

# MATHEMATICS

## Level One

### Time and Links

**Setting:** Time is very important to surveyors, not only because it forms the basis upon which a client's fees are calculated, but also because it is sometimes used in calculating positions. The Global Positioning System (GPS), for example, enables a surveyor to calculate a very accurate position of the Earth's surface through the use of satellites that orbit the Earth. A surveyor in Sydney, Australia is able to use this system to calculate the distance from a point in Dunedin to a point in Sydney to an accuracy of a few centimetres.

#### Part A

The GPS receivers all operate on a common time system known as UTC (a system that is very close to Greenwich Mean Time). If we ignore daylight savings, New Zealand is 12 hours ahead of UTC and Sydney is 10 hours ahead of UTC. That is when it is 11:00am in New Zealand, it is 9am in Sydney and it is 11:00pm the previous day at Greenwich.

#### Task One

1.If the following are 24 hour clock times and days in New Zealand, calculate the equivalent time and day in both Sydney and at Greenwich

(Note – You may wish to change these into digital am/pm times first)

- a. 08:00 4<sup>th</sup> May 2001
- b. 12.00 19<sup>th</sup> June 2001
- c. 22:45 22<sup>nd</sup> September 2001
- d. 19:05 1<sup>st</sup> October 2001
- e. 03:00 1<sup>st</sup> January 2002

#### Task Two

2.If the following are 24 hour clock times and days in Sydney, calculate the equivalent time and day in both New Zealand and at Greenwich.

- a. 04:30 9<sup>th</sup> September 2002
- b. 11:45 18<sup>th</sup> November 2002
- c. 17:25 5<sup>th</sup> April 2002
- d. 14:37 23<sup>rd</sup> August 2002
- e. 03:00 1<sup>st</sup> January 2002

## Part B

Max has to redefine the boundaries of a property in Gore. Due to the age of the old survey, all dimensions are still in an imperial unit called links. There are 0.201168m per link. Convert the dimensions of the old plan from links to metres and then compute the area in square metres and hectares. (NB 10000m<sup>2</sup> is 1 ha)

