Hooke’s Law - Energy Stored In Spring

\[ \frac{1}{2} F \Delta L \]

- Using \( W = FD \)
- We can see the area underneath graph = energy stored
- As the force is varying (keeps increasing) we must take the average force applied
- Hence we use a half of the max force applied
- Multiplied by the extension (final length – initial length)

Diffraction Grating - \( N^{th} \) Order Angle

\[ d \sin \theta = n \lambda \]

- As we can see from diagram if constructive interference (maxima) the path difference between 2 waves must be a whole number of wavelengths
- So \( AC = n \lambda \)
- And angle \( \hat{A}BC = \theta \) where \( \theta \) is the angle to the \( n^{th} \) order
- \( D \) (distance from centre to centre of each slit) = AB
- Using trigonometry we can see \( \sin \theta = \frac{n \lambda}{d} \)
- Hence \( d \sin \theta = n \lambda \)