

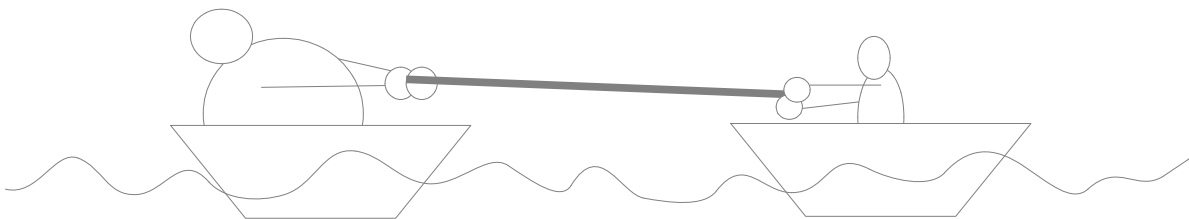
Year 11 Physics Test
Newton's Laws

1. State each of Newton's three laws of motion (in your own words or as a formula if you like) /3

2. Skydivers experience terminal speed.
 - (a) State what terminal speed is and how it occurs /3
 - (b) Explain the effect opening a parachute has on the skydiver's terminal speed /2

3. A car is driving at constant speed along a flat road.
 - (a) State the net force on the car. /1
 - (b) Draw a diagram of the car, and four forces (including vertical forces) acting *on the car*.
Make sure vectors (arrows) that should be the same length, *are* the same length. /3

4. Two students are sitting in small boats and pulling on a rope:



- (a) The student on the left is pulling with 432 N. State how much force the student on the right is pulling with. /1
 - (b) The student on the left and his boat have a total mass of 103 kg, and the friction of the water is 98.1 N.
Calculate the acceleration of the student on the left. /3
5. An experiment was conducted to investigate the relationship between force on an object and the acceleration it experiences. The hypothesis for this experiment was that acceleration would be proportional to the force, that is $a \propto F$

The results are shown below:

Force (N)	Acceleration (ms^{-2})
1.0	3.9
2.0	6.1
3.0	7.5
4.0	10.2
5.0	12.9

- (a) On graph paper, plot a graph of acceleration against force. Include a line of best fit. /5
- (b) Discuss the accuracy of the results. /2