

Three groups of 4 are 12.

$$3 \times 4 = 12$$



1 2 3 4



5 6 7 8

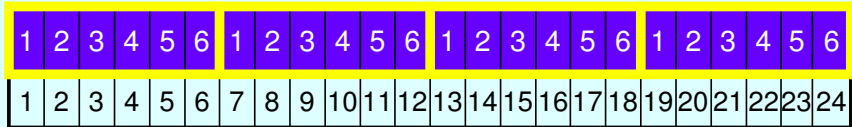


9 10 11 12

FOR PREVIEW

By repeated addition: $6 + 6 + 6 + 6 = 24$

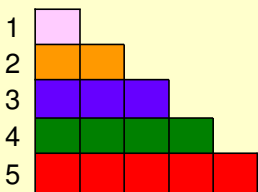
Four 6's are 24. $4 \times 6 = 24$



Skip-counting by 3 six times: 3, 6, 9, 12, 15, 18 $3 \times 6 = 18$



Multiplication can be "seen" by adding bars on a table.



4 x 4 = 16					
X	1	2	3	4	5
1	1	2	3	4	
2	5	6	7	8	
3	9	10	11	12	
4	13	14	15	16	

5 X 9 = 45					
X	1	2	3	4	5
1	1	2	3	4	5
2	6	7	8	9	10
3	11	12	13	14	15
4	16	17	18	19	20
5	21	22	23	24	25
6	26	27	28	29	30
7	31	32	33	34	35
8	36	37	38	39	40
9	41	42	43	44	45

2 X 2 = 4				
X	1	2	3	4
1	1	2		
2	3	4		

3 X 2 = 6				
X	1	2	3	4
1	1	2	3	
2	4	5	6	

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The white numbers are in the multiplication table.

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

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Product Patterns: What's in a column?

Multiples of 10 always end in 0.

Multiples of 5: 5, 0, 5, 0...repeating

Multiples of 2: 2, 4, 6, 8, 0...repeating

Multiples of 4: 4, 8, 2, 6, 0...repeating

Multiples of 6: 6, 2, 4, 0...repeating

Multiples of 8: 8, 6, 4, 2, 0...repeating

Multiples of 9: 9, 8, 7, 6, 5, 4, 3, 2, 1, 0...

(Some of the harder multiplication facts)

“Six times eight is forty eight” is a good chant.

5,6,7,8 56 = 7 x 8.)

Look at this chart:

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

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Only an odd number times

an odd number

is an odd number.

3	4	1	2	5	1	3
<u>x2</u>	<u>x1</u>	<u>x3</u>	<u>x4</u>	<u>x2</u>	<u>x2</u>	<u>x5</u>
6	4	3	8	10	2	15

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4	6	5	3	7	6	4
<u>x4</u>	<u>x3</u>	<u>x1</u>	<u>x4</u>	<u>x2</u>	<u>x6</u>	<u>x6</u>
16	18	5	12	14	36	24

4	7	8	6	3	5	7
<u>x5</u>	<u>x4</u>	<u>x3</u>	<u>x5</u>	<u>x7</u>	<u>x7</u>	<u>x1</u>
20	28	24	30	21	35	7

6	9	8	7	6	7	5
<u>x2</u>	<u>x3</u>	<u>x8</u>	<u>x6</u>	<u>x9</u>	<u>x8</u>	<u>x8</u>
12	27	64	42	54	56	40

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6	9	5	9	7	5	9
<u>x8</u>	<u>x9</u>	<u>x8</u>	<u>x4</u>	<u>x7</u>	<u>x9</u>	<u>x8</u>
48	81	40	36	49	45	72

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MULTIPLYING BY 9: Count fingers to the number you are multiplying by. Bend that finger down. Fingers to the left are in the tens column; fingers to the right are in the ones column. $9 \times 7 = 63$



Using numbers, 9 times a **number starts with one less than that number** followed by 9 minus the new number. So 9×6 is **54** (The **5** is one less than **6**. And $9-5$ is **4**.)

MULTIPLYING BY 10

Just add 0 after it.

10	10	25
<u>x 7</u>	<u>x 4</u>	<u>x 10</u>
70	40	250

MULTIPLYING BY MULTIPLES OF 10

Multiply the first digits; add a 0.

30	40	80	25
<u>x 2</u>	<u>x 5</u>	<u>x 6</u>	<u>x 20</u>
60	200	480	500

MULTIPLYING BY 100

Just add 00 after it.

100	100	136
<u>x 5</u>	<u>x 8</u>	<u>x 100</u>
500	800	13600

MULTIPLYING BY MULTIPLES OF 100

Multiply the first digits; add 00.

300	200	700	520
<u>x 2</u>	<u>x 6</u>	<u>x 9</u>	<u>x 400</u>
600	1200	6300	208000

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$$\begin{array}{r} 1 \\ 25 \\ \times 3 \\ \hline 75 \end{array}$$

$$\begin{array}{r} 4 \\ 306 \\ \times 8 \\ \hline 2448 \end{array}$$

$$\begin{array}{r} 2 \quad 3 \\ 5718 \\ \times 4 \\ \hline 22872 \end{array}$$

FOR PREVIEW

USING THE DISTRIBUTIVE PROPERTY:

$$\begin{aligned} 74 \times 3 &= (70 + 4) \times 3 \\ &= (70 \times 3) + (4 \times 3) \\ &= (210) + (12) \\ &= 222 \end{aligned}$$

$$\begin{aligned} 125 \times 42 &= 125 \times (40 + 2) \\ &= (125 \times 40) + (125 \times 2) \\ &= (5000) + (250) \\ &= 5250 \end{aligned}$$

In the examples below, notice how each row of partial products begins in the same column directly under the digit in the multiplier (second row of the problem) that is being multiplied by the multiplicand (top row).

$$\begin{array}{r} 12 \\ 408 \\ \times 23 \\ \hline 1224 \\ + 816 \\ \hline 9384 \end{array}$$

$$\begin{array}{r} 2 \quad 1 \\ 174 \\ \times 30 \\ \hline 5220 \end{array}$$

$$\begin{array}{r} 11 \quad 12 \\ 523 \\ \times 167 \\ \hline 3661 \\ + 3138 \\ \hline 87341 \end{array}$$

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Divide 20 players onto teams of 5.

You can subtract out groups of 5:

$$20-5=15 \quad 15-5=10 \quad 10-5=5 \quad 5-5=0$$

You will take out four teams of 5.

$$\begin{array}{r} 4 \leftarrow \text{quotient} \\ 5 \overline{)20} \leftarrow \text{dividend} \\ \uparrow \text{divisor} \end{array}$$



Division is also the inverse of multiplication. You can

solve the problem by thinking, "What times 5 equals 20?" 4

$$\underline{\quad} \times 5 = 20 \quad \text{may be written as } 20 \div 5 = 4 \quad \text{or as } 5 \overline{)20}$$

If you are dealing 18 cards to 3 players, how many does each person get? Divide 18 by 3.



$$\begin{array}{r} 6 \\ 3 \overline{)18} \end{array}$$



To check your work, multiply 3 players times 6 cards each.

You will get your starting total of 18 cards.

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Each relay team has

3 r1

four runners on it.

$$\begin{array}{r} 4 \overline{)13} \\ \underline{12} \\ 1 \end{array}$$

How many teams do

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13 runners make?

1

3 teams, with 1 extra. 1 is the "remainder"



$$\begin{array}{l} 2 \overline{) 2} \\ 3 \overline{) 3} \\ 4 \overline{) 2} \\ 5 \overline{) 3} \\ 1 \overline{) 5} \\ 3 \overline{) 1} \\ 4 \overline{) 3} \end{array}$$

$$\begin{array}{l} 2 \overline{) 3} \\ 3 \overline{) 12} \\ 4 \overline{) 15} \\ 5 \overline{) 5} \\ 3 \overline{) 8} \\ 4 \overline{) 6} \\ 3 \overline{) 15} \end{array}$$

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$$\begin{array}{l} 2 \overline{) 9} \\ 6 \overline{) 2} \\ 4 \overline{) 20} \\ 6 \overline{) 24} \\ 3 \overline{) 21} \\ 8 \overline{) 2} \\ 9 \overline{) 27} \end{array}$$

$$\begin{array}{l} 4 \overline{) 7} \\ 5 \overline{) 35} \\ 6 \overline{) 18} \\ 7 \overline{) 21} \\ 4 \overline{) 32} \\ 3 \overline{) 27} \\ 6 \overline{) 30} \end{array}$$

$$\begin{array}{l} 5 \overline{) 7} \\ 4 \overline{) 28} \\ 8 \overline{) 2} \\ 6 \overline{) 18} \\ 7 \overline{) 14} \\ 6 \overline{) 24} \\ 4 \overline{) 36} \end{array}$$

$$\begin{array}{l} 5 \overline{) 8} \\ 4 \overline{) 36} \\ 7 \overline{) 35} \\ 8 \overline{) 72} \\ 6 \overline{) 24} \\ 7 \overline{) 63} \\ 8 \overline{) 48} \end{array}$$

$$\begin{array}{l} 7 \overline{) 6} \\ 6 \overline{) 36} \\ 9 \overline{) 27} \\ 8 \overline{) 24} \\ 5 \overline{) 45} \\ 8 \overline{) 56} \\ 9 \overline{) 81} \end{array}$$

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$$\begin{array}{l} 7 \overline{) 7} \\ 8 \overline{) 48} \\ 6 \overline{) 36} \\ 9 \overline{) 54} \\ 8 \overline{) 56} \\ 7 \overline{) 63} \\ 6 \overline{) 48} \end{array}$$

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$$\begin{array}{l} 6 \overline{) 8} \\ 7 \overline{) 49} \\ 9 \overline{) 72} \\ 8 \overline{) 32} \\ 9 \overline{) 36} \\ 6 \overline{) 54} \\ 8 \overline{) 64} \end{array}$$

DIVIDE UP How many times does the divisor fit into the dividend?

MULTIPLY DOWN Multiplication is the inverse of division.

SUBTRACT If you can't subtract, the quotient needs to be smaller.

SMALLER? If it's not smaller than 8, the quotient should be larger.

DOTS This shows where to bring down the next digit.

$$\begin{array}{r}
 67 \text{ r}5 \\
 \hline
 8 \overline{) 541} \\
 \underline{48} \\
 61 \\
 \underline{56} \\
 5
 \end{array}$$

$$\begin{array}{r}
 203 \text{ r}1 \\
 \hline
 2 \overline{) 407} \\
 \underline{- 4} \\
 00 \\
 \underline{- 0} \\
 07 \\
 \underline{- 6} \\
 1
 \end{array}$$

$$\begin{array}{r}
 21 \text{ r}7 \\
 \hline
 40 \overline{) 847} \\
 \underline{- 80} \\
 47 \\
 \underline{- 40} \\
 7
 \end{array}$$

$$\begin{array}{r}
 26 \text{ r}8 \\
 \hline
 31 \overline{) 814} \\
 \underline{- 62} \\
 194 \\
 \underline{- 186} \\
 8
 \end{array}$$

Short division:

$$\begin{array}{r}
 359 \\
 \hline
 6 \overline{) 21^3 5^5 4}
 \end{array}$$

Remainder as a fraction:

$$\begin{array}{r}
 11 \frac{1}{4} \\
 \hline
 4 \overline{) 45}
 \end{array}$$

Remainder as a decimal:

$$\begin{array}{r}
 11.25 \\
 \hline
 4 \overline{) 45.10^2 0}
 \end{array}$$

To check, multiply; then add remainder.

$$\begin{array}{r}
 203 \\
 \times 2 \\
 \hline
 406 \\
 + 1 \\
 \hline
 407
 \end{array}$$

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