

Lecture Notes

October 8, 2012

Decimals in Base 5

0.32_5

$\frac{3}{5} + 2 \times \frac{1}{25}$

$\frac{3}{5} + \frac{2}{25} = 0.68$

Oct 8-1:28 PM

Convert 0.68 to Base 5

$0.68 \times 5 = 3.4$ 0.32_5

$0.4 \times 5 = 2.0$

$0.0 \times 5 = 0$

⋮

Oct 8-1:42 PM

11b $42_x = \text{thirty}$

$4x + 2 = 30$

42

? | 1

$4 \times 7 = 28$

Oct 8-1:45 PM

15d Convert 0.7 to base 5

$0.7 \times 5 = 3.5$ 0.3222_5

$0.5 \times 5 = 2.5$

$0.5 \times 5 = 2.5$

⋮


Oct 8-1:49 PM

Chapter 11 - Mayan #/s

Convert from Mayan to decimal

$8 \times 20 + 12 \times 1$

$160 + 12 = 172$



Oct 8-2:13 PM

Convert

$111.j.j\dots$ to Base 10

400 20 1

16 1 3

$16 \times 400 + 20 + 3$

64023

Oct 8-2:17 PM

Convert 157 to Mayan

$$\begin{array}{r} \overline{7 \quad 17} \\ \text{20} \quad \text{1} \end{array}$$

$$\begin{array}{r} 20 \overline{)157} \\ \underline{140} \\ 17 \end{array}$$

$$1 \dots j \text{ IIII} \dots$$

Oct 8-2:21 PM

'Mayan Solar Numbers'

$$\begin{array}{c} \text{!} \quad j \quad \text{II} \cdot j \quad \dots s \\ \text{360} \quad \text{18.20} \quad \text{20} \quad \text{1} \\ (\text{not } 400) \text{ years} \quad \text{months} \quad \text{days} \end{array}$$

$$1 \times 360 + 11 \times 20 + 3$$

$$360 + 220 + 3$$

$$583 = \text{583}$$

Oct 8-2:24 PM

Convert to decimal:

$$\begin{array}{c} \text{II} \cdot j \quad | \quad j \quad \text{0} \\ \text{360} \quad \text{20} \quad \text{1} \end{array}$$

$$10 \times 360 + 5 \times 20 + 0$$

$$\text{460}$$

Oct 8-2:28 PM

Convert 1038 to Mayan solar.

$$\begin{array}{c} \dots j \quad \text{III} \quad j \quad \text{III} \dots s \\ \text{2} \quad \text{15} \quad \text{18} \\ \text{360} \quad \text{20} \quad \text{1} \end{array}$$

$$\begin{array}{r} 2 \quad 15 \\ 360 \overline{)1038} \\ \underline{720} \\ 318 \\ 20 \overline{)318} \\ \underline{20} \\ 118 \\ \underline{100} \\ 18 \end{array}$$

Oct 8-2:30 PM

Mayan addition

$$\begin{array}{r} \text{II} \cdot j \quad | \quad \text{I} \dots \\ + \quad \text{II} \cdot j \quad | \quad \text{II} \dots \\ \hline \text{!} \cdot j \quad \text{IIII} \cdot j \quad \text{IIII} \dots \text{!} \\ \text{!} \cdot j \quad \dots \cdot j \quad \text{IIII} \dots \end{array}$$

$$\text{!} \cdot j \quad \dots \cdot j \quad \text{!} \quad \text{!} \cdot j \quad \dots \cdot j \quad \text{!}$$

Oct 8-2:34 PM

15d Chapter 10

Convert 0.7 to base 5

$$0.7 \times 5 = 3.5$$

$$0.5 \times 5 = 2.5$$

$$0.5 \times 5 = 2.5$$

$$\vdots$$

$$= 0.322 \dots$$

Oct 8-3:13 PM

Convert 0.425 to base 10

$$\begin{array}{c} 0.425 \\ \hline \underbrace{0.4}_{25} \quad \underbrace{0.02}_{5} \quad \underbrace{0.005}_{1} \end{array}$$

$$4 \times \frac{1}{5} + 2 \times \frac{1}{25}$$

$$\frac{4}{5} + \frac{2}{25} =$$

Oct 8-3:17 PM

#26

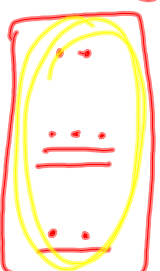
$$\begin{array}{r} 204_8 \\ \hline 64 \quad 8 \quad 1 \end{array}$$

$$\begin{array}{r} 116 \\ \hline 42 \times 7 \\ \hline 28 \\ \hline 30 \end{array}$$

$$4 \times 7 = 28$$

Oct 8-3:20 PM

Converting Mayan #s



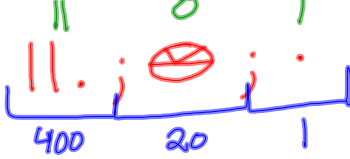
$$\begin{array}{c} 2 \quad 13 \quad 7 \\ \dots \quad \dots \quad \dots \\ \hline 400 \quad 20 \quad 1 \end{array}$$

$$2 \times 400 + 13 \times 20 + 7 \times 1$$

$$800 + 260 + 7$$

$$\underline{1067}$$

Oct 8-3:23 PM

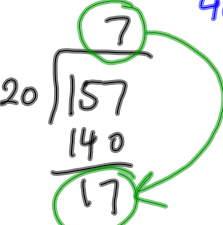


$$4400 + 0 + 1$$


$$4401$$

Oct 8-3:54 PM

Convert 157 to Mayan




$$\begin{array}{c} 7 \quad 17 \\ \hline 400 \quad 20 \quad 1 \end{array}$$



Oct 8-3:56 PM

Mayan "solar" numbers, 15



$$2 \times 360 + 6 \times 20 + 15 \times 1$$

1820 years 6 months 15 days

Oct 8-4:00 PM

Convert 1038 to Mayan Solar #.

$$\begin{array}{r} 2 \quad 15 \quad 18 \\ \hline 360 \quad 20 \quad 1 \end{array}$$

$$\begin{array}{r} 2 \\ 360 \overline{)1038} \\ \underline{720} \\ 318 \end{array}$$

$$\begin{array}{r} 15 \\ 20 \overline{)318} \\ \underline{200} \\ 118 \\ \underline{100} \\ 18 \end{array}$$

...; III; III...

Oct 8-4:04 PM

Mayan addition

$$\begin{array}{r} \text{II}..; \text{II}... \\ + \text{II}..; \text{II}... \\ \hline \end{array}$$

$$\begin{array}{r} \cdot; \text{III}...; \text{III}... \\ \cdot; \dots; \cdot; \dots; \cdot; \dots \end{array}$$

Oct 8-4:08 PM

Convert 0.42_5 to decimal

$$\begin{array}{r} 4 \quad 2 \\ \hline 25 \quad 5 \quad 1 \quad \frac{1}{5} \quad \frac{1}{25} \end{array}$$

$$4 \times \frac{1}{5} + 2 \times \frac{1}{25}$$

$$\frac{4}{5} + \frac{2}{25} = \frac{20}{25} + \frac{2}{25} = \frac{22}{25}$$

≈ 0.88

Oct 8-4:26 PM

Convert 0.7 to base 5.

$$0.7 \times 5 = 3.5$$

$$0.5 \times 5 = 2.5$$

$$0.5 \times 5 = 2.5$$

$$\vdots$$

0.322...

Oct 8-4:40 PM

116

$$\begin{array}{r} 4 \quad 2 \\ \hline ? \quad 1 \end{array}$$

$$4 \times 7 = 28$$

$$42_7 = 30$$

Oct 8-4:45 PM

70

$$\begin{array}{r} 3 \quad 6 \\ \hline 4 \quad 3 \end{array}$$

$$\begin{array}{r} 54 \\ + 1030 \\ \hline 1114_7 \end{array}$$

$$6 \times 3 = 24_7$$

$$3 \times 1 + 2 = 5$$

$$4 \times 6 = 33_7$$

$$4 \times 1 + 3 = 10_7$$

Oct 8-4:48 PM

Convert from Mayan

$3 \times 400 + 12 \times 20 + 7 \times 1$
 $1200 + 240 + 7$
 1447_{16}

Oct 8-4:56 PM

Convert 157 to Mayan.

$20 \overline{)157}$
 140
 17

15 (from 17) \rightarrow $15 \times 20 = 300$ (Mayan numeral: two bars, one dot)
 2 (from 17) \rightarrow $2 \times 1 = 2$ (Mayan numeral: two dots)

Oct 8-5:26 PM

Mayan solar numbers

$2 \times 360 + 11 \times 20 + 3 \times 1$
 $720 + 220 + 3$
 943

18-20 years, 20 months, 1 days

Oct 8-5:30 PM

Convert 1038 to Mayan solar

$360 \overline{)1038}$
 720
 318

$20 \overline{)318}$
 $20 \times$
 118
 100
 18

2 (360s), 15 (20s), 18 (1s)

Oct 8-5:37 PM

$1; 1..$
 $+ 11.; 11....$
 $111.; 111....$

Oct 8-5:40 PM