TIME ZONE PROBLEMS – Answer Key

**Calculating Time:**

To calculate time in different time zones you need to know the Coordinated Universal Time (UTC) adjustment for each zone.

Time in zone A – the UTC adjustment value for zone A = Time in zone B – the UTC adjustment value for zone B, or …

**Time B = Time A – UTC A + UTC B**

Use 24-hour clock times in your work.

Examples: 10:00AM = 10:00

 2:30PM = 14:30

 10:45PM = 22:45

 12:00 midnight = 0:00 or 24:00

Example A: ***If it is 2:30PM in Philadelphia, what time is it in San Francisco?***

San Francisco time = Philadelphia time – **UTC** Philadelphia + **UTC** San Francisco

San Francisco time = Time A – **UTC** A + **UTC** B

=14:30 – (–5:00) + (–8:00)

 =19:30 + (–8:00)

 = 11:30 or 11:30AM

Example B: ***If it is 9:14AM on Tuesday in Tokyo, what time is it in St. Paul?***

St. Paul time = Tokyo time – **UTC** Tokyo + **UTC** St. Paul

St. Paul time = Time A – **UTC** A + **UTC** B

=09:14 – (+9:00) + (–6:00)

 = 00:14 – 6:00 or 24:14 – 6:00

 = 6:14PM on Monday or 18:14 Monday

The answer is on Monday because we had to cross the International Dateline to get from Tokyo to St. Paul.

Notes:

* Expand on the above material, such as 24 Hour clock times, as needed.
* Note that some knowledge of working with integers is necessary.
* You will want to discuss the International Dateline with your students. Notice that problems #1, 3, & 12 are answers with different dates.
* Google Earth’s sunlight feature is not needed for the exercises but you should use it in some demonstrations. It has 3 display settings: UTC, personal time zone, and specific time zone. Be sure to use the correct setting for your demonstration.
* Daylight savings time should be discussed; however, it is not figured in these problems.

**Directions:**

1. **Open Google Earth and load the *Time Zone Problems* file. Deselect all *Layers* in the left sidebar menu. Collapse the *Layers* and *Search* portions of the sidebar.**
2. **Open the *Time Zone Problems* folder - be sure to expand the *Cities* folder inside.**
3. **Double-click on a city’s name in the left sidebar and you will be brought to that location. Find a white circle icon that is in the same colored region as the city. Click on the icon and you will find the time zone adjustment for that region.**
4. **Repeat step 3 as needed.**
5. **Use this information to solve the Time Zone Problems. Use the formula and work down. Include the time and day of the week in your answers. Daylight savings time will not be considered in the answers.**

1. The Super Bowl was broadcast to the troops in Afghanistan. If kick-off time was 5:30PM on Sunday in Arlington, Texas, what time did they get to watch the game in Kabul?

**Time B = Time A – UTC A + UTC B**

**B = 17:30 – (–6:00) + (+4:30)**

**B = 23:30 + 4:30**

**B = 28:00**

**B = (28:00 = 24:00 + 4:00)**

**B = 04:00, Monday**

**or 4AM, Monday**

1. Mrs. Larimer’s class had a video chat with a class from Santiago. If they linked on Tuesday at 10:00AM in Denver, what time was it for the Chilean class?

**Time B = Time A – UTC A + UTC B**

**B = 10:00 – (–7:00) + (–4:00)**

**B = 17:00 – 4:00**

**B = 13:00, Tuesday**

**or 1:00PM, Tuesday**

1. A tech company in San Francisco had a phone conference at 9:00PM on Tuesday with partners in Beijing. What was the time in Beijing?

**Time B = Time A – UTC A + UTC B**

**B = 21:00 – (–8:00) + (+8:00)**

**B = 29:00 + 8:00**

**B = 37:00**

**B = (37:00 = 24:00 + 13:00)**

**B = 13:00, Wednesday**

**or 1:00PM, Wednesday**

1. The Royal Wedding will take place in London on April 29th at 11:00AM. If this is broadcast live, what time should someone turn on the TV in Philadelphia?

**Time B = Time A – UTC A + UTC B**

**B = 11:00 – (0:00) + (–5:00)**

**B = 11:00 – 5:00**

**B = 06:00, April 29**

**or B = 6:00AM, April 29**

1. As the sun rises over Mexico City on Wednesday at 7:08AM, what time is it in New Delhi?

**Time B = Time A – UTC A + UTC B**

**B= 07:08 – (–6:00) + (+5:30)**

**B = 13:08 + 5:30**

**B = 18:38, Wednesday**

**or 6:38PM, Wednesday**

1. A German couple was on a scuba vacation in Cairns, Australia. If they phoned their children at 8:00PM on Saturday, what time was it in Berlin?

**Time B = Time A – UTC A + UTC B**

**B = 20:00 – (+10:00) + (+1:00)**

**B = 10:00 + 1:00**

**B = 11:00, Saturday**

**or 11:00AM, Saturday**

1. The 1998 World Cup Final was played between France, and Brazil. If the July 12th match started in Paris at 9:00PM, what time was the game seen in Rio de Janeiro?

**Time B = Time A – UTC A + UTC B**

**B = 21:00 – (+1:00) + (–3:00)**

**B = 20:00 + (–3:00)**

**B = 17:00, July 12**

**or 5:00PM, July 12**

1. A businessman from Cape Town had a Friday flight to Tokyo. Before he left, he adjusted his watch to Japan time. If he took off at 10:45AM local time, what time should he have on his watch?

**Time B = Time A – UTC A + UTC B**

**B = 10:45 – (+2:00) + (+9:00)**

**B = 8:45 + 9:00**

**B = 17:45, Friday**

**or 5:45PM, Friday**

1. A diplomat in Panama phoned another in Madrid. If he called at 9:15AM on Thursday, what time was it Madrid?

**Time B = Time A – UTC A + UTC B**

**B = 09:15 – (–5:00) + (+1:00)**

**B = 14:15 + 1:00**

**B = 15:15, Thursday**

**or 3:15PM, Thursday**

1. On Monday at 2:49PM, seismologists in Denver recorded an earthquake in Athens. If the information took 9 minutes to reach them, what time was the earthquake in Athens?

**Time B = Time A – UTC A + UTC B**

**B = 14:40 – (–7:00) + (+2:00)**

**B = 21:40 + 2:00**

**B = 23:40, Monday**

**or 11:40PM, Monday**

1. Two friends, one from Bissau and the other from Anchorage, chatted on the Internet. If it was Friday, 10:49AM in Bissau, what time was it in Anchorage?

**Time B = Time A – UTC A + UTC B**

**B = 10:49 – (0:00) + (–9:00)**

**B = 10:49 + (–9:00)**

**B = 01:49, Friday**

**or 1:49AM, Friday**

1. The 2010 Winter Olympics were held in Vancouver, BC, Canada. If the bronze medal hockey game between Finland and Slovakia was held on Saturday, February 27 at 7:00PM, what time was the game watched in Helsinki and Bratislava?

**Time B = Time A – UTC A + UTC B**

**B = 19:00 – (–8:00) + (2:00) B = 19:00 – (–8:00) + (1:00)**

**B = 27:00 + 2:00 B = 27:00 + 1:00**

**B = 29:00 B = 28:00**

**B = (29:00 = 24:00 + 5:00) B = (28:00 = 24:00 + 4:00)**

**B = 05:00, Sunday B = 04:00, Sunday**

**or 5:00AM, Sunday or 4:00AM, Sunday**

**in Helsinki in Bratislava**

**All done? Check your work and answers.**

**Be sure each answer has the time and day of the week.**

