

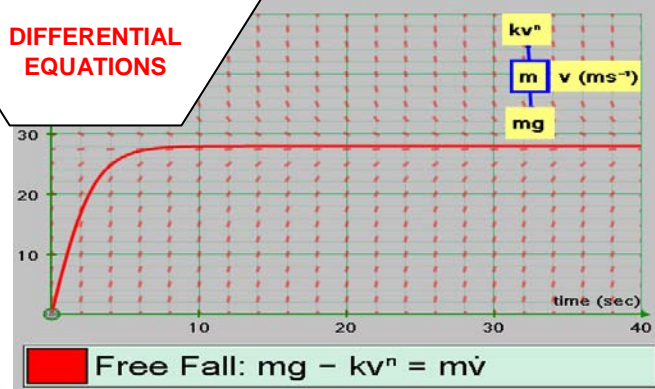
# Autograph

version 3

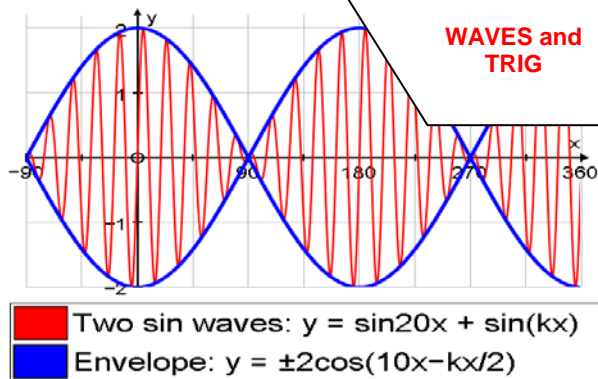
## and AP PHYSICS

Autograph is spectacular dynamic software from the UK that allows teachers to visualise many of the mathematical topics that occur in AP PHYSICS courses: B, C (Mechanics) and C (Electricity and Magnetism).

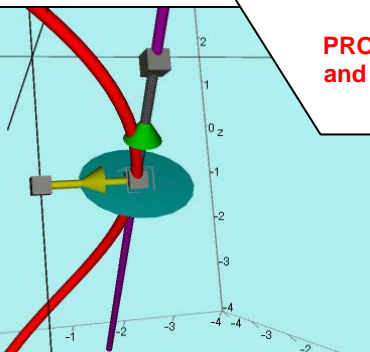
### DIFFERENTIAL EQUATIONS



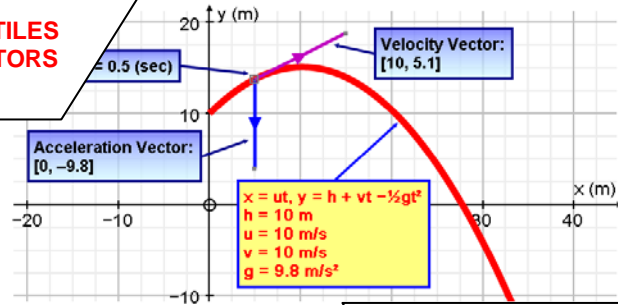
### WAVES and TRIG



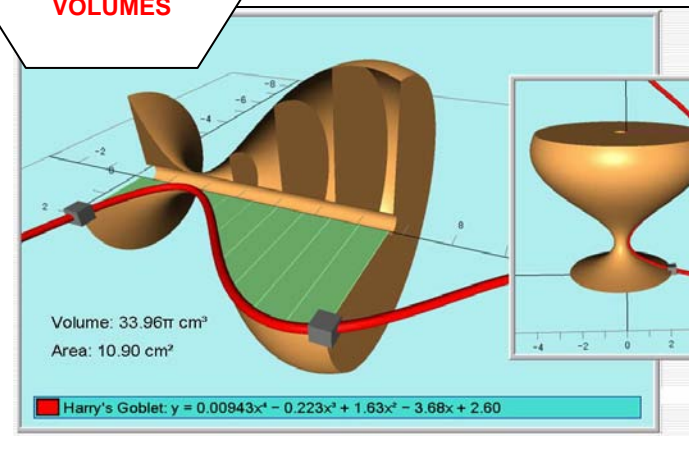
### 2D and 3D VECTORS



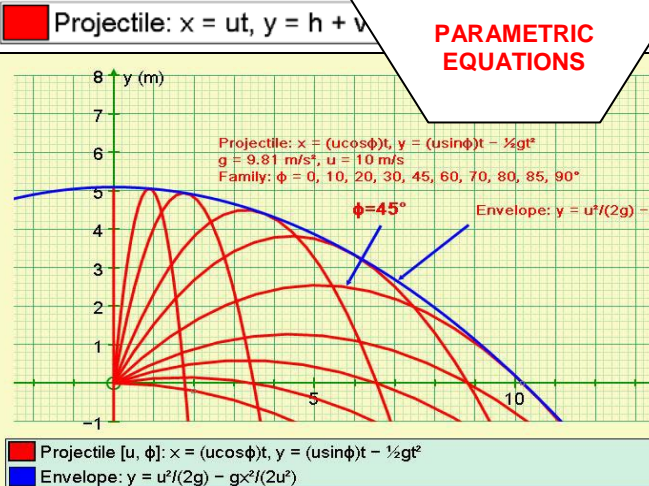
### PROJECTILES and VECTORS



### AREAS AND VOLUMES



### PARAMETRIC EQUATIONS



### THE LEARNING TEAM

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**USA: Topic Outlines for  
 AP PHYSICS B, AP PHYSICS C (Mechanics),  
 AP PHYSICS C (Electricity and Magnetism)**  
 with references to Autograph

*These courses require a general facility with many mathematical topics that are well served by Autograph, but not mentioned specially in the listing here:*

**Calculus, Trigonometry, Polar/Parametric Equations, in both 2D and 3D.**

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**PHYSICS C (Mechanics)**

[also partly in Physics B]

**A. Kinematics**

- **Vectors, vector algebra, components of vectors, coordinate systems, displacement, velocity and acceleration**
- **Motion in one dimension**
- **Motion in two dimensions, including projectile motion**



**B. Newtons laws of motion**

- Static equilibrium (first law)
- **Dynamics of a single particle (second law)**
- Systems of two or more objects (third law)



**C. Work, energy and power**

- Work and work-energy theorem
- Forces and potential energy
- Conservation of energy
- Power

**D. Systems of particles, linear and momentum**

- Center of mass
- Impulse and momentum
- Conservation of linear momentum collisions

[not in B]

**E. Circular motion and rotation**

- **Uniform circular motion**
- Torque and rotational statics
- **Rotational kinematics and dynamics**
- Angular momentum and its conservation

[not in B]

[not in B]



AUTOGRAPH PAGE

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## Physics C (Mechanics)

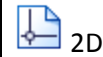
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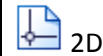
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### F. Oscillations and gravitation

- **Simple harmonic motion (dynamics and energy relationships)**
- **Mass on a spring**
- Pendulum and other oscillations; Newton's law of gravity
- **Orbits of planets and satellites** (circular)
- **Orbits of planets and satellites** (general) [not in B]



2D



2D

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### PHYSICS C (ELECTRICITY AND MAGNETISM)

(also partly in Physics B)

- A. Electrostatics
- B. Conductors, capacitors, dielectrics
- C. Electric circuits
- D. Magnetic Fields
- E. Electromagnetism

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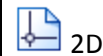
### PHYSICS B additional units:

### FLUID MECHANICS and THERMAL PHYSICS

- A. Fluid Mechanics
- B. Temperature and heat
- C. Kinetic theory and thermodynamics

### WAVES AND OPTICS

- A. Wave motion (including sound)
- **Travelling waves; Wave propagation; Standing waves; Superposition**
- B. Physical optics
- C. Geometric optics



2D

### ATOMIC AND NUCLEAR PHYSICS

- A. Atomic physics and quantum effects
- B. Nuclear Physics

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[www.autograph-maths.com](http://www.autograph-maths.com)

Oundle, May 2009