

# stem

Take the leap!

Explore the worlds of science, technology, engineering, and math.

You might save lives, reach the stars, or invent the next great thing!



A collage of scientific and mathematical diagrams including:

- A graph showing a wave function with a minimum at  $x=0$ .
- A sunflower head with its seed arrangement.
- A hexagonal molecular structure labeled "Oxygen 13.999" with atoms numbered 1 through 6.
- A hand-drawn diagram of a pendulum with a mass at the end of a string.
- A 3D rectangular prism labeled "20CM" by "50CM".
- A binary tree diagram.
- The equation  $E=MC^2$  written in chalk.
- A bar chart with arrows pointing upwards.
- A triangular grid diagram.
- A circular diagram with concentric rings and arrows.
- The equation  $V = VO(1 + \beta \Delta T)$ .
- The equation  $\sec^2(x) + \tan^2(x) = 1$ .
- A chemical structure diagram.
- The equation  $y = y_c + y_p$  and  $c = c_1 e^{-\gamma t} + c_2$ .
- A triangle with vertices labeled A, B, and C, and angles 50°, 100°, and 50°.
- A graph with axes and a curve.
- A sun-like star with a solar flare.
- A rocket launching with a path line.
- A DNA double helix structure.
- The equation  $\mu = e^{S_{\text{cond}} z} = e^{\pi z^2}$ .
- The equation  $e^{\pi z^2} \left( \frac{dy}{dx} + 2\pi z y \right) = \pi z e^{\pi z^2}$ .
- The equation  $\frac{d}{dz} (y \cdot e^{\pi z^2}) = \pi z e^{\pi z^2}$ .
- The equation  $y e^{\pi z^2} = \int \pi z e^{\pi z^2} dz$ .
- The equation  $y e^{\pi z^2} = \frac{1}{2} e^{\pi z^2} + C$ .
- The equation  $y = \frac{1}{2} + C e^{-\pi z^2}$ .
- The equation  $X = X_0 + V_0 t + \frac{1}{2} a t^2$ .
- The equation  $V_f = V_0 + a t$ .
- The chemical formula  $Mg(NO_3)_2$ .
- A right-angled triangle with angles 45°, 15°, and 90°.
- Handwritten notes and equations throughout, including:
  - Graphing calculator output: A. -1/10 sin 5 2x + C, B. -1/10 cos 5 2x + C, C. -1/5 cos 5 2x + C, D. 1/5 cos 5 2x + C, E. 1/10 sin 5 2x + C.
  - Differential equations:  $\frac{d}{dt} (r_p e^{i(\theta+q)}) = r_p e^{i(\theta+q)} \cdot i$ ,  $\frac{d}{dt} (\frac{5-2i}{5+2i}) = \sqrt{\frac{5-2i}{5+2i} \frac{5+2i}{5-2i}} = 1$ .
  - Complex numbers:  $|z| = \sqrt{\frac{5-2i}{5+2i} \frac{5+2i}{5-2i}} = 1$ .
  - Trigonometric identities:  $\tan x - \tan y = 2 \tan((x-y)/2) \cos((x+y)/2)$ ,  $\sin x - \sin y = -2 \sin((x-y)/2) \cos((x+y)/2)$ .
  - Pythagorean theorem:  $(D^2 + 2D + 1)y = \dots (D+1)(D+1)y$ .
  - Electrical formulas:  $I = \frac{V}{R}$ ,  $P = I^2 R = \Gamma \Delta V$ ,  $I = \frac{dQ}{dt}$ ,  $R = \rho \frac{L}{A}$ ,  $P = P_0 [1 + \kappa (T - T_0)]$ .
  - Other notes: sec(-), tan(-), cos(-).

science

technology

engineering

math

