

## **JEWISH CALENDAR TUTORIAL WORKSHEET 1 (515BC CHANGED SEQUENCE)**

### **YEAR BEING CALCULATED: 515 B.C. CHANGED SEQUENCE**

COMMENTS: WHEN YOU TRY TO ESTABLISH JEWISH CALENDAR DATES FOR B.C. YEARS, THEN THE WHOLE EXERCISE IS TOTALLY HYPOTHETICAL. THE JEWS THEMSELVES DON'T EVER ATTEMPT TO EXTRAPOLATE THEIR PRESENT CALENDAR BACK INTO B.C. DATES, BECAUSE THEY KNOW THAT BACK THEN VISUAL OBSERVATION OF THE NEW CRESCENTS WAS THE DECIDING FACTOR IN ESTABLISHING THE START OF EVERY MONTH OF THE YEAR, AND THE PRESENT CALENDAR AND ITS RULES WERE NOT USED AT ALL.

HOWEVER, AMONGST THOSE THAT ENGAGE IN THE EXERCISE OF EXTRAPOLATING THE PRESENT JEWISH CALENDAR BACK INTO B.C. DATES, INVARIABLY WITH A MOTIVATION OF WANTING TO SUPPORT SOME POSITION OR OTHER THAT THEY HAVE TAKEN, THERE ARE TWO SCHOOLS OF THOUGHT.

ONE APPROACH IS TO SIMPLY EXTRAPOLATE BACK TO SUCH YEARS (e.g. 515 B.C.) BY EMPLOYING THE SAME SEQUENCE OF LEAP YEARS WITHIN EVERY 19-YEAR CYCLE THAT IS EMPLOYED BY THE JEWISH CALENDAR TODAY. PEOPLE WHO USE THIS APPROACH ARE TYPICALLY OBLIVIOUS TO THE EMBARRASSING RESULTS THIS WILL VERY OFTEN PRODUCE ... LIKE PLACING THE ENTIRE FEAST OF TABERNACLES WELL INTO SUMMER, AND PLACING THE PASSOVER AND THE ENTIRE FEAST OF UNLEAVENED BREAD WELL INTO WINTER. THESE RESULTS ARE SOMEWHAT OBSCURED BY THE USE OF THE JULIAN CALENDAR FOR THOSE YEARS, BUT IT IS EASY TO EXPOSE THESE PROBLEMS.

THE SECOND AND MORE COMMON APPROACH IS VERY MUCH AWARE OF THE EMBARRASSING RESULTS ACHIEVED BY THE PRESENT SEQUENCE OF LEAP YEARS FOR SUCH DATES. HOWEVER, THEY STILL WANT TO SEE THE PRESENT JEWISH CALENDAR GO BACK INTO THE CENTURIES B.C., LIKEWISE WITH A DESIRE TO ESTABLISH SOME AUTHORITY FOR THE PRESENT JEWISH CALENDAR. SO THEY HAVE DECIDED TO SIMPLY ALTER THE SEQUENCE OF LEAP YEARS WITHIN THE 19-YEAR CYCLE FOR SUCH B.C. DATES. THE RESULT IS THAT, FOR THOSE YEARS THAT CLEARLY START FAR TOO EARLY WITH THE PRESENT SEQUENCE OF LEAP YEARS, THEY ATTEMPT TO SELECT THE FOLLOWING NEW MOON TO START THE YEAR. IN THAT WAY THE RESULTS LOOK FAR MORE REASONABLE AND FAR MORE ACCEPTABLE.

IN THIS TUTORIAL I WILL DEMONSTRATE THIS SITUATION. WE WILL FIND THE JEWISH CALENDAR DATES FOR 515 B.C. BY USING BOTH METHODS.

IN THIS EXAMPLE HERE WE WILL USE THE CHANGED (or ALTERNATE) SEQUENCE OF LEAP YEARS, WHICH IS YEARS 2, 5, 7, 10, 13, 16, 18. IN THE COMPANION TUTORIAL FOR 515 B.C. WE WILL USE TODAY'S SEQUENCE OF LEAP YEARS, WHICH IS 3, 6, 8, 11, 14, 17, 19. (THESE NUMBERS REFER TO THE YEARS WITHIN EVERY 19-YEAR CYCLE.)

[It is this changed sequence of leap years that is used in the computer program for the Jewish calendar that was produced by the Worldwide Church of God many years ago now.]

AFTERWARDS WE CAN COMPARE THE RESULTS ACHIEVED.

SO LET'S START WITH OUR CALCULATIONS OF THE JEWISH CALENDAR FOR 515 B.C., USING THE CHANGED SEQUENCE OF LEAP YEARS.

## **PART I: CALCULATION OF THE DAY OF THE WEEK FOR THE MOLAD**

**1.**

STARTING DATE YEAR:3761 B.C.

STARTING DATE MOLAD OF TISHRI:OCTOBER 7 or SEPTEMBER 37

STARTING DATE EXACT TIME:D2 H5 P204

**2.**

YEAR BEING CALCULATED:515 B.C.

**3.**

THE DIFFERENCE IN YEARS:3761 - 515 = 3246 YEARS

**4.**

CONVERT THIS DIFFERENCE INTO THE NUMBER OF 19-YR CYCLES PLUS REMAINING COMMON YEARS AND LEAP YEARS:

$3246 / 19 = 170$  cycles plus a remainder of 16 years

The changed sequence of leap years is: 2, 5, 7, 10, 13, 16, 18

Therefore the remainder of 16 years = 10 Common Years + 6 Leap Years

**5.**

CALCULATE THE DIFFERENCE BETWEEN THESE TWO DATES TO FIND THE CORRECT DAY OF THE WEEK FOR THE MOLAD.

COMMENT: For calculation purposes turn all periods of time into "Parts". The numbers will be larger, but the calculating processes will be much easier. In large numbers every 3 digits are separated by commas for easier recognition of the numbers.

See also the Data File for the actual data needed here for the calculations.

**6.**

FIRST CONVERT ALL PERIODS OF TIME INTO PARTS.

A.PER CYCLE: A Jewish 19-Year Cycle exceeds a full number of weeks by 2 Days 16 Hours 595 Parts. This is written as 2D 16H 595P.

THUS:  $2D = 2 \times 24 = 48$  HOURS plus 16 HOURS = 64 HOURS

$64 \times 1080 = 69120$  PARTS plus 595P = 69,715P

B.PER COMMON YEAR: A common year exceeds a full number of weeks by 4 Days 8 Hours 876 Parts. This is written as 4D 8H 876P.

THUS:  $4D \times 24 = 96H$  plus 8H = 104H

$104 \times 1080 = 112320$  PARTS plus 876P = 113,196P

C.PER LEAP YEAR: A (Jewish) leap year exceeds a full number of weeks by 5 Days 21 Hours 589 Parts. This is written as 5D 21H 589P.

THUS:  $5D \times 24 = 120H$  plus 21H = 141H

$141 \times 1080 = 152280$  PARTS plus 589P = 152,869P

**7.**

NOW WE CAN START WITH THE CALCULATIONS FOR OUR YEAR.

**A. FOR THE NUMBER OF CYCLES:**

$$170 \times 69,715P = 11,851,550P$$

**B. FOR THE COMMON YEARS:**

$$10 \times 113,196P = 1,131,960P$$

**C. FOR THE LEAP YEARS:**

$$6 \times 152,869P = 917,214P$$

**8.**

TOTAL UP THESE 3 AMOUNTS OF TIME:

$$11,851,550 + 1,131,960 + 917,214 = 13,900,724P$$

**9.**

CONVERT THE RESULT BACK INTO "WEEKS, DAYS, HOURS, PARTS":

$$13,900,724 / 1080 = 12,871 \text{ HOURS plus } 44P$$

$$12,871 / 24 = 536 \text{ DAYS plus } 7H$$

$$536 / 7 = 76 \text{ WEEKS plus } 4D$$

**10.**

FROM THIS RESULT DISCARD THE FULL NUMBER OF WEEKS:

THUS THE RESULT IS: 4D 7H 44P

**11.**

ADD THIS REMAINDER TO THE STARTING DATE: D2 H5 P204 plus 4D 7H 44P = D6 H12 P248

**12.**

IF THE TOTAL IS 8 DAYS OR MORE, THEN DISCARD 7 DAYS, OTHERWISE KEEP THIS RESULT:

D6 H12 P248

**13.**

THE RESULT YOU HAVE IS THE DAY OF THE WEEK AND THE EXACT TIME OF THAT DAY FOR THE JEWISH MOLAD OF TISHRI FOR THIS YEAR.

**14.**

ENTER THE RESULT HERE IN THE FORMAT: D H P: D6 H12 P248

THIS IS EQUAL TO: FRIDAY, 6:13:47 a.m.

[Comment: Day 1 = Sunday, Day 7 = Saturday; H0 = 6:00 p.m., H6 = midnight; H12 = 6:00 a.m., etc.]

You have now completed the first part of the calculation of the Molad for the year 515 B.C.. That wasn't very difficult was it? Make a note of the HOURS and PARTS in this result. (i.e. the H12 P248)

[Comment: In programs that reckon days from midnight to midnight this will appear as H6 P248.]

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