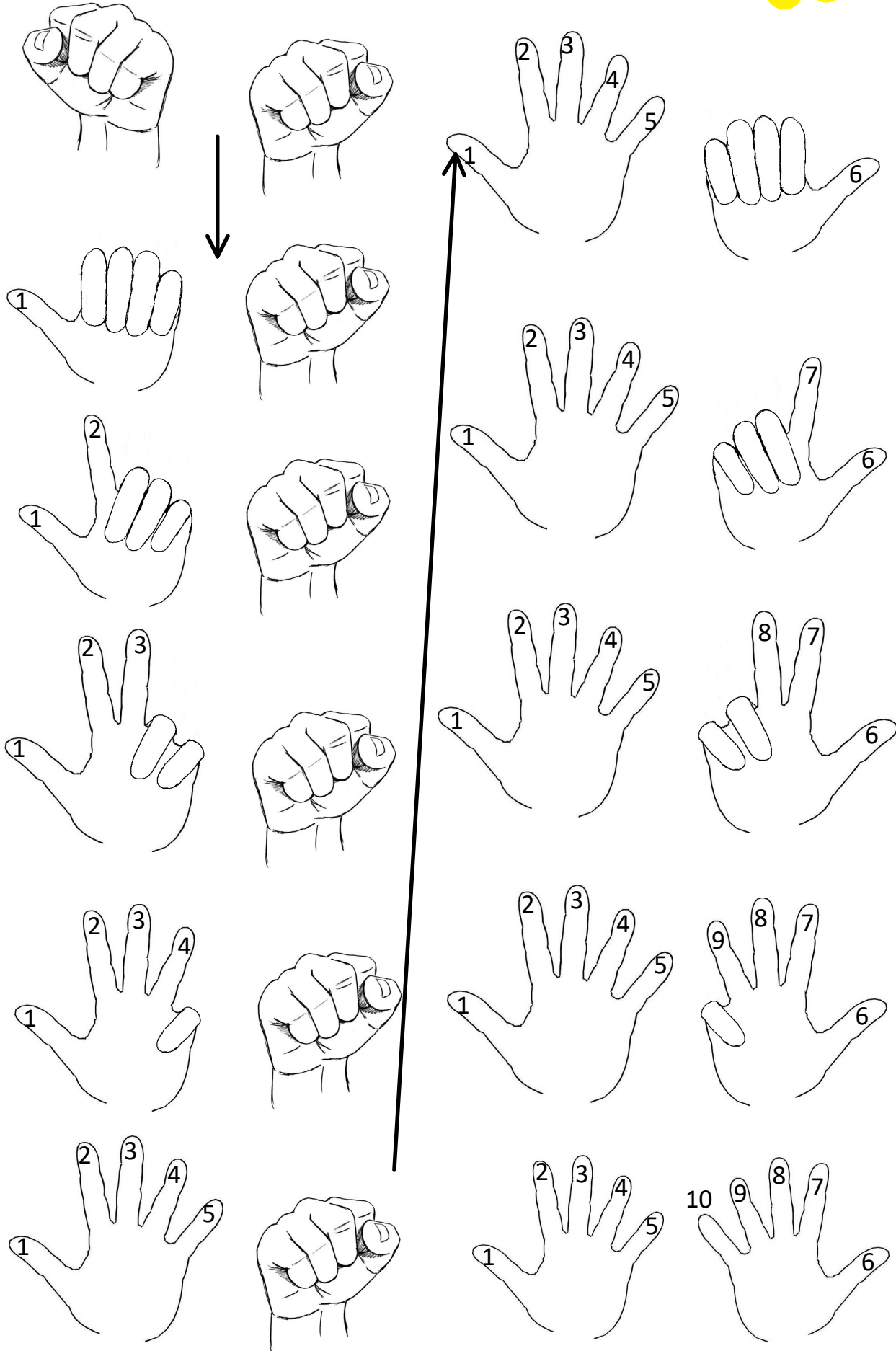
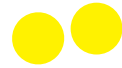


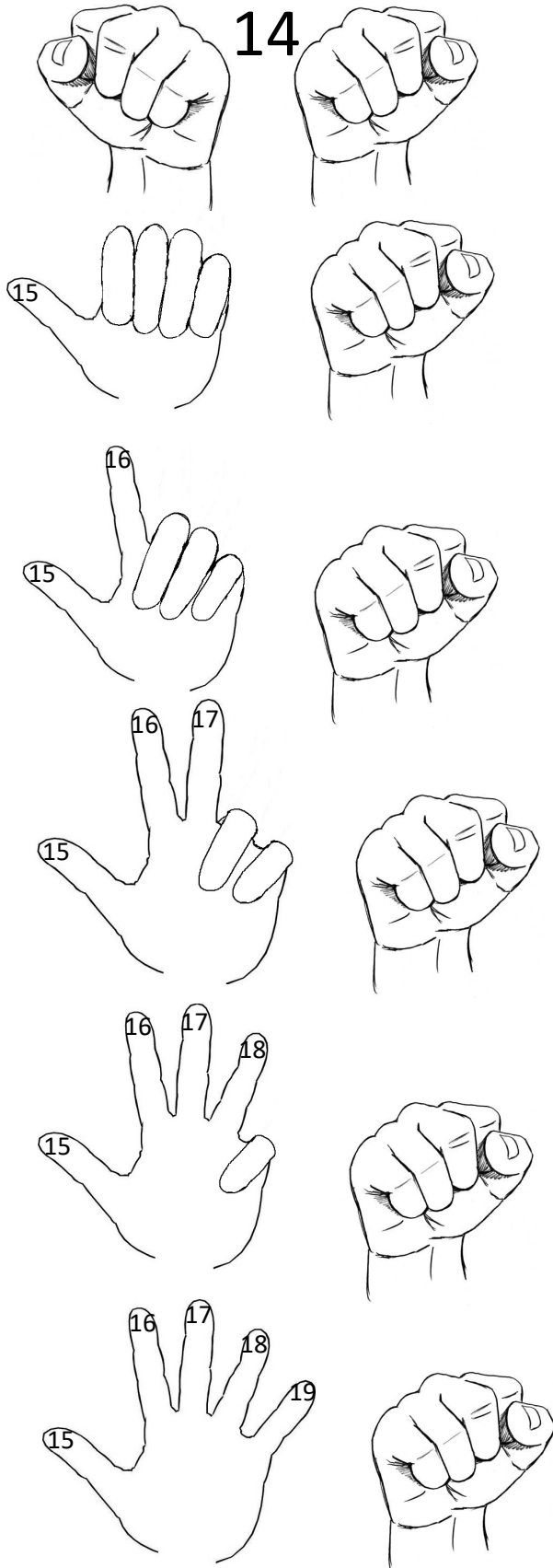
# M7 - 1.0 - 1-10 Finger Counting Notes



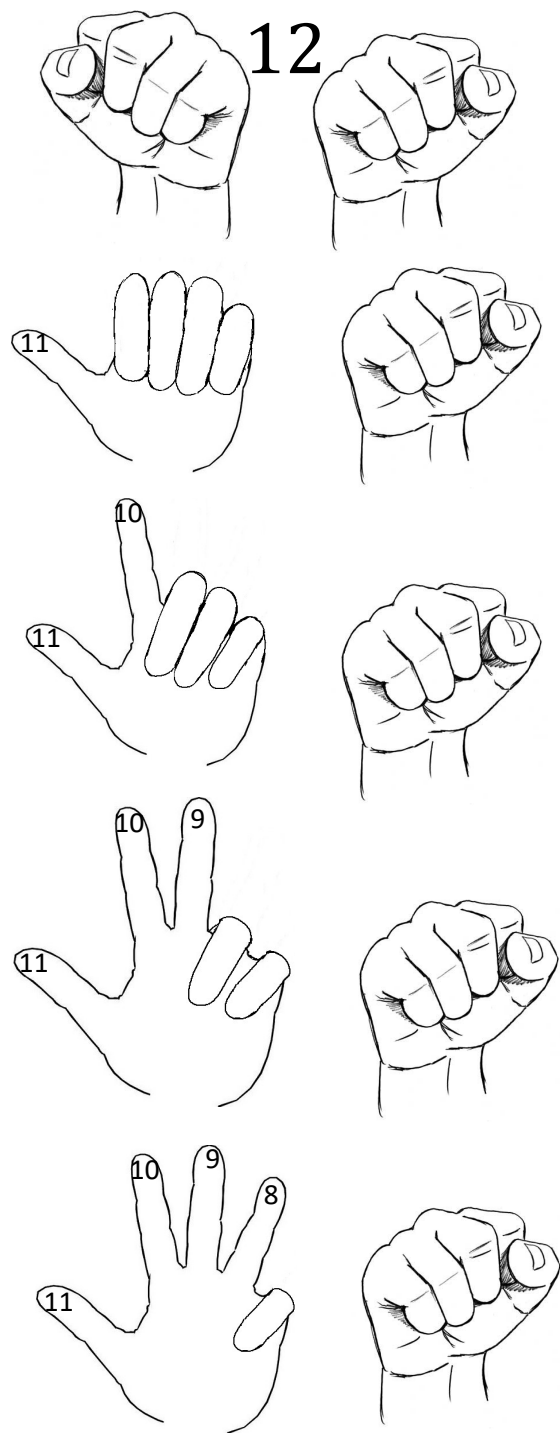
# M7 - 1.1 - Adding/Subtracting Finger Counting Notes

$14 + 5 = 19$

$12 - 4 = 9$

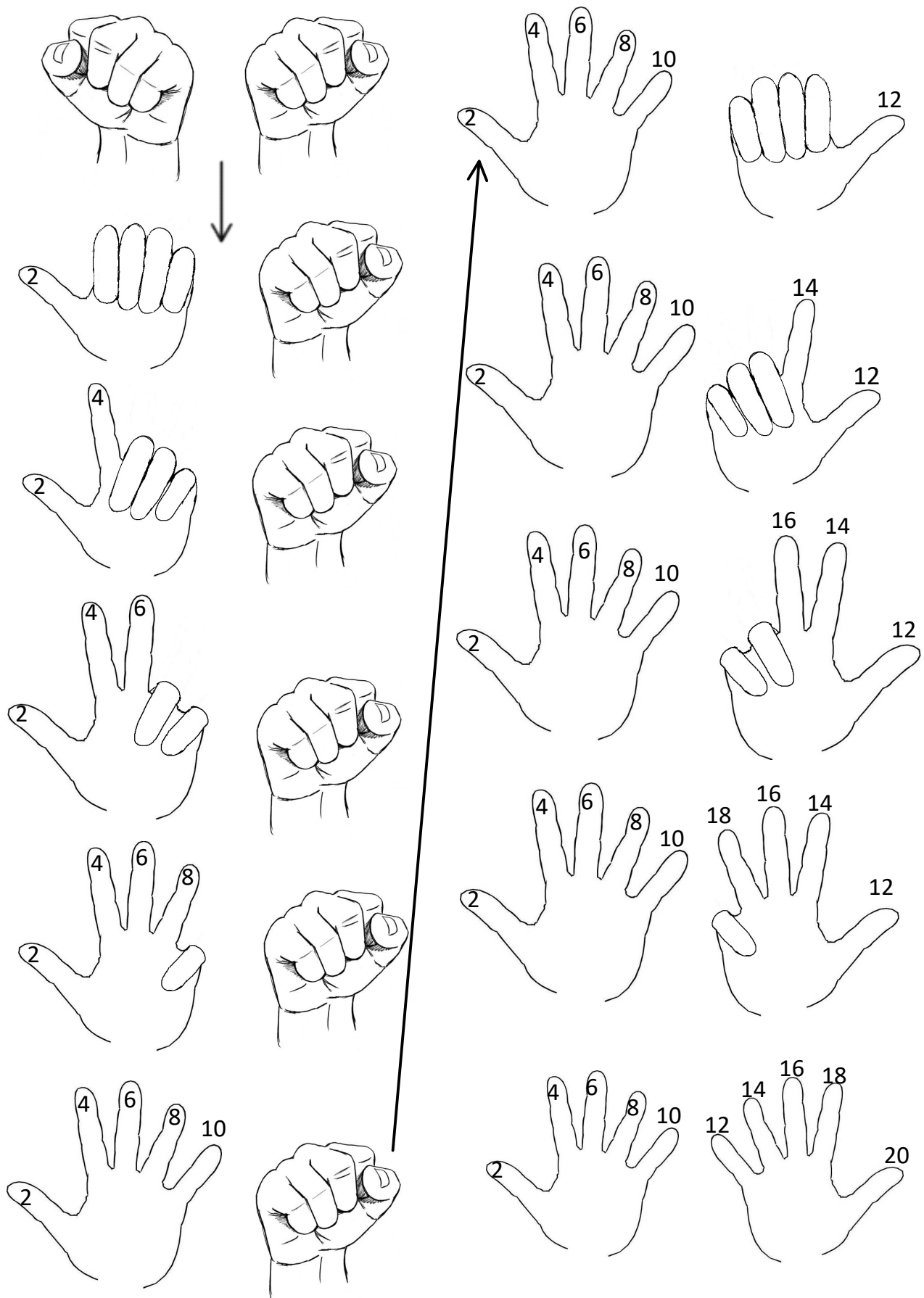


Count up from 14 until you have 5 fingers open

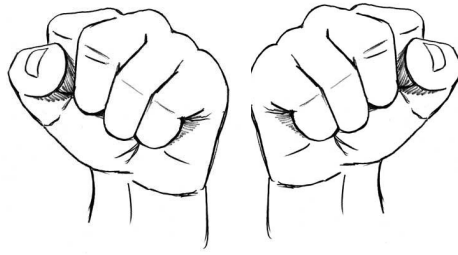


Count down from 12 until you have 4 fingers open

# M7 - 1.3 - Multiply Finger Counting Notes



# M7 - 1.4 - Exponent Finger Counting Notes



2 4 8 16 32

2's

64 128 256 512 1024

2's

3 9 27 81 243

3's

$$\begin{array}{r} 80 \times 3 = 240 \\ 1 \times 3 = +3 \\ \hline 243 \end{array}$$

5 25 125 625

5's

$$\begin{array}{r} 100 \times 5 = 500 \\ 25 \times 5 = +125 \\ \hline 625 \end{array}$$

7 49 343

7's

$$\begin{array}{r} 50 \times 7 = 350 \\ - 7 \\ \hline 343 \end{array}$$

# M7 - 2.0 - Add/Subtract/Multiply Notes

"Bigger over smaller"

$$\begin{array}{r}
 4 \\
 + \frac{3}{7} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 6 \\
 + \frac{5}{11} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 11 \\
 + \frac{6}{17} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 12 \\
 + \frac{15}{27} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 38 \\
 + \frac{26}{64} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 185 \\
 + \frac{37}{222} \\
 \hline
 \end{array}$$

$1 + 3 + 2 = 6$   $\uparrow\uparrow$   $8 + 6 = 14$   
 $1$  goes above  
 $4$  goes below

$$\begin{array}{r}
 4 \\
 - \frac{3}{1} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 6 \\
 - \frac{6}{0} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 15 \\
 - \frac{12}{3} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 18 \\
 - \frac{6}{12} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 21 \\
 - \frac{6}{15} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 29 \\
 1 \\
 \cancel{20}6 \\
 - \frac{27}{279} \\
 \hline
 \end{array}$$

$\uparrow$   $11 - 6 = 5$

Can't do  $1 - 6$ , cross off the 2 and put 1,  $2 - 1 = 1$

Can't do  $6 - 7$ , cross off the 30 and write 29

$$\begin{array}{r}
 3 \\
 \times 2 \\
 \hline
 6
 \end{array}
 \quad
 \begin{array}{r}
 9 \\
 \times 5 \\
 \hline
 45
 \end{array}
 \quad
 \begin{array}{r}
 12 \\
 \times 2 \\
 \hline
 24
 \end{array}
 \quad
 \begin{array}{r}
 211 \\
 \times 4 \\
 \hline
 844
 \end{array}$$

$2 \times 1 = 2$     $2 \times 2 = 4$     $2 \times 4 = 8$     $4 \times 1 = 4$

ones times ones  
ones times tens  
ones times hundreds

$$\begin{array}{r}
 1 \\
 16 \\
 \times 2 \\
 \hline
 32
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 216 \\
 \times 3 \\
 \hline
 648
 \end{array}
 \quad
 \begin{array}{r}
 1 \\
 246 \\
 \times 3 \\
 \hline
 738
 \end{array}$$

$2 \times 1 + 1 = 3$     $2 \times 6 = 12$ , 2 goes here, 1 goes above

$$\begin{array}{r}
 14 \\
 \times 12 \\
 \hline
 28 \\
 + 140 \\
 \hline
 168
 \end{array}$$

$1 \times 4 = 4$     $1 \times 1 = 1$    Zero goes here

ones times ones  
ones times tens  
tens times ones  
tens times tens  
...

$$\begin{array}{r}
 14 \\
 \times 20 \\
 \hline
 280
 \end{array}$$

$20 \times 14$  Put the number with the zero last on the bottom (even if it is bigger)  
 A zero goes here.

$2 \times 1 = 2$     $2 \times 4 = 8$

$$\begin{array}{r}
 3 \\
 4 \\
 67 \\
 \times 56 \\
 \hline
 402 \\
 + 3350 \\
 \hline
 3752
 \end{array}$$

If you have to carry twice, make sure you cross out the old carry.  
 A zero goes here.

$$\begin{array}{r}
 213 \\
 \times 300 \\
 \hline
 63900
 \end{array}$$

A zero goes here.   A zero goes here.

$$\begin{array}{r}
 212 \\
 \times 323 \\
 \hline
 636 \\
 4240 \\
 + 63600 \\
 \hline
 68476
 \end{array}$$

A zero goes here.   Two zeros goes here.

# M7 - 2.1 - Multiply/Divide Notes

0.5  
 $\times 2$   
10.

Shift decimal right 1 time.

**Remove trailing 0's**

$$\begin{array}{r} 0.5 \\ \times 2.0 \\ \hline \end{array} = \begin{array}{r} 0.5 \\ \times 2 \\ \hline \end{array}$$

5.  
 $\times 2$   
10.

Evaluate

0.4  
 $\times 0.3$

Shift decimal right 1 time.  
Shift decimal right 1 time. } Shift right 2 times total

4.  
 $\times 3.$   
12.

Evaluate

0.3    2 numbers behind the decimal must still have 2 numbers behind the decimal

$$\begin{array}{r} 0.3 \\ \times 0.4 \\ \hline .12 \end{array}$$

5.  
 $\times 2$   
10.

Shift decimal left 1 time.

4.  
 $\times 3.$   
12.

Shift decimal left 2 times.

0.5  
 $\times 2$   
1.0

0.4  
 $\times 0.3$   
0.12

8  $\div$  2 =  $\frac{8}{2}$  = 4

"Goes into"  $\rightarrow$   $\begin{array}{r} \phantom{0} \\ 2 \overline{) 8} \\ \hline \end{array}$   $\leftarrow$  Top

Bottom  $\rightarrow$  2

2 goes into 8 four times

Goes Into  
Multiply  
Subtract  
Bring Down  
Repeat

$\begin{array}{r} 4 \\ 2 \overline{) 8} \\ \hline - 8 \\ \hline 0 \end{array}$

4 times

$2 \times 4 = 8$

$8 - 8 = 0$

2 goes into 1 zero times

$\begin{array}{r} 08 \\ 2 \overline{) 16} \\ \hline - 16 \\ \hline 0 \end{array}$

8 times

$2 \times 8 = 16$

$16 - 16 = 0$

2 goes into 2 one time

$\begin{array}{r} 12 \\ 2 \overline{) 24} \\ \hline - 24 \\ \hline 0 \end{array}$

2 goes into 4 two times

12 times

$2 \times 12 = 24$

$24 - 24 = 0$

$\begin{array}{r} 103 \\ 2 \overline{) 206} \\ \hline - 206 \\ \hline 0 \end{array}$

$2 \times 103 = 206$

$24 - 24 = 0$

$\begin{array}{r} 078 \\ 2 \overline{) 156} \\ \hline - 14 \downarrow \\ \hline 16 \end{array}$

Bring Down

$\begin{array}{r} 16 \\ \hline 0 \end{array}$

$\begin{array}{r} 4 \\ 2 \overline{) 9} \\ \hline - 8 \\ \hline 1 \end{array}$  remainder

$\frac{9}{2} = 4 R: 1$

$\frac{9}{2} = 4 + \frac{1}{2}$

$\begin{array}{r} 1.6 \\ 5 \overline{) 8.0} \\ \hline - 5 \downarrow \\ \hline 30 \end{array}$

5 goes into 8 one time

5 goes into 30 six times

$8 \overline{) 4.0}$

Bring up the decimal, put a zero in front

$\begin{array}{r} 0.5 \\ 8 \overline{) 4.0} \end{array}$

$0.02 \overline{) 8.00}$

Put two zeros here

$2 \overline{) 800}$

$4.0 \overline{) 0.8}$

$40 \overline{) 8}$

$0.45 \overline{) 1.8}$

$45 \overline{) 180}$

$1.5 \overline{) 6.0}$

$15 \overline{) 60}$

Move the decimal of both the inside and outside in the same direction the same number of times.

# M7 - 2.3 - Multiplication Table (Non Redundant)?

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0												
1	0	1											
2	0	2	4										
3	0	3	6	9									
4	0	4	8	12	16								
5	0	5	10	15	20	25							
6	0	6	12	18	24	30	36						
7	0	7	14	21	28	35	42	49					
8	0	8	16	24	32	40	48	56	64				
9	0	9	18	27	36	45	54	63	72	81			
10	0	10	20	30	40	50	60	70	80	90	100		
11	0	11	22	33	44	55	66	77	88	99	110	121	
12	0	12	24	36	48	60	72	84	96	108	120	132	144

# M7 - 2.0 - Add/Sub/Div/Mult by Grouping

○○○○○○○○○○ + ○○○○○○○○○  $8 + 7 =$

○○○○○○○○○○ + ○○ + ○○○○○○○  $8 + 2 + 5 =$

10

○○○○○○○○○○ + ○○○○○○○  $10 + 5 =$

○○○○○○○○○○ + ○○○○○○○ = 15

$8 + 7 =$	$2 + 5 = 7$
$8 + 2 + 5 =$	$8 + 2 = 10$
$10 + 5 = 15$	

Split a number so it adds to ten with the other number.

10

○○○○○○○○○○ ○○ - ○○○○○○○○○  $12 - 8 =$

$12 - 8 =$

○○○○○○○○○○ ○○ - ○○ - ○○○○○○○○○  $12 - 2 - 6 =$

$12 - 2 - 6 =$

○○○○○○○○○○ - ○○○○○○○○○

$10 - 6 =$

○○○○ = 4

Split the second number so it subtract the ones from the first number.

$10 = 12 - 2$
$-8 = -2 - 6$

$12 - 8 =$
$12 - 2 - 6 =$
$10 - 6 = 4$

$3 \times 16 = 3 \times 10 + 3 \times 6 = 30 + 18 = 48$

$16 = 10 + 6$

1	16
x	3
	48

$6 \times 36 = 6 \times 30 + 6 \times 6 = 180 + 36 = 216$

$36 = 30 + 6$

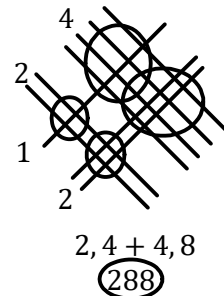
3	36
x	6
	216

Split a number or both into 10s then multiply.

$12 \times 24 = 10 \times 20 + 10 \times 4 + 2 \times 20 + 2 \times 4$   
 $= 200 + 40 + 40 + 8 = 288$

12
x 24
48
240
288

x	1	2
2	200	40
4	40	8
		288



$9 \times 7 = 70 - 7 = 63$   
 $10 \times 7 = 70$

Round one number up to 10 and multiply then subtract the appropriate amount.

Division by Grouping.

$10 \div 2 = \frac{10}{2} = 5$

○○○○○○○○

$10 \div 5 = \frac{10}{5} = 2$

○○○○○○



# M7 - 3.0 - LCM GCF Notes

Lowest common multiple (LCM): the lowest number both numbers go into  
 Greatest common factor (GCF): the biggest number that goes into two numbers

## 8 and 12?

### Lowest Common Multiple (LCM):

8 and 12 = 24	8 : 8, 16, <b>24</b> , 32
	12 : 12, <b>24</b> , 36

$8 = 2^3$       Index Form  
 $12 = 2^2 \times 3^1$        $LCM = 2^3 \times 3^1 = 24$

LCM: All the numbers to the highest exponent

### Greatest Common Factor (GCF):

8 and 12 = 4	8 : 1, 2, <b>4</b> , 8
	12 : 1, 2, 3, <b>4</b> , 6, 12

$8 = 2^3$       Index form:  
 $12 = 2^2 \times 3^1$        $GCF = 2^2 = 4$

GCF: Common numbers to the lowest exponent

## 72 and 60?

$72 = 2 \times 2 \times 2 \times 3 \times 3$   
 $60 = 2 \times 2 \times 3 \times 5$

$LCM = 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 360$   
 $LCM = 2^3 \times 3^2 \times 5^1 = 360$

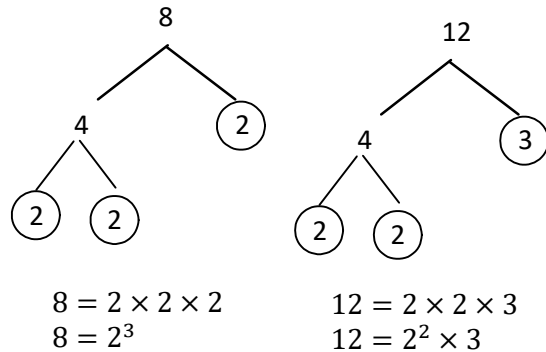
LCM: All the numbers to the highest exponent

$72 = 2 \times 2 \times 2 \times 3 \times 3$   
 $60 = 2 \times 2 \times 3 \times 5$   
 $GCF = 2 \times 2 \times 3 = 12$   
 $GCF = 2^2 \times 3^1 = 12$

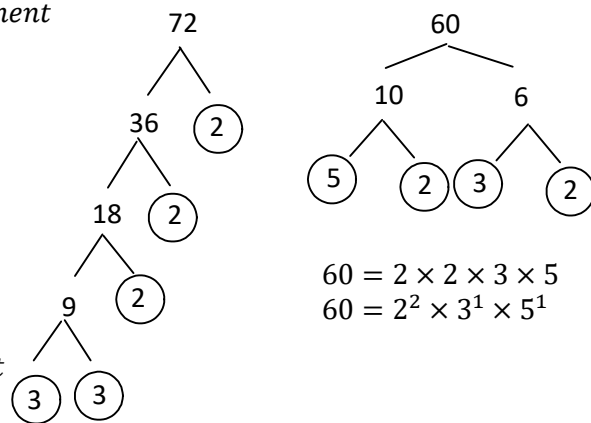
GCF: Common numbers to the lowest exponent

### Prime Factorization Tree

8 and 12:



72 and 60:



$72 = 2 \times 2 \times 2 \times 3 \times 3$   
 $72 = 2^3 \times 3^2$

OR

LCM:
72: 72, 144, 216, 288, <b>360</b>
60: 60, 120, 180, 240, 300, <b>360</b>
GCF:
72: 1, 2, 3, 4, 6, 8, 9, <b>12</b> , 18, 24, 36, 72
60: 1, 2, 3, 4, 5, 6, 10, <b>12</b> , 15, 20, 30, 60

2 goes into even numbers ending in 0, 2, 4, 6, or 8  
 3 goes into numbers whose digits add to multiples of 3. 369? 3+6+9=18. 3 goes into 18! 3 goes into 369.  
 5 goes into numbers ending in 5 or 0  
 Or do Long Division or use calculator