

Fourth and Fifth Grade Strategies – *Multiplication and Division Multi-Digit Problems

Strategies the students will be using will vary depending on the size of the number. The focus is on grouping numbers and not counting by ones.

*** Fourth grade students focus on continuing to become proficient in the basic multiplication/division combinations and apply those strategies to more complex problems – many which can be done mentally. They should have at least two efficient ways to solve multi-digit problems mentally or with some recording for multiplication and division.**

Multiplication:

Multiplication by breaking numbers apart (using landmarks)

12 x 14	12 x 14	12 (another way to keep track)
10 x 14 = 140	10 x 10 = 100	<u>x 14</u>
2 x 14 = 28	2 x 10 = 20	100
140 + 28 = 168	4 x 10 = 40	20
	2 x 4 = 8	40
	= 168	<u>8</u>

Multiplying each place, starting with the largest place (related to the traditional partial product algorithm)

29 x 4	29 x 12
20 x 4 = 80	20 x 12 = 240
9 x 4 = 36	9 x 12 = (9 x 10) + (9 x 2) = 90 + 18 = 108
80 + 36 = 116	240 + 108 = 348

Breaking up one of the numbers into parts that are easier to multiply (landmarks other than 10's)

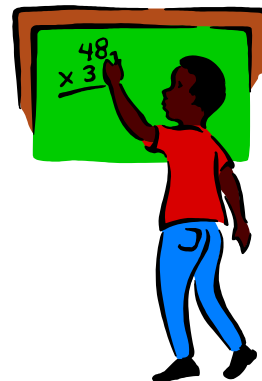
29 x 4	128 x 32
(25 x 4) + (4 x 4)	(125 x 32) + (3 x 32)
25 x 4 = 100	125 x 32 = (125 x 10) + (125 x 10) + (125 x 10) + (125 x 2)
4 x 4 = 16	= 1250 + 1250 + 1250 + 250 = 4000
100 + 16 = 116	3 x 32 = 96
	96 + 4000 = 4096

Half and double

12 x 14	12 x 45 =
12 x 7 = 84	6 x 90 =
84 + 84 = 168	= 540

Rounding the numbers up or down, then compensating

29 x 12	32 x 96
29 x 12 = (30 x 12) – (1 x 12)	32 x 96 = (32 x 100) – (32 x 4)
30 x 12 = 360	= 3200 – 128 = 3072
360 – 12 = 348	

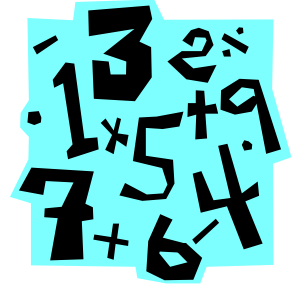


Please note that students may use larger numbers or chunks once they are more confident with their understanding with number. Also, the recording of the numbers is to **explain** how they solved the problem and can look tedious. Many of the steps can be done **mentally** with some keeping track on paper if necessary.

Division:

Subtracting groups of the divisor

$$\begin{array}{r} 159 \div 13 \qquad 159 \qquad 29 \quad \text{OR Use the Big 7 method of recording (see below)} \\ 10 \times 13 = 130 \quad \underline{-130} \qquad \underline{-26} \\ 2 \times 13 = 26 \qquad 29 \qquad 3 \\ 12 \text{ r}3 \end{array}$$



Breaking the problem into parts

$$150 \div 48 = (50 \div 48) + (50 \div 48) + (50 \div 48) = 3 \text{ r } 6$$

(There is one 48 with 2 left over in each 50)

OR

$$159/13$$

Break into 130 + 29, 130 divided by 13 is 10; 29 divided by 13 is 2 with 3 remaining

Transferring the problem into an equivalent problem that is easier to solve.

$$1400 \div 35 = 200 \div 5 \text{ (divide both numbers by 7)}$$

$$928/16 = 464/8 = 232/4 = 116/2 = 58$$

Solving and easier related problem, then compensating

$$247 \div 13$$

Solve $260 \div 13$ (There are 20 thirteens in 260, but 247 is 13 less than 260. So there are only 19 thirteens in 247)

*Dealing out into groups**

$$159/13$$

Give 10 to each group; that uses up 130; 29 is left

Give 1 more to each group; that uses up 13; 16 is left

Give 1 more to each group; 3 is left.

The result is 12 in each group, remainder 3

Big 7 – (looks like a big 7) method of recording to keep track of repeated subtraction.

$$\begin{array}{r|l} 7 \overline{)293} & \\ \underline{-70} & 7 \times 10 \\ 223 & \\ \underline{-140} & 7 \times 20 \\ 83 & \\ \underline{-70} & 7 \times 10 \\ 13 & \\ \underline{-7} & 7 \times 1 \\ 6 & \end{array}$$

41 R 6

Fourth Grade Computation Expectations: At least two efficient strategies for multiplying and dividing multi-digit numbers.

Fifth Grade Computation Expectations are the same as fourth with continued practice and refinement of efficient strategies.