FORM 5 SPM PHYSICS SHORTHAND NOTES
Chapter 1 Force and Motion II
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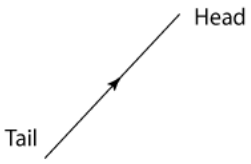
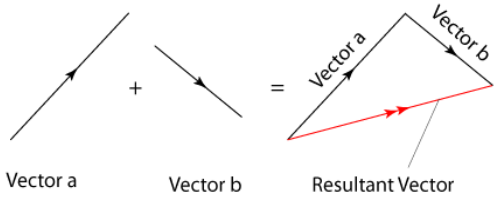
1.0 Vector Quantities

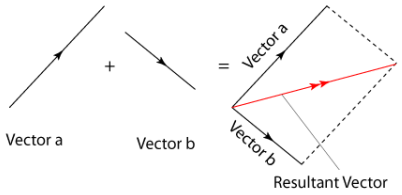
Scalar: Quantity which can be fully described by magnitude only.
Vector: Quantity which can be fully described by both magnitude and direction



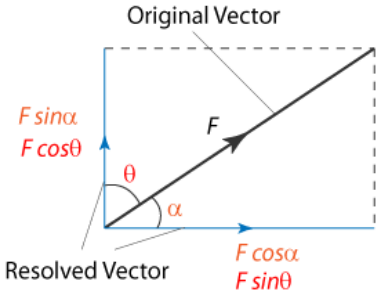
Vector Diagram

Vectors can be added through the use of triangle or parallelogram method.

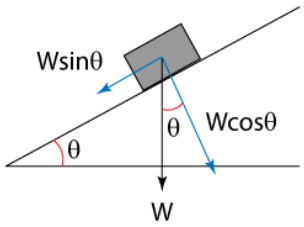




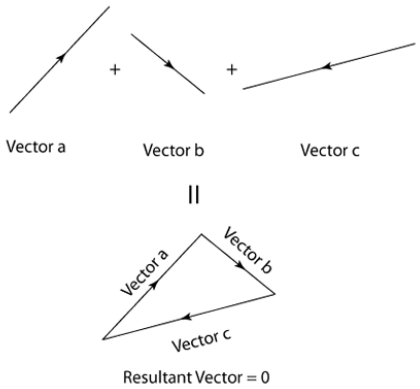
Vector's can be resolved into horizontal and vertical component.

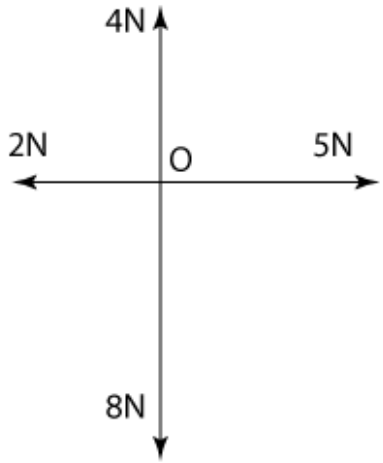


e.g.



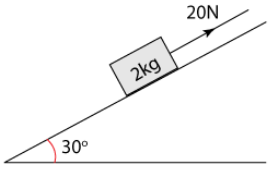
Vectors in equilibrium





Find the resultant force by using

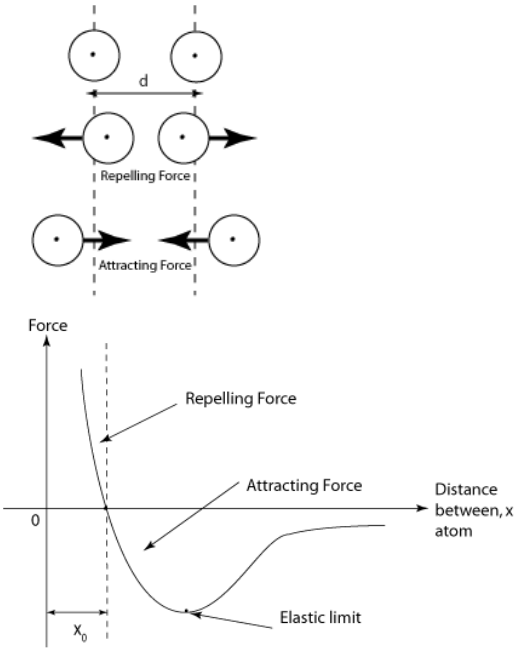
a) Triangle method
b) Parallelogram method
c) Calculation



A block of mass 2 kg is pulling along a plane by a 20N force as shown in the diagram above. Given that the friction between block and plane is 2N, find the magnitude of the resultant force parallel to the plane.

2.0 Elasticity

Elasticity: The ability of a sub-stance to recover its original shape and size after distortion.



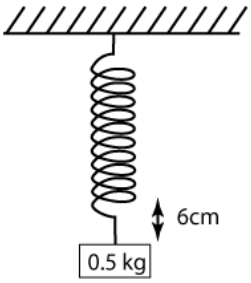
Hooke's Law: If a spring is not stretched beyond its elastic limit, the force that acts on it is directly proportional to the extension of the spring.

Elastic limit: The maximum force that can be applied to a spring such that the spring will be able to recover to its original strength when the force is removed.

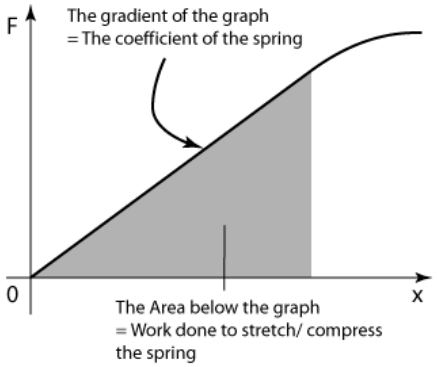
$$F = kx$$

where *k* is the **spring constant** and *x* is the extension of the spring.

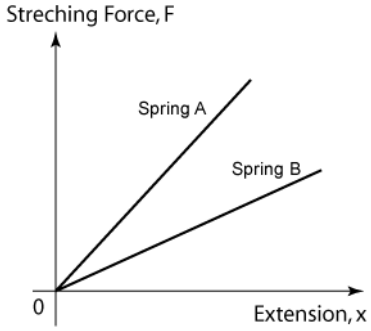
Spring constant: The ratio of the force applied on a spring to the extension of the spring.
SI unit: N/m
Quantity: Scalar



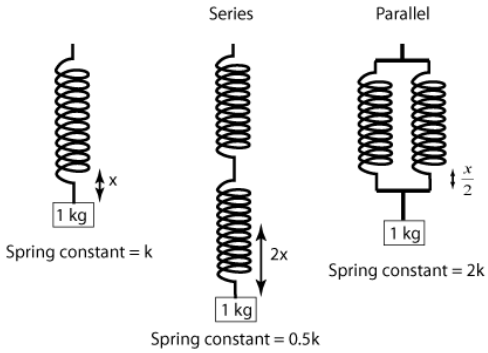
Find the energy stored in the spring.



The gradient is the spring constant, k



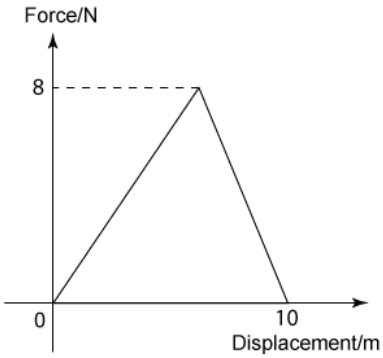
The higher the gradient, the greater the spring constant and vice versa (more stiff).



Series	Parallel
$\frac{1}{k_{eq}} = \frac{1}{k_1} + \frac{1}{k_2}$	$k_{eq} = k_1 + k_2$

Factors affecting the stiffness of a spring:

1) Material
2) Diameter of wire
3) Diamter of the spring
4) Length of the spring



Find the work done.