



# Higher Vectors Homework - Sheet 1

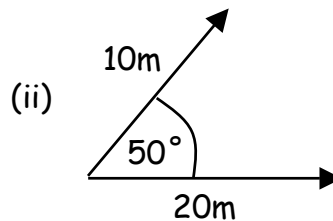
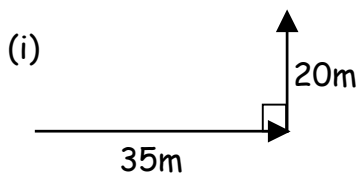
Aims: Practice at using vectors to solve a variety of problems.

Remember :  $A^2=B^2+C^2$  and  $S_{in}OHC_{os}AHT_{an}OA$

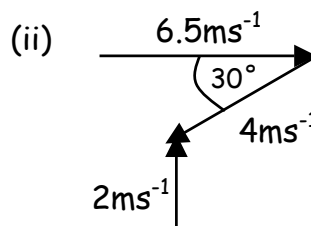
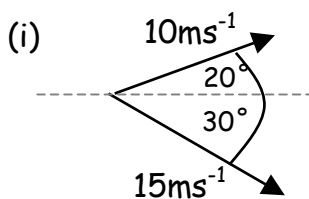
- |  |              |
|--|--------------|
|  | <u>Marks</u> |
| 1. What is the difference between a vector and scalar quantity?  | <u>2</u>     |
| 2. Put the following into a table of vectors and scalars:<br><i>Velocity, acceleration, force, mass, time, weight, energy, momentum, Work Done, speed, displacement, temperature.</i>  | <u>3</u>     |
| 3. During a drag race, a car drives along a straight track for a distance of 300m in a time of 20s. It then reverses back 100m, this takes 15s.<br>a) (i) What is the total <b>distance</b> travelled by the car?<br>(ii) Find the car's average <b>speed</b> .<br>b) (i) What is the total <b>displacement</b> of the car?<br>(ii) Find the average <b>velocity</b> .<br>c) (i) What would be the car's displacement if it were to return to the starting point?<br>(ii) What would this make its average velocity? | <u>6</u>     |

4. Find the resultant vector for the following by drawing a scale diagram.

a) Displacements:



b) Velocities:



# Higher Vectors Homework - Sheet 2



Aims: Practice at dealing with force vectors.

- |  | <u>Marks</u>                          |
|--|---------------------------------------|
| <p>5. A boat is crossing from one bank of a river to the other bank. The boat sets off on a direct path from one side to the other at a velocity of <math>15\text{ms}^{-1}</math>. There is a strong current flowing at right angles to the boat at <math>6\text{ms}^{-1}</math>.</p> <p>a) What is the resultant velocity of the boat?</p> <p>b) The boat takes 5minutes to cross the river. How wide is the river?</p> <p><i>(Hint: find the displacement first then use it to find the width)</i></p> | 4                                     |
| <p>6. A box of mass 18kg is at rest on a horizontal frictionless surface. A force of 4.0N is applied to the box at an angle of <math>26^\circ</math> to the horizontal.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>a) Show that the horizontal component of the this force is 3.6N.</p> <p>b) Calculate the acceleration of the box along the horizontal surface.</p> <p>c) Calculate the horizontal distance travelled by the box in a time of 7s.</p>                             | 5                                     |
| <p>7. A 1kg trolley runs down a runway which is 2m long and raised by 30cm at one end. If its speed remains constant throughout calculate the force of friction acting up the slope.</p>   | 3                                     |
| <p>Additional 3 marks available for neat layout and clear writing</p>  | 3                                     |
| <p>This homework is designed to test you on the understanding of the core ideas that we have been looking at in class. If you are stuck with any part of it then please come and ask for help.</p>   | <p><u>Total</u></p> <p><u>=30</u></p> |