**Resolving and Combining Vectors**

**At the end of this you should be able to:**

* **Combine** 2 or more parallel vectors.
* **Combine** 2 or more perpendicular vectors.
* **Resolve** a vector into perpendicular components.
* **Combine** 2 or more vectors at any angle.

# **Definitions**:

|  |  |
| --- | --- |
| Resultant |  |

# **Combining 2 Perpendicular Vectors:**

* You will need to know how to apply Pythagoras Theory to understand this method!

Example: **Calculate** the resultant of 4N horizontally to the right and 3N vertically upward.

**Step 1**: **Draw** diagram showing vectors tip to tail and draw the resultant:

**Step 2: Apply** Pythagoras Theorem to calculate the Resultant.

# **Combining 2+ Perpendicular Vectors:**

**Step 1:** Decide positive directions: *Usually right and up are positive (left and down are negative)*

**Step 2:** Combine any parallel vectorsby adding them together.

**Step 3:** Combine the resultants of the same direction vectors using Pythagoras Theorem.

Example: **Calculate** the resultant of 2ms-1 to the right, 4 ms-1 to the left and 1 ms-1 upwards.

**Positive Directions:**

**Horizontal Resultant:**

**Vertical Resultant:**

**Calculate Resultant:**

# **Resolving a Vector into Perpendicular Components:**

* You will need to know how to use the SOHCAHTOA rules for right angle triangles for this section.

**Why?** This is to allow us to deal with vectors that are not perpendicular.

Example: **Resolve** a 4m displacement at 300 above the horizontal into perpendicular components *(horizontal and vertical directions)*

# **Combining Non-Perpendicular or Parallel Vectors:**

**Step 1: Resolve** vectors into perpendicular components.

**Step 2: Combine** vectors in parallel directions.

**Step 3: Combine** vectors in perpendicular directions.

Example: **Calculate** the resultant of a 5N force at 600 above horizontal and a 2N force at 450 above the horizontal.

# **Online Assessment Worked Solutions:**

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# **Additional Notes Space:**

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