

10. Give the *continuous* fraction to $\frac{a}{b}$ and find the first three converging fractions to $\frac{186}{45}$.
11. Find the value of the subnormal in the Parabola.
12. In the Ellipse $y^2 = (1 - e^2)(a^2 - x^2)$, when the coordinates are rectangular, and the origin is at the centre.

NATURAL PHILOSOPHY.

1. Define the *moment* of a force ; *triangle* of forces ; *polygon* of forces.
2. Find the centre of gravity of a triangle, and state why the centre of gravity of a revolving wheel must be in the axis.
3. State the ratio of P:W common to all the mechanical powers according to the principle of the constancy of work done.
4. Explain the action of the differential pulley.
5. A body being projected upwards or downwards with a velocity V, find v the velocity at any point of its ascent or descent.
6. Find the space through which the moon is drawn towards the earth in one second, its distance being taken to be 60 of the earth's radii.
7. How does the *time* of vibration vary with the length of the pendulum ? How does the *number* of its vibrations in a given time vary as the force of gravity varies ?
8. Find the ratio of the pressures on two spheres just immersed, the radii being 2 and 5 respectively.
9. How is the volume of an irregular solid found most accurately ?
10. Water spouts from an orifice in a vertical side of a vessel at 16 1-12 feet below the level of the liquid : Find the range of the jet on a horizontal plane 4 feet below the opening.