Mass Density
\[ \text{mass density} = \frac{\text{mass}}{\text{volume}} \]

Speed
\[ \text{average speed} = \frac{\text{distance covered}}{\text{elapsed time}} \]

Acceleration
\[ a = \frac{\Delta v}{\Delta t} \text{ or } \frac{v_f - v_i}{t_f - t_i} \]
(a=average acceleration; \( v \)=velocity; \( t \)=time; \( v_f \)=final velocity; \( v_i \)=initial velocity; \( t_f \)=final time; \( t_i \)=initial time)

Law of Universal Gravitation
\[ F = G \frac{m_1 m_2}{d^2} \]
(F=force of attraction; \( m_1 \) and \( m_2 \)=the masses of the two bodies; \( d \)=distance between the centers of \( m_1 \) and \( m_2 \); \( G \)=gravitational constant)

Work Done by a Force
\[ \text{work} = (\text{force})(\text{distance}) \]

Power
\[ \text{power} = \frac{\text{work}}{\text{time}} \] (see above formula for work)

Kinetic Energy
\[ KE = \frac{mv^2}{2} \]
(KE=kinetic energy; \( m \)=mass; \( v \)=velocity)

Specific Heat
\[ Q = cm\Delta t \]
(\( Q \)=quantity of heat; \( c \)=specific heat; \( m \)=mass; \( \Delta t \)=change in temperature)

Electric Current - Strength
\[ I = \frac{Q}{t} \]
(I=the current strength; \( Q \)=quantity of charge; \( t \)=time)

Momentum
\[ \text{momentum} = (\text{mass})(\text{velocity}) \]

Mass-Energy Equivalence
\[ E = mc^2 \]
(\( E \)=the energy [measured in ergs] equivalent to a mass \( m \) [measured in grams]; \( c \)=speed of light [measured in centimeters per second])

Power Expended in an Electric Appliance
\[ P = IV \]
(P=power in watts; \( I \)=current; \( V \)=voltage)

Newton's Second Law of Motion
\[ \text{force} = (\text{mass})(\text{acceleration}) \]

Torque
\[ T = FR \]
(\( T \)=torque; \( F \)=force; \( R \)=radius)

Boyle's Law
when temperature constant:
\[ \frac{p_1 V_1}{V_2} = p_2 \]
(\( p_1 \)=original pressure; \( p_2 \)=new pressure; \( V_1 \)=original volume; \( V_2 \)=new volume)

Wave Motion
\[ V = nl \]
(\( V \)=wave velocity; \( n \)=wave frequency; \( l \)=wavelength)

Illumination on a Surface Perpendicular to the Luminous Flux
\[ E = \frac{I}{r^2} \]
(\( E \)=illumination; \( I \)=intensity of the source; \( r \)=distance from source to surface perpendicular to the beam)

Focal Length of Mirrors and Lenses
\[ \frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \]
(\( f \)=focal length; \( d_o \)=object distance; \( d_i \)=image distance)

Images in Mirrors and Lenses
\[ \frac{h_i}{h_o} = \frac{d_i}{d_o} \]
(\( h_i \)=image height; \( h_o \)=object height; \( d_i \)=image distance; \( d_o \)=object distance)

Ohm's Law
\[ I = \frac{V}{R} \]
(I=strength of the current flowing in a conductor; \( V \)=the potential difference across the conductor; \( R \)=its resistance)