mathcity.org Merging man and maths	**Federal Board - Annual 2003** Paper I Mathematics Paper-I , Time Allowed: 2.30 Hours Max. Marks: 80 , Available online @ http://www.mathcity.org/fsc

Section –B ($4 \times 10 = 40$ marks)

Q # 2 (i) Show that $\sim q \wedge (p \to q) \to \sim p$ is a tautology. **OR** Find λ if matrix $A = \begin{bmatrix} 4 & \lambda & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{bmatrix}$ is singular.	Ex 2.4 - 3(iv) – p54 Ex 3.3 – 11(i) – p114
(ii) If α and β are the roots of $ax^2 + bx + c = 0$, find the equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$. **OR** Show that the roots of $x^2 + (mx + c)^2 = a^2$ will be equal if $c^2 = a^2(1 + m^2)$.	Ex 4.6 – 7(ii) – p164 Ex 4.7 – 5 – p167
(iii) Resolve $\frac{1}{x^2 - 1}$ into partial fraction. **OR** Which term of the $-2, 4, 10, ...$ is 148?	Ex 5.1 – 1 – p183 Ex 6.2 – 7 – p194
(iv) Find the sum of the n terms of the series whose nth term is $n^2 + 4n + 1$. **OR** How many signals can made with 4 different flag when any number of them are to be used at a time?	Ex 6.11 – 15(ii) – p229 Ex 7.2 – Exp2- p234
(v) Expand; $(a + 2b)^5$.	Ex 8.2 – 1(i) – p273
(vi) Find the trigonometric function of 765°	Ex 9.3 – 6(iii) – p309
(vii) Show that $\cos(\alpha + \beta) \cdot \cos(\alpha - \beta) = \cos^2 \beta - \cos^2 \alpha$	Ex 10.2 – 5 – p327
(viii) A vertical pole is 8*m* high and the length of its shadow is 6*m*. What is the angle of elevation of the sun at the time?	Ex 12.3 – 1 – p359
(ix) Find the greatest angle of the triangle if the sides of the triangle are 16, 20, 33.	Ex 12.6 – 7 – p373
(x) Solve; $2\sin\theta + \cos^2\theta - 1 = 0$.	Ex 14 – 5 – p407

Section C (40 Marks (5+5 each))

Note: *Attempt any four questions. Graph paper will be supplied on demand.*

Q # 3 (a) Prove that $(A \cup B)' = A' \cap B'$. **(b)** Solve the following equations $2x + 2y + z = 3, \quad 3x - 2y - 2z = 1, \quad 5x + y - 3z = 2$	Ex 2.3 – prop (i) – p42 Ex 3.5 – 1 – p138
Q # 4 (a) Show that the roots of the equation $(x-a)(x-b) + (x-b)(x-c) + (x-c)(x-a) = 0$ are real. **(b)** Solve the equations: $x^2 - 5xy + 6y^2 = 0$, $x^2 + y^2 = 45$.	Ex 4.7 – Exp3 – p166 Ex 4.9 – 4 – p172

Q # 5 (a) Resolve $\dfrac{9x-7}{(x^2+1)(x+3)}$ into partial fraction. **(b)** The sum of an infinite geometric series is 9 and the sum of square of its term is $81/5$. Find the series.	Ex 5.3 – 1 – p187 Ex 6.8 – 14 – p216
Q # 6 (a) Prove that ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$. **(b)** If x is nearly equal to 1, then prove that $$px^p - qx^q \approx (p-q)x^{p+q}.$$	Ex 7.4 – 10 – p242 Ex 8.3 – 6 – p284
Q # 7 (a) Prove that $\sin\dfrac{\pi}{9}\cdot\sin\dfrac{2\pi}{9}\cdot\sin\dfrac{\pi}{3}\cdot\sin\dfrac{4\pi}{9}=\dfrac{3}{16}$. **(b)** Draw the graph of $y=\cos\dfrac{x}{2}$; $x\in[-\pi,\pi]$.	Ex 10.4 – 5(ii) – p336 Ex 11.2 – 1(vi) – p351
Q # 8 (a) Solve the triangle ABC when a = 28.3, b = 31.7, c = 42.8. **(b)** Show that $\dfrac{1}{r^2}+\dfrac{1}{r_1^2}+\dfrac{1}{r_2^2}+\dfrac{1}{r_3^2}=\dfrac{a^2+b^2+c^2}{\Delta^2}$.	Ex 12.6 – 3 – p373 Ex 12.8 – Exp3 – p383
Q # 9 (a) Show that $\sin^{-1}\dfrac{77}{85}-\sin^{-1}\dfrac{3}{5}=\cos^{-1}\dfrac{15}{17}$ **(b)** Solve; $4\sin^2\theta-8\cos\theta+1=0$	Ex 13.2 – 7 – p400 Ex 14 – 8 – p407

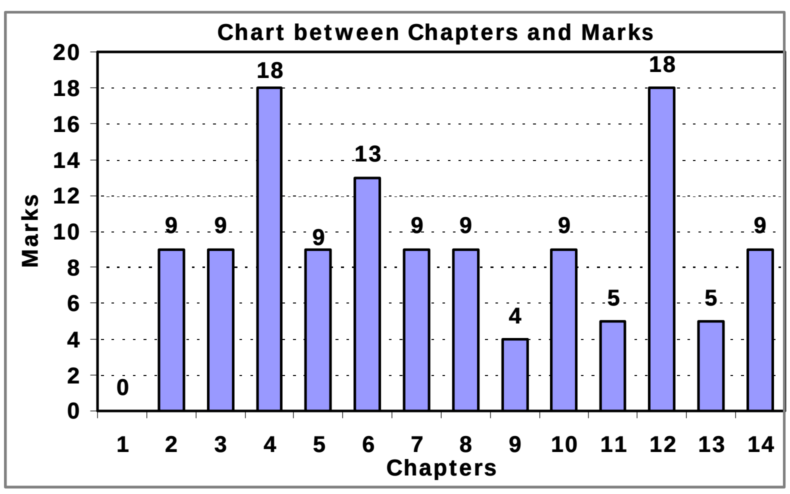
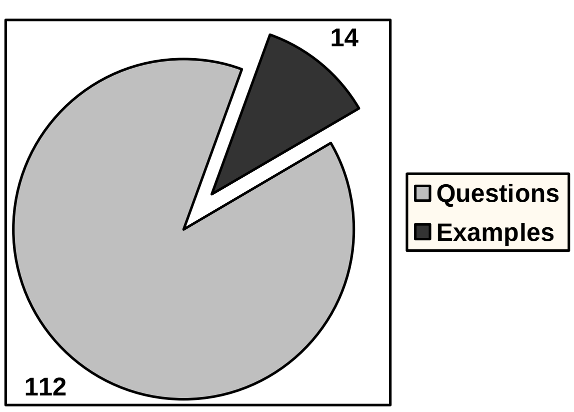
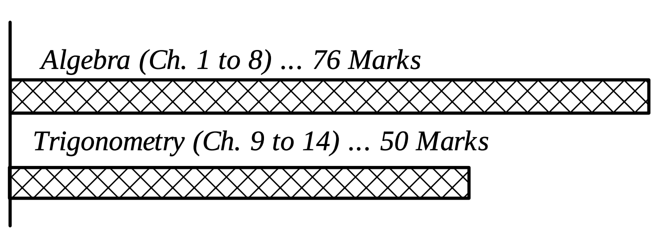


Chart between Questions from Exercises and Examples





Relation between Algebraic & Trigonometric portion.