**Assignment 1 - Kinematics Name: ……………………………**

1. The speedometer on your bike/car has two units of measurement. What are they? Explain why they are different. (2)
2. Download a GPS app on your phone. For example, ViewRanger. There are many free ones to choose from. Find an open space to move around in – must be outdoors so that the phone can pick up the satellite signals. Ideally, use the settings to set the units to m/s.
3. Walk in a straight line for a few mins.

Average speed = …………………………………....

1. Run in a straight line for a few mins.

Average speed = …………………………………….

1. Using this data, how long would it (in theory) take you to walk or run the End-to-End, which is 26 miles/42 km? (4)
2. Spirit of Bermuda can sail at an average speed of 7 knots (nautical miles per hour). It is 635 nautical miles from Newport to Bermuda. How long is the voyage likely to take? What factors may affect this? (3)
3. According to one of my students, he can beat the ferry from Hamilton to Dockyard. This seems both highly unlikely and dangerous. Find out the ferry times, then use Google Maps to determine the distance by road. What must his average speed be to beat the ferry as he boasts? Discuss his boast. (4)
4. The International Space Station orbits the Earth every 92 mins. Its orbit is circular and has a radius of 6770 km.
5. What is the distance that the ISS moves in one complete orbit? (maths!)
6. How fast it is travelling in km/hr?
7. How fast it is travelling in m/s? (6)
8. A student gets on his motorbike and accelerates to 36 km/hr (10 m/s) in 4 seconds from rest. Calculate her acceleration in m/s2. (2)
9. When she is up to speed, she cruises at 36 km/hr for the next 5 mins. What is her acceleration? (1)
10. The Sun is 150 million km away. Light travels at 300,000,000 m/s. How long does it take light to reach us from the Sun? (2)
11. A student drops off a cliff into the sea. The cliff is 15 m high.
12. Describe what happens to his speed as he falls.
13. If he dropped off a 5 m cliff, how would his speed be affected?
14. Two students jump off at the same time. What can you say about the speed as they hit the water and why? (4)
15. A speedboat increases its speed from 20 m/s to 30 m/s over a distance of 200 m.
16. What is the magnitude of its acceleration? (2)
17. What is the time it takes the boat to travel the 200 m distance? (2)

Total 32 marks