Formulae for Mathematics 1 and 2

Logarithms

$$\ln(ab) = \ln a + \ln b$$

$$\ln\left(\frac{a}{b}\right) = \ln a - \ln b$$

$$\ln a^n = n \ln a$$

$$\log_a b = \frac{\ln b}{\ln a}$$

Binomial theorem

$$(a+x)^n = a^n + na^{n-1}x + \frac{n(n-1)}{2!}a^{n-2}x^2 + \frac{n(n-1)(n-2)}{3!}a^{n-3}x^3 + \ldots$$

Trigonometric identities

$$\sin^2 x + \cos^2 x = 1$$

$$\tan^2 x + 1 = \sec^2 x$$

$$1 + \cot^2 x = \operatorname{cosec}^2 x$$

$$\sin(x+y) = \sin x \cos y + \cos x \sin y$$

$$\sin(x-y) = \sin x \cos y - \cos x \sin y$$

$$\cos(x+y) = \cos x \cos y - \sin x \sin y$$

$$\cos(x-y) = \cos x \cos y + \sin x \sin y$$

$$\sin 2x = 2 \sin x \cos x$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

Circle sectors and segments

$$s = r\theta$$

$$A_{\text{sa}} = \tfrac{1}{2}rs = \tfrac{1}{2}r^2\theta$$

$$A_{\text{sm}} = \tfrac{1}{2}r^2(\theta - \sin\theta)$$

General sine equations

$$y = A\sin(\omega t - \alpha)$$

$$y = A\sin 2\pi\left(\frac{t}{T} - \frac{x}{\lambda}\right)$$

Matrix inverse

$$A^{-1} = \frac{\text{Adjoint}(A)}{|A|}$$

Differentiation rules

$$\frac{d}{dx}(f(x)g(x)) = f'(x)g(x) + f(x)g'(x)$$

$$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

$$\frac{dy}{dx} = \frac{dy}{du}\frac{du}{dx}$$

Newton-Raphson iteration

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

Parametric differentiation

$$\frac{dy}{dx} = \frac{dy}{dt}\frac{dt}{dx}$$

$$\frac{d^2y}{dx^2} = \left[\frac{d}{dt}\left(\frac{dy}{dx}\right)\right]\frac{dt}{dx}$$

Areas and volumes

$$A = \int y dx \quad \text{and} \quad V = \pi \int y^2 dx$$

Integration by parts

$$\int u dv = uv - \int v du$$

$$\int uv' dx = uv - \int u'v dx$$

Partial fractions

$$\frac{\ldots}{(x+1)(x-3)} = \frac{A}{x+1} + \frac{B}{x-3}$$

$$\frac{\ldots}{(x+1)^3} = \frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{(x+1)^3}$$

$$\frac{\ldots}{(x^2+1)(x^2+3)} = \frac{Ax+B}{x^2+1} + \frac{Cx+D}{x^2+3}$$

Hyperbolic functions

$$\sinh x = \frac{1}{2}(e^x - e^{-x})$$

$$\cosh x = \frac{1}{2}(e^x + e^{-x})$$

Engineering Mathematics 1 Polytechnic

Eleanor E. Hawkins

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Flow Visualization Experiments with a Dolphin Moe William Rosen,1963 The manner in which water flows about the body of a swimming dolphin is a subject conerning which little is known In 1958 2 years before the research described in this report what appeared to be an immense transverse vortex was discovered by the author in the water spray over the back of a leaping dolphin In addition a peculiar system of large twin armed transverse vortexes appeared in the spray wake behind its tail Fur ther original experiments that year with a fish led to the discovery by the author that a remarkable system of large discrete vortexes the Fish Vortex System exists in the water at the sides of a swimming fish The resemblance of the dolphin s spray vortex to the fish vortexes in design and position was striking These discoveries stimulated the further flow visualization research on dolphins reported here The findings of this research indicate the presence of a vortex phenomenon under water about the body of a dolphin that resembles the Fish Vortex System Author Polytechnic Mathematics Dr. Farkhunda Sayyed,Prof. Pooja Mishra,2024-10-02 This book is designed to provide a comprehensive understanding of fundamental mathematical concepts required in diploma courses Covering topics such as Trigonometry algebra and probability it is aligned with diploma syllabus and prepare the students for exams and practical applications With clear explanations and solutions we have tried to provide a clear understanding of the topics through exercise This book is ideal for students for strengthening their mathematical skills for success in flying colors We are providing explanations in simple language for a better understanding and skill based education The contents of this book ensures an elaborated and informative This is helpful for students looking for a big success into diploma mathematics **British Qualifications** Barbara Priestley,1978 **Indian Engineering** ,1920 **Engineering** ,1871 **Catalogue** Washington and Lee University,1907 1857 58 includes Triennial register of Alumni □□□□□□□□□□□□ Frank Joseph Shulman,Anna See Ping Leon Shulman,2001-01-01 A descriptively annotated multidisciplinary cross referenced and extensively indexed guide to 2 395 dissertations that are concerned either in whole or in part with Hong Kong and with Hong Kong Chinese students and emigres throughout the world **Parliamentary Papers** Great Britain. Parliament. House of Commons,1904 *The Encyclopedia Americana* ,1927 Proceedings American Society for Engineering Education,Society for the Promotion of Engineering Education (U.S.),1898 **The United States Catalog** ,1921 The Americana ,1923 **Engineering and Technology Enrollments** ,1988 **Bulletin** ,1925 **Catalogue and Circular of the Agricultural and Mechanical College of Alabama** Agricultural and Mechanical College of Alabama,1912 Daily Graphic Ransford Tetteh,2014-09-12 *Title Announcement Bulletin* ,1957 *British Qualifications* ,1973 The Chemical News and Journal of Industrial Science ,1902 **The United States Catalog** Eleanor E. Hawkins,1921

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