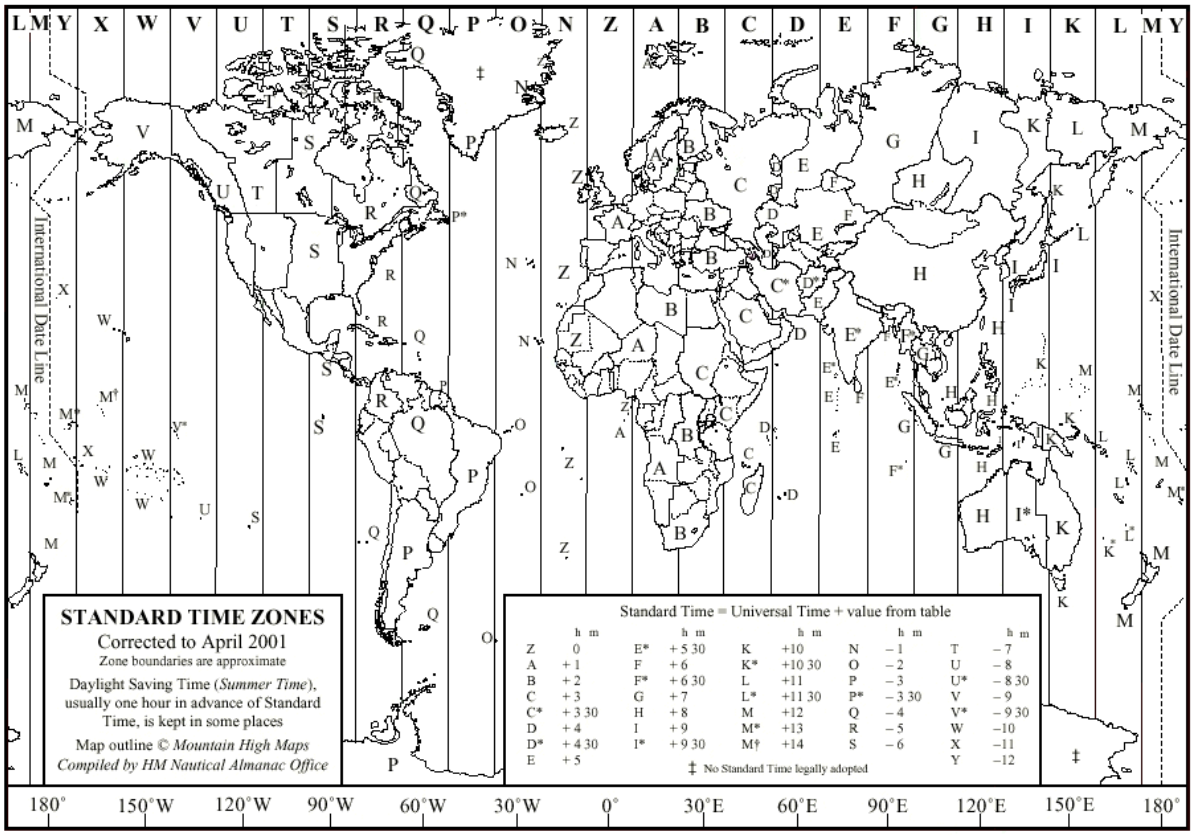


WORLD MAP OF TIME ZONES

Domestic and International Time Zones

INTENTIONALLY LEFT BLANK

Greenwich Mean Time
Although local time is a practical method of telling time on schedules, it is not always feasible to use local time when engaged in international business activities. It is necessary to have a common “language” of time. You will recall that Greenwich, England, is internationally accepted as the point through which the prime meridian passes. The local time at Greenwich is also accepted as the reference time or international commerce, and is referred to as “Greenwich Mean Time” (GMT) or “Zulu Time” (Z-time).

Once again, refer to the world map. Notice that as you move west from Greenwich, the times become progressively earlier. Conversely, as you move east from Greenwich, the times become progressively later.

Each time zone is a specific number of hours later, or earlier than GMT. On our map, notice the local time n Frankfurt is 1301, one hour later than Greenwich. We say that Frankfurt is “GMT plus 1”, or simply “plus 1”. The local time in Rio is shown as 0901, three hours earlier than GMT. Accordingly, we say that Rio is “GMT minus 3”, or “minus 3”.

As a Flight Attendant, you will be expected to fill out and or read certain forms which use GMT as the common time denominator. This means you must know how to convert local time to GMT, and vice versa. Most international airline schedules will indicate a city’s relation to GMT by the use of a “plus” sign or “minus” sign, e.g., +6 or -2, just as we have shown on the map.

Converting GMT to Local Time
To convert GMT to local time, add or subtract the number of hours as indicated by the “plus” or “minus sign”. Looking at the map, you will see that New York is -5. On the same map, GMT is shown as 1201. Subtract five hours from GMT to determine the local time in New York: 0701. Since Moscow is +3, you would add three hours to GMT to determine the local time there: 1501.

Converting Local Time to GMT
To convert local time to GMT, so the opposite of what the + or – symbol indicates. You know that New York is -5, and that the local time shown on the map is 0701. You would add five hours to the local time to determine GMT: 1201. Moscow is +3, and the local time there is 1501. Subtract three hours to determine GMT: 1201

Whenever you are unsure whether to add or subtract hours, pause for a moment and consider: are you trying to determine the time in a location that is east or went of you? Remember: times in the zones to your east are later, and times to your west are earlier.

Local Standard Time
Local Standard Time is the time which is observed in any given location.

In the continental United States, we refer to the various time zones as Eastern Standard Time, Central Standard Time, Mountain Standard Time, and Pacific Standard Time. When Daylight Savings Time is in effect, the time is then referred to as Eastern Daylight Time, etc.. Remember that each time zone extends from the North Pole to the South Pole. While some areas within a particular time zone may elect to use Daylight Savings Time, others will not. Therefore it is possible to have two different times within the same time zone.

The use of local time is a practical method of designating flight departure and arrival times. It allows passengers plan ahead and arrange their schedules accordingly. For example, if the

local time of arrival is 0130, most people will arrange to go directly to a hotel to sleep, whether they are tired or not, because they will wish to conform to the local time.

Zulu Time to Local Time Conversion Procedure

Zulu time and Greenwich Mean Time (GMT) are both the same and are reported in the 24 hour clock. To convert from the 24 hour clock to the 12 hour clock: If between 0000 and 1200, you just add a.m. If between 1300 and 2359, you subtract 12 hours and add p.m.

To convert Zulu time (or GMT) to local time, add or subtract the following numbers for the appropriate time zone to find the local time in the 24 hour clock.

	Time Zone – Zulu to Local (24 hour clock)						
	Pacific	**Mountain**	**Central**	**Atlantic**	**England**	**France**	**Israel/ Egypt**
Standard	-8	-7	-6	-5	0	+1	+2
Daylight Savings	-7	-6	-5	-4	N/A	0	N/A

Examples:
You are in Lake Jackson (during the winter) and the current Zulu time is 1600 hours. To find local time, find the time zone you are in (Central Time Zone for Lake Jackson), go down to "Standard" (remember: Spring – forward; Fall – back) and read -6 hours. Subtract 6 hours from 1600 and get 1000 hours on the 24 hour clock, which is 10:00 a.m. local time on the 12 hour clock.

You are in Cairo, Egypt, and only know "Z" time. The current time Zulu is 1600 hours. To determine local time, find the time zone you are in (Egypt), go down to "Standard" and add 2 hours to 1600, which becomes 1800 hours on the 24 hour clock. Then subtract 12 hours from 1800, and the result is 6:00 pm local time.

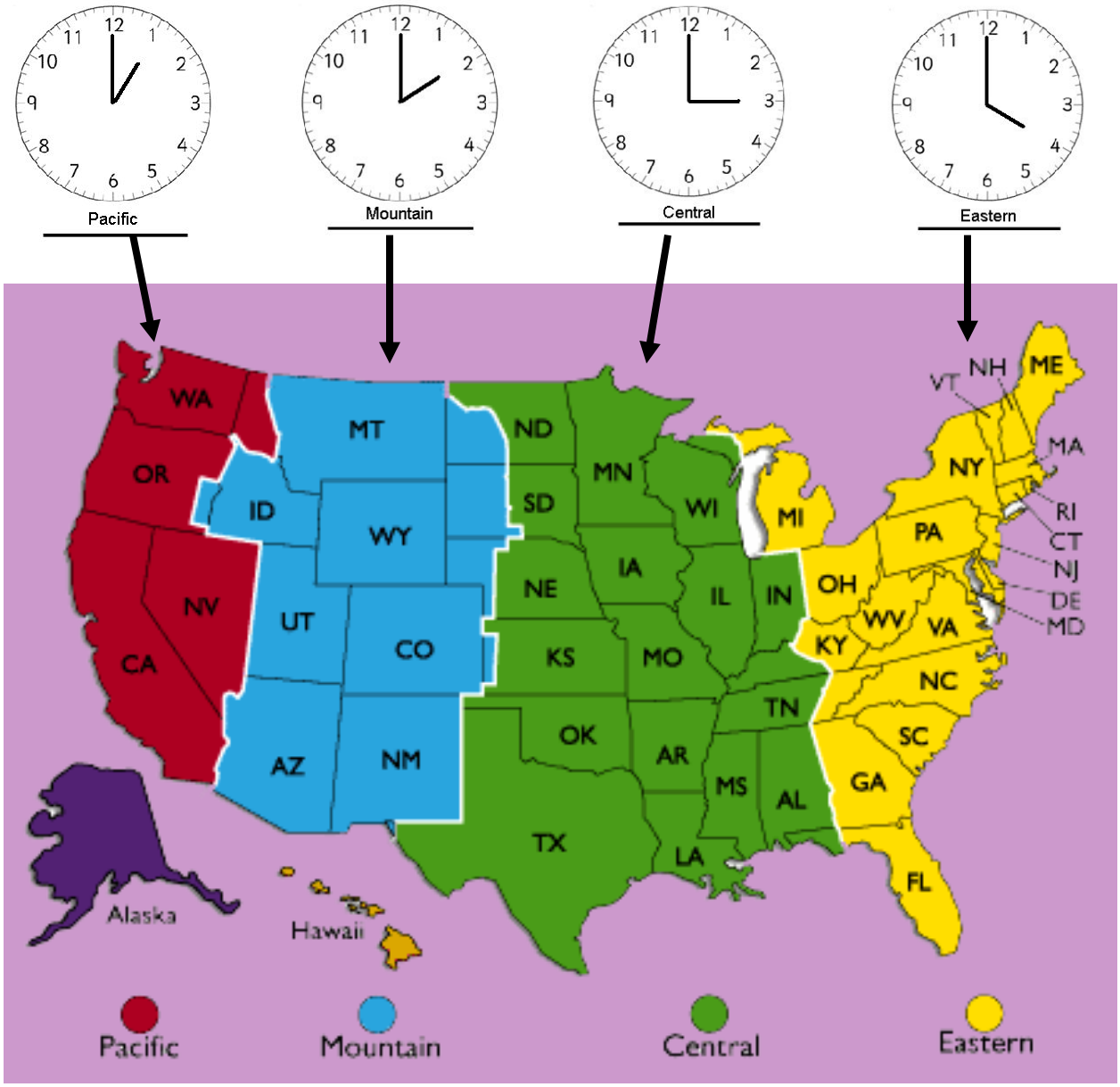
To find Zulu time no matter where you are, all you do is look at your watch (which will probably be set to where you live in the States), convert the 24 hour clock, go to the appropriate time zone in the table, change the sign on the number in the table and add it to the time.

You are in Paris during summer and you want to know what Zulu time it is. You look at your watch and it reads 11:30 p.m. in New York Time. Convert 11:30 p.m. to the 24 hour clock, which is 2330 hours. New York is in the Atlantic time zone. You go to Daylight Savings and read -4 hours. Change -4 to +4, and add 4 hours to 2330 to find the current Zulu time of 0330 Zulu.

Time Conversion Sheet

Local MIA		24 Hr.	Standard Time (+5 GMT) Zulu	Daylight Savings (+4 GMT) Zulu
12:00 Mid.		0000	0500 Z	0400 Z
1:00 a.m.		0100	0600 Z	0500 Z
2:00 a.m.		0200	0700 Z	0600 Z
3:00 a.m.		0300	0800 Z	0700 Z
4:00 a.m.		0400	0900 Z	0800 Z
5:00 a.m.		0500	1000 Z	0900 Z
6:00 a.m.		0600	1100 Z	1000 Z
7:00 a.m.		0700	1200 Z	1100 Z
8:00 a.m.		0800	1300 Z	1200 Z
9:00 a.m.		0900	1400 Z	1300 Z
10:00 a.m.		1000	1500 Z	1400 Z
11:00 a.m.		1100	1600 Z	1500 Z
12:00 p.m.	Noon	1200	1700 Z	1600 Z
1:00 p.m.		1300	1800 Z	1700 Z
2:00 p.m.		1400	1900 Z	1800 Z
3:00 p.m.		1500	2000 Z	1900 Z
4:00 p.m.		1600	2100 Z	2000 Z
5:00 p.m.		1700	2200 Z	2100 Z
6:00 p.m.		1800	2300 Z	2200 Z
7:00 p.m.		1900	2400 Z	2300 Z
8:00 p.m.		2000	0100 Z	2400 Z
9:00 p.m.		2100	0200 Z	0100 Z
10:00 p.m.		2200	0300 Z	0200 Z
11:00 p.m.		2300	0400 Z	0300 Z

Time Zones


Pacific
Mountain
Central
Eastern
WA
OR
CA
NV
ID
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
MO
AR
LA
WI
IL
MS
MI
IN
OH
KY
TN
AL
WV
VA
NC
SC
GA
FL
PA
NY
VT
NH
ME
MA
RI
CT
NJ
DE
MD
Alaska
Hawaii
Pacific
Mountain
Central
Eastern

Elapsed Time Computations

Now that you have learned to compute to 24 hour clock time, there is one more point which needs to be covered before we can go on to journey time. That is the relationship of the time zones in the United States. Whenever you compute elapsed (journey) time you must account for the time changes made in crossing a time zone boundary.

The United States is divided into four time zones. Within the 48 contiguous states there are four standard time zones. A time zone covers the area between every 15 degrees of longitude.

This figure of 15 degrees of longitude per each time zone is based upon the fact that the earth rotates through a complete circle of 360 degrees every 24 hours, thus the Earth rotates 15 degrees each hour. For places 15 degrees toward the east, the time is one hour later than it is where you are. For places 15 degrees towards the west, the time is one hour earlier.

For example:

City	Time Zone	12 Hour Clock	24 hour clock
New York, NY	Eastern (EST)	4:00 p.m.	1600
Chicago, IL	Central (CST)	3:00 p.m.	1500
Denver, CO	Mountain (MST)	2:00 p.m.	1400
Los Angles	Pacific (PST)	1:00 p.m.	1300

To further clarify the statement, going east the time is one hour later, rather than the usual layman interpretation that the east is one hour earlier. Assume you are in Chicago, Illinois, and the time is 3:00 pm or 1500 hours. From the above example you see at that moment in New York City the time is 1600 hours, or 4:00 p.m. In other words, one hour later than in the progress of the passing of 24 hours.

Now, look at the corresponding map. You can see the division of the United States into four time zones and the relation of one to the other three.

We said the time zone boundaries are 15 degrees of longitude apart. This is basically true, but as you probably have noticed, the boundaries are very uneven. In many cases the time zone boundary will follow a State boundary or a river, rather than the longitudinal line.

Establishment of three new time zones in Alaska and Hawaii have been made by the Department of Transportation. They became effective March 18, 1968.

The Department extended the already established Pacific Time Zone to cover Southeastern Alaska, and designated Yukon Standard Time, Alaska-Hawaii Standard Time, and Bering Standard Time.

The Pacific Time Zone extension makes official the time which has been observed for several years in the Alaskan cities of Juneau, Sitka, and Ketchikan and other areas of 137 degrees west longitude.

Yukon time is in the area between 137 and 141 degrees west longitude, including Yakutat, Alaska.

The Alaska-Hawaii zone includes Central Alaska and all of the Hawaiian Islands. It lies between 141 and 157 degrees, 30 minutes West longitude.

The Bering Zone covers Alaska between the west longitude lines of 157 degrees, 30 minutes and 172 degrees, 30 minutes and the Aleutian Islands, west of 172 degrees, 30 minutes.

Daylight Savings Time – Move Clock Ahead 1 Hour
Generally during the summer months, a city or an entire state will go on Daylight Savings Time. When this happens, the time being used is one hour later (ahead of) the standard time of that zone. In other words, if the standard time is 12:00 noon, the Daylight time is 1 :00 p.m.

Basic Steps for Elapsed Time Computations
As we mentioned earlier in this section, there are several methods by which the elapsed time may be computed. However, we feel this method is the easiest and most foolproof. It involves only three basic steps:

1. Change both times to 24-hour clock.
2. Subtract the departure time from the arrival time.
3. Adjust for the time zone change, if any.

Some flights do not cross time zones. In these cases, the third step is automatically eliminated. For example, lets suppose a flight departs from Saginaw at 0700 a.m. and arrives in Cleveland at 7:45 a.m. Both cities are in the Eastern Standard Time Zone (EST). Reference map on page 7.

1 Change both times to 24 hour clock
7:00 a.m. = 0700
7:45 a.m. = 0745

2 Subtract the departure time from the arrival time. (It may be helpful to separate hours from minutes in this step.)

0745	or	07/45
0700	or	07/00
0045		/45 = 45 minutes

3 Adjust for time zone changes (Remember, both cities are in the same time zone so this step is eliminated.)

The elapsed time for this flight is 45 minutes.

Reference map on page 7. Here is another example:

DEPART Chicago at 11:05 a.m. (CST)
ARRIVE Dallas at 2:07 p.m. (CST)

1 11:05 a.m. = 1105
2:07 p.m. = 1407

2 1407
-1105
3:02, or 3 hours, 2 minutes.

Given the departure and arrival times, see if you can correctly compute the elapsed time for the following problems.

1 DEPART San Francisco, CA at 12:00 Noon, (PST)
ARRIVE Seattle, WA at 1:42 p.m. (PST) _____

2 DEPART Albuquerque, NM, at 11:15 a.m. (MST)
ARRIVE Denver, CO, at 12:45 p.m. (MST) _____

3 DEPART Kansas City, KS, at 9:15 p.m. (CST)
ARRIVE Minneapolis, MN, at 10:59 p.m. (CST) _____

4 DEPART Philadelphia, PA, at 4:30 p.m. (EST)
ARRIVE Miami, FL, at 6:50 p.m. (EST) _____

5 DEPART Dayton, OH at 8:00 a.m. (EST)
ARRIVE Cleveland, OH, at 8:41 a.m. (EST) _____

6 DEPART San Diego, CA, at 7:00 am (PST)
ARRIVE Las Vegas, NV, at 8:20 a.m. (PST) _____

Answers

1 1 hour 42 minutes

2 1 hour 30 minutes

3 1 hour 44 minutes

4 2 hours 20 minutes

5 41 minutes

6 1 hour 20 minutes

Time zone changes
Adjusting for time zone changes require that you remember one thing – when traveling west, one hour must be added for each time zone boundary crossed; when traveling east, one hour must be subtracted for each time zone boundary crossed.

Westbound Flights
Again, when the flight is westbound, you add one hour for each time zone boundary crossed. Therefore, when going from the Eastern zone to the Central Zone, you add one hour since you have crossed only one time zone boundary. From Eastern to Mountain, you add two hours, and from Eastern to Pacific you add three hours.

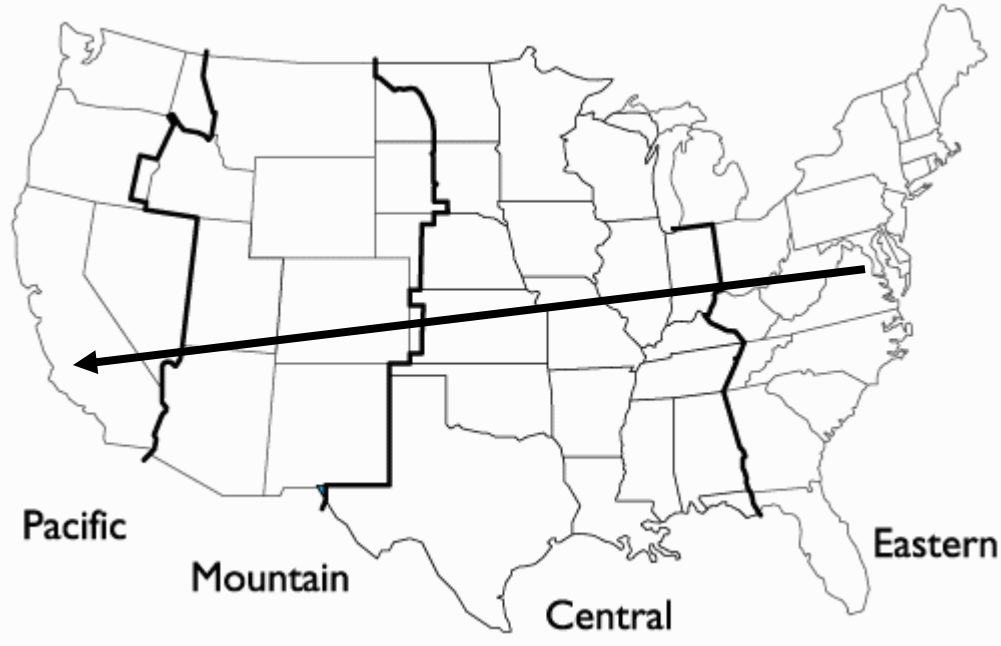
For example:

1 DEPART Washington D.C. at 5:40 p.m. (EST)
ARRIVE Los Angles, CA at 7:55 p.m. (PST)

1 5:40 p.m. = 1740
7:55 p.m. = 1955

2 1955
-1740
2:15

3 2:15
+3:00 (crossed 3 time zone boundaries)
5:15 or 5 hours 15 minutes



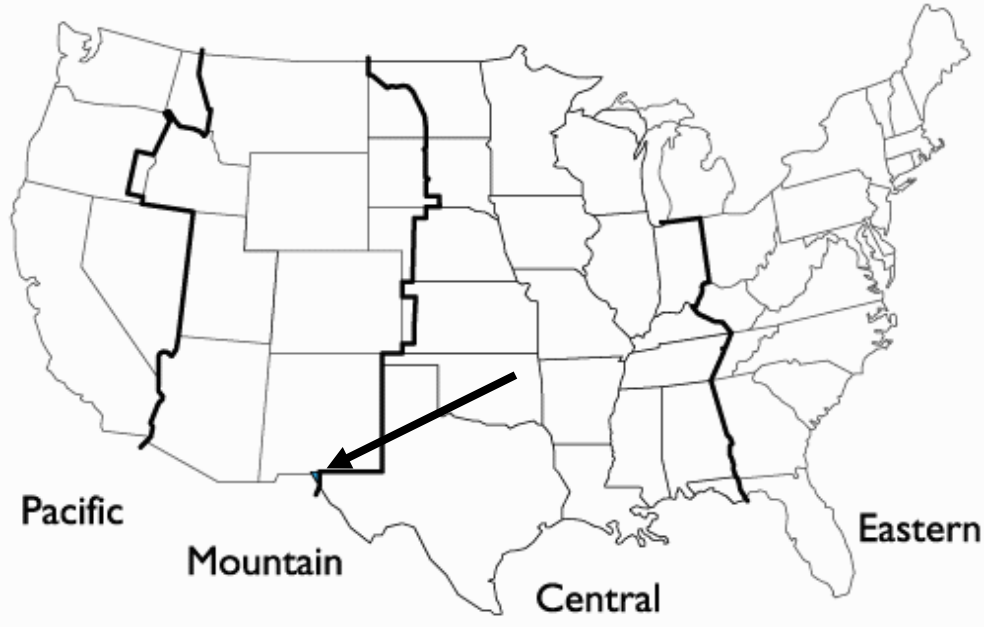
Another example

DEPART Tulsa, OK, at 5:30 p.m. (CST)
ARRIVE El Paso, TX, at 8:43 p.m. (MST)

1 5:30 p.m. = 1730
8:43 p.m. = 2043

2 2043
-1730
313

3 3:13
+ 1:00 (crossed one time zone boundary)
4:13 or 4 hours 13 minutes



Now try working these problems for westbound flights

1 DEPART Philadelphia, PA, at 5:05 p.m. (EST)
ARRIVE Minneapolis, MN, at 6:40 p.m. (CST) _____

2 DEPART Des Moines, IO, at 8:00 a.m. (CST)
ARRIVE Los Angles, CA, at 10:00 a.m. (PST) _____

3 DEPART Denver, CO, at 11:35 a.m. (MST)
ARRIVE Portland, OR, at 1:47 p.m. (PST) _____

4 DEPART Washington, D.C. at 10:15 a.m. (EST)
ARRIVE Salt Lake City, UT, at 3:25 p.m. (MST) _____

5 DEPART Boston, MA, at 2:40 p.m. (EST)
ARRIVE San Francisco, CA, at 6:43 p.m. (PST) _____

6 DEPART Saginaw, MI, at 08:33 a.m. (EST)
ARRIVE Reno, NV, at 11:18 a.m. (MST) _____

Answers

1 2 hours 35 minutes

2 4 hours

3 3 hours 12 minutes

4 7 hours 10 minutes

5 7 hours 3 minutes

6 4 hours 45 minutes

Eastbound Flights
When the flight is traveling east, you must subtract one hour for each time zone boundary which the flight crosses.

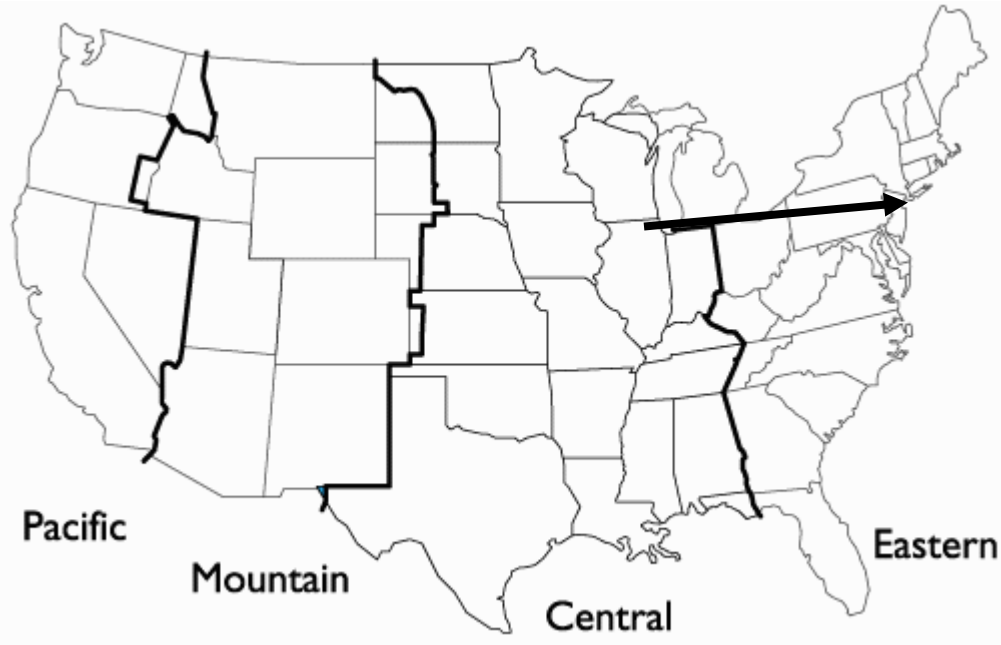
For example

DEPART Chicago, IL, at 7:00 a.m. (CST)
ARRIVE New York, NY at 9:48 a.m. (EST)

1 7:00 a.m. = 0700
9:48 a.m. = 0948

2 0948
-0700
248

3 2:48
-1:00 (crossed one time zone boundary)
1:48 or 1 hour 48 minutes



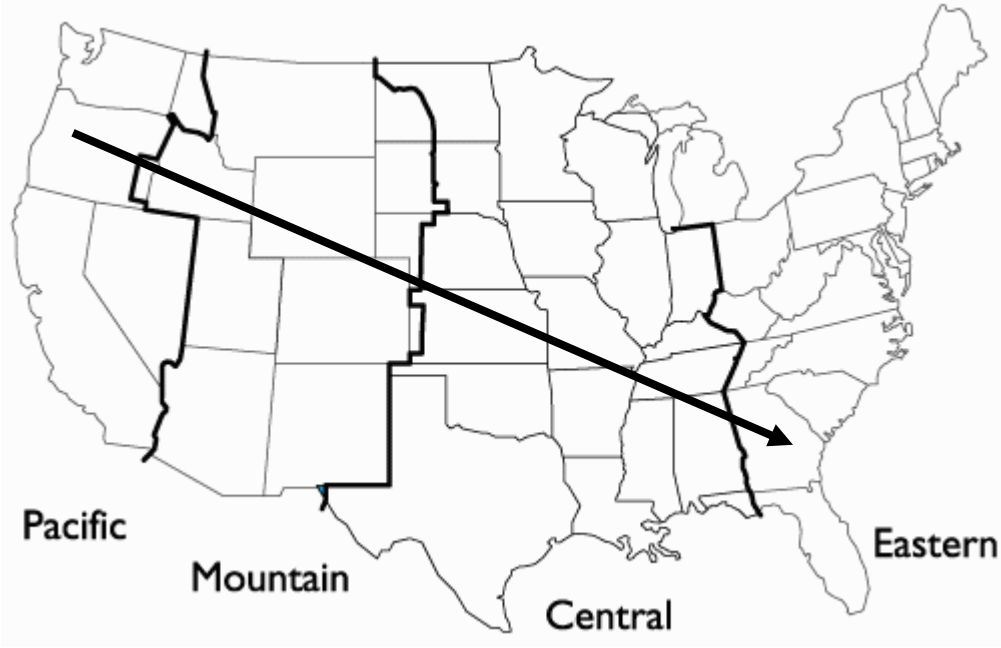
Another example

DEPART Portland, OR, at 3:10 p.m. (PST)
ARRIVE Atlanta, GA, at 11:50 p.m. (EST)

1 3:10 p.m. = 1510
11:50 p.m. = 2350

2 2350
-1510

3 8:40
-3:00
5:40 or 5 hours 40 minutes



See if you can work these problems correctly.

1 DEPART Colorado Springs, CO, at 7:25 am (MST)
ARRIVE St. Louis, MO, at 11:41 a.m. (CST) _____

2 DEPART Albuquerque, NM, at 3:00 p.m. (MST)
ARRIVE Saginaw, MI, at 9:40 p.m. (EST) _____

3 DEPART San Diego, CA, at 11:35 a.m. (PST)
ARRIVE El Paso, TX, at 3:40 p.m. (MST) _____

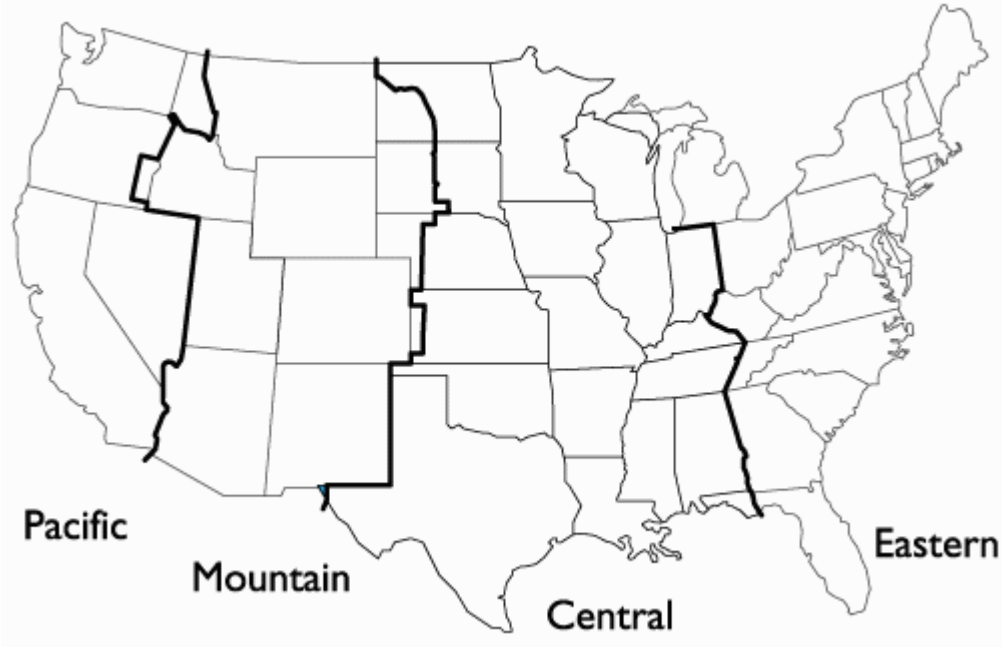
4 DEPART Seattle, WA, at 9:00 a.m. (PST)
ARRIVE Washington, D.C. at 4:30 p.m. (EST) _____

5 DEPART Portland, OR, at 8:20 a.m. (PST)
ARRIVE Lincoln, NE, at 3:20 p.m. (CST) _____

Answers

1 3 hours 16 minutes
2 4 hours 40 minutes
3 3 hours 5 minutes
4 4 hours 30 minutes
5 5 hours

Lets try mixing them up. The next problems involve some flights that are in the same time zone, some that are eastbound and others that are westbound. Be careful – watch the time zone changes and directions carefully, and try to get them all correct.



1 DEPART Reno, NV at 9:45 p.m. (PST)
ARRIVE Las Vegas, NV at 10:49 p.m. (PST) _____

2 DEPART Los Angles, CA, at 8:20 a.m. (PST)
ARRIVE Salt Lake City, UT, at 11:30 a.m. (MST) _____

3 DEPART Seattle, WA, at 12:50 a.m. (PST)
ARRIVE Wichita, KS, at 6:51 a.m. (CST) _____

4 DEPART Syracuse, NY, at 6:10 p.m. (EST)
ARRIVE Chicago, IL, at 6:45 p.m. (CST) _____

5 DEPART Boston, MA, at 5:00 p.m. (EST)
ARRIVE San Diego, CA, at 8:45 p.m. (PST) _____

6 DEPART Tucson, AZ, at 8:45 a.m. (MST)
ARRIVE San Antonio, TX, at 12:51 p.m. (CST) _____

7 DEPART Philadelphia, PA, at 2:00 p.m. (EST)
ARRIVE Pittsburgh, PA, at 2:57 p.m. (EST) _____

8 DEPART New York, NY at 4:15 p.m. (EST)
ARRIVE El Paso, TX, at 7:27 p.m. (MST) _____

9 DEPART San Francisco, CA, at 12:15 p.m. (PST)
ARRIVE Tampa, FL, at 8:47 p.m. (EST) _____

10 DEPART Dallas, TX, at 8:05 a.m. (CST)
ARRIVE Colorado Springs, CO, at 8:43 a.m. (MST) _____

Answers

1 1 hour 4 minutes
2 2 hours 10 minutes
3 4 hours 1 minute
4 1 hour 35 minutes
5 6 hours 45 minutes
6 3 hours 6 minutes
7 57 minutes
8 5 hours 12 minutes
9 5 hours 32 minutes
10 1 hour 38 minutes

Borrowing an hour

From time to time it will be necessary for you to borrow an hour. This only happens when the number of minutes which you are subtracting are higher than the minutes you are subtracting from.

For example:

DEPART Cincinnati, OH, at 2:50 p.m. (EST)
ARRIVE Columbus, OH, at 3:23 p.m. (EST)

1523
-1450

Since you cannot subtract 50 minutes from 23 minutes, you must change the arrival time by borrowing one hour. Remember, one hour equals 60 minutes. So you add 60 minutes to the number of minutes already shown in the time.

1523 = 1483

Now you are able to subtract.

1483
-1450
33 minutes

Here is a second example

DEPART Miami, FL, at 10:15 a.m. (EST)
ARRIVE Colorado Springs, CO, at 1:08 p.m. (MST)

1308 = 1268
- 1015 = 1015
2:53
+ 2:00 (hours between EST and MST)
4:53 or 4 hours 53 minutes