})$ (d) $(\sqrt{3}-\sqrt{2})$ **Answer: C**
157. Solve for $x$ in the surd equation $\sqrt{2x-2}-\sqrt{x-2}=\sqrt{x}$ (a) 1 and 2 (b) 0 and 1 (c) 0 and 2 (d) 2 and 3 **Answer: C**
158. Factorize $2x^3-9x^2+3x+4$ completely (a) $(x-1)(x-4)(2x-1)$ (b) $(x-1)(x-4)(2x+1)$ (c) $(x+1)(x-4)(2x+1)$ (d) $(x+1)(x+4)(2x+1)$ **Answer: B**
159. In the equation $5x^4+9x^3-12x^2-9x+5=0$, find the value of $\left(x-\frac{1}{x}\right)$ (a) $2,\frac{1}{5}$ (b) $3,\frac{1}{5}$ (d) $-3,\frac{1}{5}$ (d) $-2,\frac{1}{5}$ **Answer: D**
160. What is the remainder when $x^3+3x^2-13x-10$ is divided by $(x-3)$? (a) 3 (b) 4 (c) 5 (d) 6 **Answer: C**
161. Determine the square of the remainder when $3x^4-2x^3-10x-5$ is divided by $(x-4)$ (a) 34035 (b) 320098 (c) 350452 (d) 354025 **Answer: D**
162. Given that $(x-1)$ is a factor of the equation $2x^4-3x^3-px^2+33x-18=0$, what is $p$? (a) 11 (b) 12 (c) 13 (d) 14 **Answer: D**
163. Determine the values of $p$ and $q$ if $(x-1)$ and $(x+2)$ are factors of $2x^3+px^2-x+q$ (a) $p=5,q=-6$ (b) $p=3,q=-3$ (c) $p=4,q=5$ (d) $p=3,q=5$ **Answer: A**
164. Find the value of the constant $K$ if $4x^3+Kx^2+7x-23$ has a remainder 7 when divided by $2x-5$? (a) 6 (b) $-6$ (c) $-8$ (d) 8 **Answer: C**
165. If one of the zeroes of the polynomial $p(x)=x^2+qx+6$ is 3, find the value of the constant $q$ (a) 5 (b) $-5$ (c) 6 (d) $-6$ **Answer: B**
166. If $x=-3$ and $x=1$ are zeros of the polynomial $ax^3+x^2+bx+15$, where $a$ and $b$ are constants. Find the value of $a-b$ (a) 20 (b) 21 (c) 22 (d) 23 **Answer: C**
167. What is the remainder when $x^3-3x^2-13x-10$ is divided by $x-3$ (a) $-40$ (b) $-45$ (c) $-49$ (d) $-52$ **Answer: C**
168. For what value of $P$ is $(x-1)$ a factor of the polynomial $2x^4-3x^3-Px^2+33x-18$? (a) 11 (b) 12 (c) 13 (d) 14 **Answer: D**
169. Solve for $x$ an evaluate $\frac{x^2+1}{x}$ if $5x^4-36x^3+62x^2-36x+5=0$ (a) $\frac{21}{5},3$ (b) $\frac{22}{5},3$ (c) $\frac{24}{5},2$ (d) $\frac{26}{5},2$ **Answer: D**
170. Find the roots of the equation $x^3+5x^2-2x-24=0$ (a) 2, 3, and $-4$ (b) 2, $-3$, and $-4$ (c) 2, 3, and 4 (d) $-2,-3$, and $-4$ **Answer: B**
171. Factorize the equation $x^3+5x^2-2x-24=0$ (a) $(x+2)(x+3)(x-4)$ (b) $(x-2)(x-3)(x-4)$ (c) $(x-2)(x+3)(x+4)$ (d) $(x+2)(x+3)(x+4)$ **Answer: C**
172. Resolve $\frac{5x^2+9x-1}{(2x+3)(x^2+5x+2)}$ (a) $\frac{2}{2x+4}+\frac{2x-1}{x^2+5x+8}$ (b) $\frac{1}{2x+3}+\frac{2x-1}{x^2+5x+2}$ (c) $\frac{2x+3}{3x+5+6}+\frac{1}{2x+8}$ (d) $\frac{4}{9x+3}+\frac{2x+7}{3x^2+5x+1}$ **Answer: B**
173. Resolve $\frac{x+7}{x^2-7x+10}$ into partial fraction (a) $\frac{2}{x-5}+\frac{3}{x-2}$ (b) $\frac{3}{x^2+2}+\frac{6}{3x+7}$ (c) $\frac{4}{x-5}+\frac{3}{7x+8}$ (d) $\frac{4}{x-5}-\frac{3}{x-2}$ **Answer: D**

# ZENITH TUTORIALS MTH 101 PDF

174. Resolve $\frac{14x^2+31x+5}{(x-1)(2x+3)^2}$ into partial fraction (a) $\frac{2}{x-1}+\frac{3}{2x+3}+\frac{4}{(2x+3)^2}$ (b) $\frac{2x+1}{x-1}+\frac{4}{3x^2+2}+\frac{1}{2x}$ (c) $\frac{2x-5}{x^2+3}+\frac{3}{2x+3}$ (d) $\frac{4x+7}{x-1}+\frac{2}{3x+1}+\frac{5}{x+2}$ **Answer: A**

175. Resolve $\frac{3x^2}{x^2-5x+4}$ into partial fraction (a) $3+\frac{16}{(x-4)}-\frac{1}{(x-1)}$ (b) $\frac{1}{x-4}+\frac{1}{x-1}$ (c) $4+\frac{15}{x-4}-\frac{1}{x-1}$ (d) $\frac{16}{x-4}-\frac{1}{x-1}$ **Answer: A**

176. Resolve $\frac{7x^2-18x-7}{(x-4)(2x^2-6x+3)}$ into partial fraction (a) $3x+2+\frac{7x-3}{x^2-x-6}$ (b) $\frac{2x+1}{x^2-1}-\frac{2}{x-1}+\frac{1}{(x-1)^2}$ (c) $\frac{x-1}{x^2+1}+\frac{2x}{x-1}+\frac{2}{x+1}$ (d) $\frac{3}{x-4}+\frac{x+4}{2x^2-6x+3}$ **Answer: D**

177. Resolve $\frac{8x-72}{(x+1)(x-3)^2}$ into its partial fraction (a) $\frac{8}{x+1}+\frac{(2x-1)}{x^2-9}$ (b) $\frac{5}{x+1}-\frac{5}{x-3}-\frac{12}{(x-3)^2}$ (c) $\frac{5}{x+1}-\frac{5}{x-3}+\frac{12}{(x-3)^2}$ (d) $\frac{8}{x+1}+\frac{5x-72}{x^2-3^2}$ **Answer: C**

178. Resolve $\frac{3x^3-x^2-13x-13}{x^2-x-6}$ into partial fraction (a) $\frac{2x+1}{x^2+1}-\frac{2}{x-1}+\frac{1}{(x-1)^2}$ (b) $3x+2+\frac{7x-1}{x^2-x-6}$ (c) $\frac{2}{x^2+1}-\frac{x+1}{x-1}+\frac{2}{(x-1)^2}$ (d) $\frac{x-1}{x^2+1}-\frac{2x}{x-1}+\frac{2}{x+1}$ **Answer: B**

179. Resolve into partial fraction $\frac{2x-1}{(x^2-4)(x^2+1)}$ (a) $\frac{2}{20(x-2)}+\frac{1}{4(x+2)}+\frac{2x}{5(x^2+1)}$ (b) $2x-1+\frac{1}{4(x+2)}+\frac{1-2x}{5(x^2+1)}$ (c) $\frac{2}{20(x-2)}+\frac{1}{4(x+2)}+\frac{1-2x}{5(x^2+1)}$ (d) $\frac{3}{20(x-2)}+\frac{1}{4(x^2-1)}+\frac{2x-1}{5(x^2+1)}$ **Answer: C**

180. Find the value of $M$ if $\frac{Z-3}{(1-Z)(Z+2)}=\frac{M}{1-Z}+\frac{N}{Z+2}$ (a) $-\frac{2}{3}$ (b) 4 (c) $\frac{3}{2}$ (d) $-3$ **Answer: A**

181. Given that $-2=A(x-1)^2+B(x-1)(x-2)+C(x-1)$, find the value of $C$ (a) 5 (b) 4 (c) 3 (d) 2 **Answer: D**

182. If $(a+b)\left(\frac{1}{a^2}+\frac{1}{b^2}\right)\left(\frac{a^4}{b^2}+\frac{b^4}{a^2}\right)\geq K\sqrt{ab}$, what is the value of $K$ (a) 5 (b) 6 (c) 7 (d) 8 **Answer: D**

183. Simplify $\frac{a^3+b^3}{a+b}$ (a) $2ab$ (b) $ab$ (c) $3a^2b^2$ (d) $\sqrt{4ab}$ **Answer: B**

184. Simplify $2(a+b)\left(\frac{1}{a^2}+\frac{1}{b^2}\right)\left(\frac{a^4}{b^2}+\frac{b^4}{a^2}\right)$ (a) $8ab$ (b) $16ab$ (c) $12\sqrt{ab}$ (d) $2ab$ **Answer: B**

185. Simplify $(x+y+z)\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$ (a) 6 (b) 7 (c) 9 (d) 8 **Answer: C**

186. Solve $2xy=x+y,\ 5xz=6z-2x,\ 3yz=3y+4z$ (a) $x=2, y=\frac{2}{3}$ and $z=-1$ (b) $x=1, y=-2$ and $z=\frac{3}{2}$ (c) $x=3, y=2$ and $z=-2$ (d) $x=1, y=-2$ and $z=-1$ **Answer: A**

187. Solve for $x$ in the equation $5^{2x+1}-2(5^{x+1})+5=0$ (a) 0 (b) 1 (c) 2 (d) 3 **Answer: A**

188. Simplify $2\log_a x-3\log_a 2x+\log_a x^2$ (a) $\log_a\left(\frac{x}{8}\right)$ (b) $\log_a 8x$ (c) $\log_a\left(\frac{x}{4}\right)$ (d) $\log_a 4x$ **Answer: A**

189. Solve $\frac{1}{\sqrt{x+1}-\sqrt{x}}-\frac{2}{\sqrt{x-2}+\sqrt{x}}=\sqrt{x+1}$ (a) 1 (b) 2 (c) 3 (d) 4 **Answer: B**

190. Find $y$ in terms of $x$ in $5\log_a y-2\log_a(x^2+4)=2\log_a y+\log_a x$ (a) $\sqrt{x(x-4)^2}$ (b) $\sqrt[2]{x(x+4)}$ (c) $\sqrt[3]{x(x+4)^2}$ (d) $\sqrt{x(x+4)^2}$ **Answer: C**

191. Simplify $2^{x+3}-15=2^{1-x}$ (a) 0 (b) 2 (c) $-\frac{1}{8}$ (d) 1 **Answer: D**

192. Simplify $5^{2x}+1=26(5^{x-1})$ (a) 1, 1 (b) 1, 2 (c) $-1, 1$ (d) 2, 1 **Answer: C**

193. The set of values $x$ and $y$ which satisfies the equation $x^2-y-1=0$ and $y-2x+2=0$ is _____ (a) $x=1, y=0$ (b) $x=1, y=1$ (c) $x=0, y=1$ (d) $x=-1, y=-2$ **Answer: A**

# ZENITH TUTORIALS MTH 101 PDF

194. Simplify $\frac{3(2^{n+1})-4(2^{n-1})}{2^{n+1}-2^n}$ (a) 1 (b) 2 (c) 3 (d) 4 **Answer: D**

195. If $\sqrt{x^2+9} = x+1$, solve for $x$ (a) 5 (b) 8 (c) 4 (d) 6 **Answer: C**

196. If $x = 2-\sqrt{2}$, evaluate $x^2 + \frac{4}{x^2}$ (a) 10 (B) 20 (C) 13 (D) 12 **Answer: D**

197. Solve the pair of equation $xy = 10-(-1),\ 2(\log_{10} x - 1) = \log_{10} y$ (a) $x = 10, y = 1$ (b) $x = 5, y = 2$ (c) $x = 15, y = 16$ (d) $x = 8, y = 2$ **Answer: A**

198. Rationalize $\frac{\sqrt{1+x}+\sqrt{x}}{\sqrt{1+x}-\sqrt{x}}$ (a) $1+x+2\sqrt{x(1-x)}$ (b) $1+2x+2\sqrt{x(1+x)}$ (c) $1-2x+2\sqrt{x(1+x)}$ (d) $1+2x-2\sqrt{x(2+x)}$ **Answer: B**

199. If $a\sqrt{5}+b\sqrt{2}$ is a square root of $95-30\sqrt{10}$, find the value of $a$ and $b$ (a) $5, -3$ (b) $4, -6$ (c) $-3, 5$ (d) $2, 5$ **Answer: C**

200. Given that $a = \frac{1}{2-\sqrt{3}}, b = \frac{1}{2+\sqrt{3}}$, what is $a^2+b^2$? (a) 12 (c) 20 (c) 14 (d) 15 **Answer: C**

201. Simplify $\sqrt{18x^2+\sqrt{48x^4+\sqrt{x^8}}}$ (a) $5x$ (b) $6x$ (c) $10x$ (d) $3x$ **Answer: A**

202. If $\frac{(x^2y^{-3}z)^{\frac{3}{4}}}{x^{-1}y^4z^6} = x^py^qz^r$, evaluate $2p-q+r$? (a) 5 (b) 6 (c) 10 (d) 8 **Answer: B**

203. Simplify $\log_{10} w^{\frac{1}{2}} + \frac{1}{4}\log_{10} w - \frac{1}{12}\log_{10} w^7$ (a) $\frac{1}{5}\log_{10} w$ (b) $\log_{10} w$ (c) $4\log_{10} w$ (d) $\frac{1}{6}\log_{10} w$ **Answer: D**

204. Given that $y = \frac{\sqrt{px+q}+\sqrt{px-q}}{\sqrt{px+q}-\sqrt{px-q}}$, what is the value of $y + \frac{1}{y}$? (a) $\frac{2px}{q}$ (b) $\frac{px}{q}$ (c) $\frac{4qx}{p}$ (d) $\frac{3q}{px}$ **Answer: A**

205. A geometric sequence is defined by $\sqrt{2}-1, 3-2\sqrt{2}$. Find the common ratio (a) $\sqrt{3}-2$ (b) $\sqrt{2}-1$ (c) $\sqrt{3}-1$ (d) $\sqrt{2}-2$ **Answer: B**

206. The sum of the first 4 terms of an exponential sequence is 15 and the common ratio is $\frac{1}{2}$, find the first term of the sequence (a) 1 (b) 2 (c) 4 (d) 5 **Answer: A**

207. Which term of the sequence 1024, 512, 256 is $\frac{1}{8}$ (a) $n = 12$ (b) $n = 13$ (c) $n = 14$ (d) $n = 15$ **Answer: C**

208. The sum of the first 3 terms of a linear sequence is 18. Find their product, if the first term is 4 (a) 150 (b) 184 (c) 176 (d) 192 **Answer: D**

209. Valuate $\frac{u^5}{u^6}$ if the nth term of the sequence is given as $128\left(\frac{1}{4}\right)^{n-1}$ (a) 2 (b) 8 (c) 6 (d) 4 **Answer: D**

210. The first term of an A.P is $-7$ and the ratio of the 8th term to the 3rd term is 7:1, calculate the common difference? (a) $d = 4$ (b) $d = 6$ (c) $d = 7$ (d) $d = 3$ **Answer: B**

211. The nth term of a sequence is $\log_{16}(n+3)$. What is the difference between 13th and the first term? (a) 2 (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) 4 **Answer: C**

212. Find the first four terms of the sequence whose general term is given by $U_n = \frac{n+1}{3n+2}$ (a) $\frac{2}{5}, \frac{3}{8}, \frac{4}{11}, \frac{5}{14}$ (b) $\frac{3}{8}, \frac{5}{14}, \frac{6}{16}, \frac{8}{17}$ (c) $\frac{2}{8}, \frac{4}{11}, \frac{6}{14}, \frac{8}{18}$ (d) $\frac{2}{3}, \frac{3}{5}, \frac{4}{7}, \frac{5}{9}$ **Answer: A**

213. The nth term of a sequence is $2^{2n-1}$. Which term of the sequence is $2^9$? (a) 4 (b) 7 (c) 5 (d) 6 **Answer: C**

214. The nth term of a sequence is given by $(-1)^{n-1} \times 2^{n-1}$. Find the sum of the second and the third term (a) 2 (b) $-2$ (c) 3 (d) $-3$ **Answer: B**

# ZENITH TUTORIALS MTH 101 PDF

215. The nth term of a sequence is defined by $u_n = 3^2\left(\frac{1}{3}\right)^n$, find $\frac{u_5}{u_6}$ (a) 1 (b) 2 (c) 3 (d) 4
**Answer: C**

216. The nth term of a sequence is $5 + (n-1)^2$. Evaluate $u_4 - u_6$ (a) $-13$ (b) $-20$ (c) $-9$ (d) $-16$
**Answer: D**

217. If $(x+1), \frac{1}{2}x$ and $x-5$ are the first 3 terms of a linear sequence, find their common difference (a) 4 (b) $-5$ (c) 3 (d) $-3$ **Answer: D**

218. Find the 15th term of the sequence $-3, 2, 7$ .... (a) 60 (b) 67 (c) 70 (d) 82 **Answer: B**

219. Find the 5th term of the sequence $(x+1), \frac{1}{2}x, x-5$ (a) 3 (b) $-5$ (c) $-7$ (d) $-4$ **Answer: C**

220. Find the number of terms in an A.P given that the 1st and last term are $x$ are $37x$ respectively and its common difference is $4x$ (a) 10 (b) 13 (c) 32 (d) 19 **Answer: A**

221. In an A.P, the difference between the 8th and 4th term is 20 and the 8th term is $1\frac{1}{2}$. Find the first term? (a) $-\frac{67}{2}$ (b) $\frac{65}{2}$ (c) $\frac{57}{2}$ (d) $-\frac{63}{2}$ **Answer: A**

222. The 1st term of a linear sequence is twice the common difference. Find the 5th term of the sequence? (a) $3d$ (b) $9d$ (c) $6d$ (d) $2d$ **Answer: C**

223. The first term of an A.P is $-8$. The ratio of the 7th term to the 9th term is $\frac{5}{8}$. Calculate the common difference of the progression. (a) 3 (b) 5 (c) 8 (d) 6 **Answer: A**

224. Find the value of the constant $P$ from which we have $2P-1, 5P+3, 11$ are first 3terms of an A.P (a) 3 (b) $\frac{1}{2}$ (c) $\frac{3}{2}$ (d) 2 **Answer: B**

225. The 6th and 13th term of an AP and 0 and 14 respectively. Find the first term of an A.P? (a) $-9$ (b) $-10$ (c) 9 (d) 10 **Answer: B**

226. In a certain linear sequence, the sum of the first and 5th term is 18 and 5th term is 6 more than the 3rd term. Find the sum of the first 10 terms of the sequence (a) 180 (b) 178 (c) 165 (d) 159 **Answer: C**

227. The first term of an A.P is $-7$ and the ratio of the 8th term to the 3rd term is 7:1. If the sum of the first nth term is 120, find the number of terms of the sequence? (a) 9 (b) 8 (c) 7 (d) 6
**Answer: B**

228. Find the last term of a linear sequence, if the sum of the first 6th term is 30 and 1st term is $-5$? (a) 12 (b) 13 (c) 14 (d) 15 **Answer: D**

229. In a certain linear sequence, the sum of the third term and the next fourth term is 18, what is the next fourth term? (a) $9+2d$ (b) $9-2d$ (c) $9+4d$ (d) $6-2d$ **Answer: A**

230. Find the arithmetic mean between 4 and 8 (a) 6 (b) 8 (c) 9 (d) 5 **Answer: A**

231. What are the values of $b, c$ and $d$ in the A.P of $8, b, c, d, 20$? (a) 12, 16, 19 (b) 11, 14, 17 (c) 14, 16, 18 (d) 13, 19, 23 **Answer: B**

232. Find the three arithmetic mean between $-3$ and 21 (a) 2, 4, 6, 8, 10 (b) 5, 8, 11, 14, 17 (c) 1, 5, 9, 13, 17 (d) 4, 6, 10, 14 **Answer: C**

233. The number $p-4, p+2, 3p+1$ are in G.P, find the two possible values of the common ratio (a) $\frac{3}{4}$ or $-\frac{1}{3}$ (b) $\frac{5}{2}$ or $-\frac{1}{3}$ (c) $\frac{4}{5}$ or $\frac{3}{4}$ (d) $\frac{3}{4}$ or $-\frac{5}{2}$ **Answer: B**

234. Find the common ratio of an exponential sequence of $\log p, \log p^2, \log p^4$ (a) 9 (b) 6 (c) 4 (d) 2 **Answer: D**

235. Find the common ratio of the tree consecutive terms of $\sin x, \cos x, -\sin x$ (a) $\sin x$ (b) $\cos x$ (c) $\tan x$ (d) $\cot x$ **Answer: D**

# ZENITH TUTORIALS MTH 101 PDF

236. Find the 7th term of an exponential sequence of the form 5, 10, 20, 40 (a) 280 (b) 300 (c) 320 (d) 330 **Answer: C**

237. Find the nth term of the sequence $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ (a) $\frac{1}{2}\left(\frac{1}{2}\right)^{n-1}$ (b) $\left(\frac{1}{2}\right)^{n}$ (c) $\left(\frac{1}{2}\right)^{n-1}$ (d) $\frac{1}{2}\left(\frac{1}{2}\right)^{n}$ **Answer: A**

238. An exponential sequence is such that the 3rd term minus the 1st term is 48. The fourth term minus the second term is 144. Find the 6th term of the sequence (a) 1428 (b) 1458 (c) 1548 (d) 1287 **Answer: B**

239. Find the geometric mean between 3 and 27 (a) 10 (b) 6 (c) 9 (d) 8 **Answer: C**

240. Find the sum of the 8th term of a G.P 12, 6, 3 (a) $\frac{765}{32}$ (b) $\frac{756}{31}$ (c) $\frac{765}{31}$ (d) $\frac{756}{32}$ **Answer: A**

241. The fourth and the 7th term of a G.P are 24 and 192 respectively. Find the sum of the first 6 terms (a) 189 (b) 190 (c) 179 (d) 182 **Answer: A**

242. How many terms of the sequence 5, 15, 45, 135…. Must be taken for the sum to exceed 200 (a) 4 (b) 5 (c) 6 (d) 7 **Answer: B**

243. Find the sum to infinity of the series $1, +\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots \ldots \ldots$ (a) 4 (b) 5 (c) 2 (d) 3 **Answer: C**

244. The fourth and 8th term of a G.P are 24 and $\frac{8}{27}$ respectively. Find the two possible values of $a$ and $r$ (a) $a = \pm 469, r = \pm\frac{1}{4}$ (b) $a = \pm 846, r = \pm 3$ (c) $a \pm 640, r = \pm\frac{1}{5}$ (d) $a = \pm 648, r = \pm\frac{1}{3}$ **Answer: D**

245. Find a formula for the nth term of an A.P $12, 5, -2 \ldots \ldots$ (a) $19 + 7n$ (b) $18 - 6n$ (c) $10 - 7n$ (d) $19 - 7n$ **Answer: D**

246. Find the sum of the first 20 terms of $2 + 5 + 8 + \ldots \ldots \ldots \ldots$ (a) 610 (b) 660 (c) 650 (d) 630 **Answer: A**

247. Given that $2 - 3k, 2k + 3, k + 7$ are consecutive terms in a linear sequence, find the common difference (a) $\frac{1}{2}$ (b) $\frac{4}{3}$ (c) $3\frac{1}{2}$ (d) $2\frac{3}{5}$ **Answer: C**

248. A sequence is defined by $2 + \sqrt{3}, 5 + \sqrt{3}, 8 + \sqrt{3} + \ldots \ldots \ldots \ldots$ Find the 6th term of the sequence? (a) $17 - \sqrt{3}$ (b) $17 + \sqrt{3}$ (c) $15 - \sqrt{3}$ (d) $15 + \sqrt{3}$ **Answer: B**

249. Given the sequence 5, 1, − 3……. which term of the sequence is $-75$ (a) 22nd (b) 21st (c) 24th (d) 25th **Answer: B**

250. A series is defined as? **Answer: A partial sum of a sequence**

251. What is the sum of integers from 1 to 1000 (a) 510501 (b) 500510 (c) 501510 (d) 500500 **Answer: D**

252. The sum of the first $n$ terms of a finite G.P whose ratio is less than one is? (a) $a\left(\frac{1-r^n}{1-r}\right)$ (b) $a\left(\frac{1+r^n}{1+r}\right)$ (c) $a\left(\frac{1+r^n}{1-r}\right)$ (d) $\left(\frac{1-r^n}{1+r}\right)$ **Answer: A**

253. The 3rd and 9th terms of a linear sequence are $4p - 2q$ and $10p - 8q$ respectively. Obtain the common difference $(d)$ (a) $p + q$ (b) $q - p$ (c) $p - q$ (d) $q + p$ **Answer: C**

254. The sum of the first n terms of an A.P whose difference is not zero equals half the sum of its subsequent $n$ members. Find the ratio of the sum of the first $3n$ terms and the sum of the first $n$ terms (a) 4 (b) 6 (c) 7 (d) 9 **Answer: B**

255. Find the sum to infinity of the geometric series $5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \ldots \ldots \ldots$ (a) 5 (b) 6 (c) 7 (d) 3 **Answer: D**

256. In the binomial expansion of $(x - 3y)^5$, what is the coefficient of $x^2y^3$ (a) 209 (b) 190 (c) $-280$ (d) $-270$ **Answer: D**

# ZENITH TUTORIALS MTH 101 PDF

257. Find the greatest coefficient in the binomial expansion of $(3x+1)^8$ (a) 20421 (b) 20412 (c) 20444 (d) 20123 **Answer: B**
258. Find the greatest coefficient in the expansion of $(2x+3)^6$ (a) 4089 (b) 4190 (c) 4900 (d) 4860 **Answer: D**
259. Find the largest coefficient in $(3x-2)^3$ (a) 36 (b) 38 (c) 29 (d) 40 **Answer: A**
260. Find the greatest coefficient in the expansion of $(6-4x)^{-3}$ (a) 0.0137 (b) 0.701 (c) 0.0317 (d) 0.1073 **Answer: D**
261. Find the greatest coefficient of the expression $(7+5x)^{-3}$ (a) 0.0141 (b) 0.0411 (c) 0.0114 (d) 0.0104 **Answer: C**
262. What is ${}^nC_r + {}^nC_{r+1}$? (a) $\frac{n+1}{(n-r)!r!}$ (b) $\frac{(n+1)!}{(n-r)!(r+1)!}$ (c) $\frac{n+1}{(n-r-1)(r+1)}$ (d) $\frac{(n+1)!}{(n-r+1)!r!}$ **Answer: B**
263. What is ${}^nC_r + {}^nC_{r-1}$ (a) ${}^{n-1}C_r$ (b) ${}^{n-1}C_{r-1}$ (c) ${}^{n-1}C_{r+1}$ (d) ${}^{n+1}C_r$ **Answer: D**
264. What is ${}^nC_r + {}^nC_{r+1}$ (a) ${}^{n-1}C_r$ (b) ${}^{n+1}C_{r+1}$ (c) ${}^{n-1}C_{r-1}$ (d) ${}^{n+1}C_r$ **Answer: B**
265. What is ${}^nC_r + {}^nC_{r-1}$ (a) $\frac{(n+1)!}{(r-1)!(n-r+1)!}$ (b) $\frac{n+1}{(r-1)!(n-r+1)!}$ (c) $\frac{n!}{r!(n-r-1)!}$ (d) $\frac{(n+1)!}{r!(n-r+1)!}$ **Answer: D**
266. The symbol $\binom{n}{r}$ is used to denote the number of _____ of *n* things taken *r* at a time **Answer: Combination**
267. In expansion of $(a+b)^n$, for a large *n*, the best method to apply is _____ **Answer: Binomial**
268. The relationship between combination and permutation is _____ (a) ${}^nC_r = \frac{{}^nP_r}{(r-1)!}$ (b) ${}^nC_r = \frac{{}^nP_r}{C_r}$ (c) ${}^nC_r = \frac{{}^nP_r}{r!}$ (d) ${}^nC_r = \frac{{}^nP_r}{n!}$ **Answer: C**
269. Find the term independent of *y* in the expression $\left(y^4 + \frac{3}{y^2}\right)^{36}$ (a) $3.54 \times 10^{10}$ (b) $3.54 \times 10^{20}$ (c) $3.45 \times 10^{10}$ (d) $3.45 \times 10^{20}$ **Answer: B**
270. Find the constant term in the expansion of $\left(2x^2 - \frac{1}{x}\right)^6$ using the binomial expansion (a) 40 (b) 50 (c) 60 (d) 70 **Answer: C**
271. If $\frac{{}^nP_3}{{}^nC_4} = 6$, what is the value of *n* (a) 5 (b) 6 (c) 7 (d) 8 **Answer: C**
272. What is the coefficient of $x^4$ in the expansion of $(1+x)(1-x)^n$ (a) ${}^nC_4 - {}^nC_3$ (b) ${}^nC_5 - {}^nC_3$ (c) ${}^nC_3 - {}^nC_1$ (d) ${}^nC_4 - {}^nC_2$ **Answer: A**
273. Find the value of *n* if the coefficient of the third term in the expansion of $(1+x)^{2n}$ is zero? (a) 0, 1 (b) $0, \frac{1}{2}$ (c) 1, 2 (c) 2, 3 **Answer: B**
274. Find the term in $x^2$ in the expansion of $\left(1 - \frac{1}{2x}\right)^{12}$ (a) $-\frac{99}{4}x^2$ (b) $\frac{99}{4}x$ (c) $\frac{99}{4}x^2$ (d) $-\frac{99}{4}x$ **Answer: A**
275. Find the term independent of *x* in the expansion of $\left(x - \frac{1}{2x}\right)^{12}$ (a) $\frac{200}{17}$ (b) $\frac{231}{16}$ (c) $\frac{213}{16}$ (d) $\frac{231}{17}$ **Answer: B**
276. Einstein's theory of relativity predicts that if a stick *l* moves with a velocity in the direction of its length, it will shrink by a factor $\sqrt{\left(1 - \frac{V^2}{C^2}\right)}$ where $C$ is the speed of light. What is the

approximate low speed by taking the first two terms of the expansion? (a) $1+\frac{V}{2C^2}$ (b) $1-\frac{V^2}{2C}$ (c) $1-\frac{V}{2C}$ (d) $1-\frac{V^2}{2C^2}$ **Answer: D**

277. Using the expansion of $(+8x)^4=(1.04)^4$, what is the value of $x$? (a) 0.501 (b) 0.006 (c) 0.005 (d) 0.621 **Answer: C**
278. If $Kx^4$ is a term in the binomial expansion of $(1+2x)^5$, what is the value of $K$? (a) 60 (b) 70 (c) 80 (d) 90 **Answer: C**
279. The coefficient of $x^2$ in the inomial expansion of $(1+bx)^5$ is 40, what is the value of $b$? (a) 1 (b) 2 (c) 3 (d) 4 **Answer: B**
280. If the first three terms of the expansion of $(1+px)^5$ in ascending powers of $x$ are $1+20x+160x^2$, what is the value of $p$? (a) 4 (b) 3 (c) 2 (d) 1 **Answer: A**
281. Given that $Px^3$ and $Qx^4$ are two consecutive terms in the binomial expansion of $(1+4x)^6$, what is $P+Q$? (a) 5020 (b) 5120 (c) 5310 (d) 5210 **Answer: B**
282. What is the square root of the greatest coefficient in the expansion of $(2x+3)^6$ (a) $16\sqrt{14}$ (b) $18\sqrt{15}$ (c) $18\sqrt{20}$ (d) $12\sqrt{10}$ **Answer: B**
283. Given that ${}^nC_r={}^nC_{n-r}$, solve the equation ${}^{12}C_{1-3y}={}^{12}C_{1-2y}$ (a) 2 (b) 3 (c) $-2$ (d) $-3$ **Answer: C**
284. Given that ${}^nC_r={}^nC_{n-r}$, solve the equation ${}^{16}C_{4+3x}={}^{16}C_x$ (a) $x=4$ (b) $x=5$ (c) $x=2$ (d) $x=3$ **Answer: D**
285. _____ is defined as a rectangular array of numbers enclosed in bracket **Answer: Matrice**
286. _____ are regarded as the vertical lines of the entries (a) columns of the matrix (b) rows of the matrix (c) determinant of the matrix (d) transpose of the matrix **Answer: A**
287. A matrix that has equal number of rows as column is called _____ (a) row matrix (b) null matrix (c) square matrix (d) diagonal matrix **Answer: C**
288. A matrix in which all elements are zero except the leading elements is called _____ (a) row matrix (b) identity matrix (c) null matrix (d) diagonal matrix **Answer: D**
289. _____ is a diagonal matrix in which the leading diagonal elements are in unity (a) singular matrix (b) null matrix (c) unit/identity matrix (d) symmetric matrix **Answer: C**
290. A matrix whose elements are all zero is called _____ (a) singular matrix (b) null matrix (c) identity matrix (d) symmetric matrix **Answer: B**
291. A matrix whose determinant is zero is called _____ (a) singular matrix (b) null matrix (c) identity matrix (d) symmetric matrix **Answer: A**
292. A matrix whose determinant is not equal to zero is _____ (a) singular matrix (b) null matrix (c) identity matrix (d) non-singular matrix **Answer: D**
293. _____ is a matrix that has only one column (a) row matrix (b) column matrix (c) square matrix (d) diagonal matrix **Answer: B**
294. _____ is a matrix that has only one row (a) row matrix (b) column matrix (c) square matrix (d) diagonal matrix **Answer: A**
295. A number is said symmetric if (a) $A=|A|$ (b) $A=A^-$ (c) $A=A^T$ (c) $A=/A/$ **Answer: C**
296. A matrix that is equal to the negative of its transpose is called _____ **Answer: Skew symmetric matrix**
297. What type of matrix is $\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}$ (a) singular matrix (b) null matrix (c) unit/identity matrix (d) diagonal matrix **Answer: C**

# ZENITH TUTORIALS MTH 101 PDF

298. Find $x$ and $y$ if $\begin{pmatrix} 2x-5y & 6 \\ -4 & 3x+y \end{pmatrix} = \begin{pmatrix} 10 & 4 \\ 6 & -2 \end{pmatrix}$ (a) $-1, 3$ (b) $0, -2$ (c) $1, 3$ (d) $-2, 1$

**Answer: B**

299. Given that $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, what is $A^T$? (a) $\begin{pmatrix} d & c \\ b & a \end{pmatrix}$ (b) $\begin{pmatrix} a & c \\ b & d \end{pmatrix}$ (c) $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ (d) $\begin{pmatrix} a & d \\ b & c \end{pmatrix}$

**Answer: B**

300. A matrix is an Hermitian matrix if (a) $A = |A|$ (b) $A = A^2$ (c) $A = A^T$ (d) $A = A^{-T}$

**Answer: D**

301. If $\begin{pmatrix} x & y \\ z & w \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ what are $x, y, z,$ and $w$? (a) $x = 1, y = 2, z = 3, w = 4$ (b) $x = 2, y = 3, z = 4, w = 5$ (c) $x = 1, y = 1, z = 1, w = 1$ (d) $x = 2, y = 1, z = 4, w = 3$ **Answer: A**

302. If $\begin{pmatrix} 4x-3y & 5 \\ -3 & 8x-y \end{pmatrix} = \begin{pmatrix} 10 & 5 \\ -3 & -10 \end{pmatrix}$ find $x$ and $y$ (a) $x = -6, y = -3$ (b) $x = 3, y = 4$ (c) $x = -2, y = -3$ (d) $x = -2, y = -6$ **Answer: D**

303. If $\begin{pmatrix} 2 & 2x-y \\ 6x-5y & xy \end{pmatrix} = \begin{pmatrix} 2 & 8 \\ 32 & -8 \end{pmatrix}$ find $x$ and $y$ (a) $x = 2, y = 3$ (b) $x = 2, y = -4$ (c) $x = -3, y = 2$ (d) $x = 5, y = -3$ **Answer: B**

304. If $\begin{pmatrix} y+z & 0 & 4 \\ 3 & 3x-y-z & 2 \\ x+y-3z & 6 & 5 \end{pmatrix} = \begin{pmatrix} 6 & 0 & 4 \\ 3 & -7 & 2 \\ -13 & 6 & 5 \end{pmatrix}$ find $x, y$ and $z$ (a) $x = -\frac{1}{3}, y = \frac{4}{3}, z = \frac{14}{3}$ (b) $x = \frac{2}{3}, y = \frac{4}{3}, z = \frac{11}{3}$ (c) $x = \frac{2}{3}, y = -\frac{3}{2}, z = -\frac{4}{3}$ (d) $x = \frac{1}{3}, \frac{4}{3}, z = \frac{14}{2}$ **Answer: A**

305. If $\begin{pmatrix} x & \frac{y}{3} \\ 2u & 6 \end{pmatrix} - \begin{pmatrix} 2+2x & 5 \\ 3 & v \end{pmatrix} = \begin{pmatrix} 4 & -3 \\ 2 & 3 \end{pmatrix}$ find $x, y, u$ and $v$ (a) $x = 6, y = -6, u = \frac{2}{5}, v = 4$ (b) $x = 3, y = 4, u = 4, v = 3$ (c) $x = -6, y = 6, u = \frac{5}{2}, v = 3$ **Answer: C**

306. If $\begin{pmatrix} x^2-x+1 & 7 \\ 0 & x \end{pmatrix} = \begin{pmatrix} 7 & 7 \\ x^2-7x+12 & x \end{pmatrix}$, find $x$ (a) $x = 2\ or -4$ (b) $x = -2\ or -4$ (c) $x = -2\ or\ 3$ (d) $x = 3\ or\ 4$ **Answer: C**

307. The matrix $\begin{pmatrix} 3 & 2 & -1 \\ 1 & 0 & 5 \end{pmatrix}$ is _____ matrix (a) $3 \times 3$ matrix (b) $3 \times 2$ matrix (c) $2 \times 2$ matrix (d) $2 \times 3$ matrix **Answer: D**

308. The matrix $\begin{pmatrix} 2 & 3 \\ 0 & -1 \\ 2 & 5 \end{pmatrix}$ is _____ matrix (a) $3 \times 3$ matrix (b) $3 \times 2$ matrix (c) $2 \times 2$ matrix (d) $2 \times 3$ matrix **Answer: B**

309. If $A = \begin{pmatrix} 4 & 2 & 3 \\ 5 & -1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 4 & 3 \\ 5 & 8 & 0 \end{pmatrix}$ what are $A+B$ and $A-B$ (a) $A+B = \begin{pmatrix} 6 & 5 & 6 \\ 10 & 2 & 7 \end{pmatrix}$ $A-B = \begin{pmatrix} 3 & -2 & 0 \\ 0 & -9 & 2 \end{pmatrix}$ (b) $A+B = \begin{pmatrix} 10 & 2 & 7 \\ 10 & 6 & 6 \end{pmatrix}$ $A-B = \begin{pmatrix} 3 & 2 & 1 \\ 4 & -6 & 2 \end{pmatrix}$ (c) $A+B = \begin{pmatrix} 5 & 6 & 6 \\ 10 & 7 & 2 \end{pmatrix}$ $A-B = \begin{pmatrix} 3 & -2 & 0 \\ 0 & -9 & 2 \end{pmatrix}$ (d) $A+B = \begin{pmatrix} 4 & 5 & 6 \\ 10 & 9 & 6 \end{pmatrix}$ $A-B = \begin{pmatrix} -2 & 0 & 3 \\ 1 & -2 & 9 \end{pmatrix}$

**Answer: C**

310. If $A = \begin{pmatrix} 1 & 2 \\ 4 & 3 \\ 2 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 2 & 4 & 1 \\ 6 & 1 & 7 & 5 \end{pmatrix}$ what is $AB$? (a) $\begin{pmatrix} 15 & 4 & 18 & 11 \\ 30 & 11 & 37 & 19 \\ 6 & 4 & 8 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 12 & 5 & 8 & 19 \\ 20 & 11 & 17 & 11 \\ 6 & 4 & 8 & 2 \end{pmatrix}$ (c) $\begin{pmatrix} 4 & 4 & 18 & 11 \\ 16 & 12 & 37 & 19 \\ 6 & 6 & 8 & 0 \end{pmatrix}$ (d) $\begin{pmatrix} 15 & 10 & 18 & 11 \\ 27 & 11 & 37 & 19 \\ 8 & 4 & 6 & 2 \end{pmatrix}$ **Answer: A**

# ZENITH TUTORIALS MTH 101 PDF

311. If $A = \begin{pmatrix} 4 & 7 & 6 \\ 2 & 1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 4 \\ 2 \\ 3 \end{pmatrix}$ find $A \times B$? (a) $\begin{pmatrix} 16 \\ 28 \\ 40 \end{pmatrix}$ (b) $\begin{pmatrix} 40 & 22 & 16 \\ 18 & 21 & 8 \end{pmatrix}$ (c) $\begin{pmatrix} 19 \\ 48 \end{pmatrix}$ (d) $\begin{pmatrix} 48 \\ 19 \end{pmatrix}$

**Answer: D**

312. If $A = \begin{pmatrix} 2 & 5 \\ 7 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 6 & 11 \\ 7 & -13 \end{pmatrix}$ find $A \times B$? (a) $\begin{pmatrix} 43 & -47 \\ 25 & 70 \end{pmatrix}$ (b) $\begin{pmatrix} 47 & -43 \\ 70 & 25 \end{pmatrix}$ (c) $\begin{pmatrix} 25 & 70 \\ -43 & 47 \end{pmatrix}$ (d) $\begin{pmatrix} 70 & -43 \\ 47 & 25 \end{pmatrix}$ **Answer: B**

313. If $A = \begin{pmatrix} 2 & 3 & 4 \\ 5 & 1 & 7 \\ 9 & 8 & 6 \end{pmatrix}$, find $A^T$? (a) $\begin{pmatrix} 4 & 7 & 6 \\ 3 & 1 & 8 \\ 2 & 5 & 9 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 3 & 4 \\ 9 & 8 & 6 \\ 5 & 1 & 7 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 5 & 9 \\ 3 & 1 & 8 \\ 4 & 7 & 6 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 3 & 4 \\ 5 & 1 & 7 \\ 9 & 8 & 6 \end{pmatrix}$ **Answer: C**

314. If $A = \begin{pmatrix} 1 & 7 \\ 5 & 6 \end{pmatrix}$, find determinant of $A$ (a) $-29$ (b) 29 (c) $-42$ (d) 36 **Answer: A**

315. If $A = \begin{pmatrix} 0 & 1 & 4 \\ 2 & 3 & 1 \\ 1 & 4 & 1 \end{pmatrix}$ what is the determinant of $A$? (a) 12 (b) 24 (c) 22 (d) 19 **Answer: D**

316. Find the determinant of the matrix $G = \begin{pmatrix} -2 & 0 & 1 \\ -1 & 1 & 2 \\ 0 & 8 & 1 \end{pmatrix}$ (a) $-24$ (b) 22 (c) 33 (d) 19

**Answer: B**

317. What is the minor of 8 in the matrix $\begin{vmatrix} -2 & 0 & 1 \\ -1 & 1 & 2 \\ 0 & 8 & -1 \end{vmatrix}$ (a) $-2$ (b) 2 (c) $-3$ (d) 8 **Answer: C**

318. Given that $A = \begin{pmatrix} 4 & k & 1 \\ -3 & 0 & -y \\ 2 & -1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & -3 & 2 \\ -1 & 0 & -1 \\ 1 & 2 & 3 \end{pmatrix}$ If $A = B^T$, find $(k, y)$ (a) $(k, y) = (1, -2)$ (b) $(k, y) = (-1, -2)$ (c) $(k, y) = (-2, -1)$ (d) $(k, y) = (-2, 1)$ **Answer: B**

319. Find the rank of the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 1 & 3 & 4 \end{pmatrix}$ (a) 1 (b) 2 (c) 3 (d) 4 **Answer: B**

320. If the rank of augmented matrix is equal to the coefficient matrix, then _____

**Answer: The equations have solution or the solution is unique**

321. If the rank of coefficient matrix is less than the rank of augmented matrix, then _____

**Answer: The equation have no solution**

322. Given that $A = \begin{pmatrix} 2 & 3 \\ 4 & 1 \end{pmatrix}$, find $A^{-1}$ (a) $\frac{1}{10}\begin{pmatrix} 1 & 3 \\ -2 & -4 \end{pmatrix}$ (b) $\frac{1}{-10}\begin{pmatrix} -3 & 2 \\ -4 & 1 \end{pmatrix}$ (c) $\frac{1}{10}\begin{pmatrix} 1 & -3 \\ 4 & -2 \end{pmatrix}$ (d) $\frac{1}{-10}\begin{pmatrix} 1 & -3 \\ -4 & 2 \end{pmatrix}$ **Answer: D**

323. Solve for $x$ and $y$ if $\begin{pmatrix} 1 & 1 \\ 3 & y \end{pmatrix}\begin{pmatrix} x \\ 1 \end{pmatrix} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ (a)

324. What is the determinant of the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 2 & 0 & -1 \end{pmatrix}$ (a) 5 (b) $-3$ (c) $-4$ (d) 2 **Answer: B**

325. What is the value of $k$ if $\begin{vmatrix} -2 & 1 & 1 \\ 2 & 1 & k \\ 1 & 3 & -1 \end{vmatrix} = 23$ (a) 1 (b) 2 (c) 3 (d) 4 **Answer: B**

326. If $X = \begin{pmatrix} 1 & 2 \\ 0 & 3 \end{pmatrix}$ and $Y = \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$, find $XY$ (a) $\begin{pmatrix} 2 & 2 \\ 0 & 9 \end{pmatrix}$ (b) $\begin{pmatrix} 3 & 3 \\ 4 & 6 \end{pmatrix}$ (c) $\begin{pmatrix} 10 & 9 \\ 7 & 12 \end{pmatrix}$ (d) $\begin{pmatrix} 10 & 7 \\ 12 & 9 \end{pmatrix}$ **Answer: D**

# ZENITH TUTORIALS MTH 101 PDF

327. If $P = \begin{pmatrix} 3 & -2 & 4 \\ 5 & 0 & 6 \\ 7 & 5 & -1 \end{pmatrix}$, what is $-2P$? (a) $\begin{pmatrix} -6 & 4 & -8 \\ -10 & 0 & -12 \\ -14 & -10 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 10 & 0 & 12 \\ 6 & -4 & 8 \\ 14 & 10 & -2 \end{pmatrix}$ (c) $\begin{pmatrix} -10 & 0 & 8 \\ 6 & -4 & 12 \\ 10 & 14 & -2 \end{pmatrix}$ (d) $\begin{pmatrix} 6 & 4 & -8 \\ -10 & 0 & 12 \\ 14 & 10 & 2 \end{pmatrix}$ **Answer: A**

328. Find the non-zero positive value of $x$ which satisfies the equation $\begin{vmatrix} x & 1 & 0 \\ 1 & x & 1 \\ 0 & 1 & x \end{vmatrix} = 0$ (a) $-2$ (b) 2 (c) $\sqrt{2}$ (d) $\frac{1}{2}$ **Answer: C**

329. Given that $Q = \begin{pmatrix} 6 & 0 \\ 4 & 5 \end{pmatrix}$ and $Q + P = \begin{pmatrix} 7 & -2 \\ 6 & 8 \end{pmatrix}$ Evaluate $|Q + 2P|$ (a) 200 (b) 120 (c) 100 (d) 130 **Answer: B**

330. The determinant of the matrix $\begin{pmatrix} x & 1 & 0 \\ 1-x & 2 & 3 \\ 1 & 1+x & 4 \end{pmatrix}$ in terms of $x$ is? (a) $-3x^2 + 9x - 1$ (b) $3x + 1$ (c) $3x^2 + 8x + 2$ (d) $4x^2 + 7x - 1$ **Answer: A**

331. Given that matrix $K = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$, what is the matrix $K^2 + K + 1$, where $I$ is a $2 \times 2$ matrix (a) $\begin{pmatrix} 7 & 10 \\ 21 & 24 \end{pmatrix}$ (b) $\begin{pmatrix} 21 & 24 \\ 10 & 7 \end{pmatrix}$ (c) $\begin{pmatrix} 10 & 7 \\ 21 & 24 \end{pmatrix}$ (d) $\begin{pmatrix} 10 & 21 \\ 7 & 24 \end{pmatrix}$ **Answer: C**

332. If the matrix $P$ has an inverse $P^{-1} = \begin{pmatrix} 1 & -3 \\ 0 & 1 \end{pmatrix}$ what is $P$? (a) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 3 \\ 1 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 \\ 3 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 3 \\ 0 & 1 \end{pmatrix}$ **Answer: D**

333. If $\begin{vmatrix} -x & 2 \\ 4x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 3x \\ 4 & -5 \end{vmatrix}$, what is the value of $x$? (a) 4 (b) $-4$ (c) $-5$ (d) 5 **Answer: C**

334. The inverse of the matrix $\begin{pmatrix} 2 & 1 \\ 1 & 1 \end{pmatrix}$ is (a) $\begin{pmatrix} 1 & -1 \\ -1 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 1 \\ 1 & -2 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}$ **Answer: A**

335. Given that $A = \begin{pmatrix} 1 & 1-i \\ 2+i & 3 \end{pmatrix}$, what is $\bar{A}$? (a) $\begin{pmatrix} 1 & 1+i \\ 2-i & 3 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 1-i \\ 2-i & -3 \end{pmatrix}$ (c) $\begin{pmatrix} -1 & -1+i \\ 2+1 & -3 \end{pmatrix}$ (d) $\begin{pmatrix} 3 & 1+i \\ 2-i & 3 \end{pmatrix}$ **Answer: A**

336. The determinant obtained after deleting the row and column containing an element $aij$ of a square matrix is called? **Answer: minor of $aij$**

337. Given the matrix $A = \begin{pmatrix} 1 & 0 & 10 \\ 1 & 1 & 1 \\ 4 & 1 & 2 \end{pmatrix}$ what is $A^{-1}$ (a) $\begin{pmatrix} 1 & 1 & 4 \\ 0 & 1 & 1 \\ 10 & 1 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 10 & 1 & 2 \\ 0 & 1 & 1 \\ 1 & 1 & 4 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 & 0 \\ -2 & 2 & 1 \\ -3 & 1 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 0 & 0 \\ 2 & 2 & -1 \\ -3 & -1 & 1 \end{pmatrix}$ **Answer: D**

338. The product of a $(p \times q)$ matrix and a $(q \times r)$ matrix will result in _____ (a) $(p \times q)$ (b) $(p \times r)$ (c) $(q \times r)$ (d) $(p \times q \times r)$ **Answer: B**