4th & 5th Grade Math with Math Dad and Science Mom

Place Value and Whole Numbers

Objectives: 4.NBT.A.1, 4.NBT.A.2

Place Value, Saying a number out loud. Multiplying and dividing by 10. Decompose it into parts.

Warm-up Problem: Use the numbers below to make the number **12** by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

4, 4, 8, 6

1. How do we say the number 5,288,917,843,335,881?
   5 quadrillion, 288 trillion, 917 billion, 843 million, 335 thousand, 881
2. How do we say the number 83,243,765,432?
   83 billion, 243 million, 765 thousand, 432.
3. How do we say the number 626,490,000,156,712,154?
   626 quadrillion, 490 trillion, 156 million, 712 thousand, 154
4. Decompose the number 3,576 into a sum of parts.
   3,576 = 3000 + 500 + 70 + 6.
5. Decompose the number 104,329 into a sum of parts.
   104,329 = 100,000 + 4,000 + 300 + 20 + 9.
6. Multiply the number 457 by 10.
   457 × 10 = 4,570.
7. Divide the number 2,440 by 10.
   2,440 ÷ 10 = 244

Recap Problems:

1. How do we say the number 62,305,956,411,042,333?
   62 quadrillion, 305 trillion, 956 billion, 411 million, 42 thousand, 333.
2. Decompose the number 36,871 into a sum of parts.
   36,871 = 30,000 + 6000 + 800 + 70 + 1.
3. Multiply the number 5,892 by 10.
   5,892 × 10 = 58,920.
4. Divide the number 657,360 by 10.
   657,360 ÷ 10 = 65,736.

1. How do we say the number 56,702,055,128?

   56 billion, 702 million, 55 thousand, 128.

2. How do we say the number 909,611,142,890,304?

   909 trillion, 611 billion, 142 million, 890 thousand, 304.

3. How do we say the number 78,800,000,000,361,000?

   78 quadrillion, 800 trillion, 361 thousand.

4. Decompose the number 3,732 into a sum of parts.

   $3,732 = 3,000 + 700 + 30 + 2.$

5. Decompose the number 3,141,592 into a sum of parts.

   $3,141,592 = 3,000,000 + 100,000 + 40,000 + 1000 + 500 + 90 + 2.$

6. Decompose the number 6,391,045 into a sum of parts.

   $6,391,045 = 6,000,000 + 300,000 + 90,000 + 1,000 + 40 + 5.$

7. Which digit of 845,219 is in the 10-thousands place?

   ↑ There are 4 ten-thousands

8. Which digit of 83,390 is in the hundreds place?

   ↑ There are 3 hundreds

9. Which digit of 468 is in the tens place?

   ↑ There are 6 tens.

Challenge Problem: How do we say the number 12,345,678,909,099,876,543,210

12 sextillion, 345 quintillion, 678 quadrillion, 909 trillion, 99 billion, 876 million, 543 thousand, 210.

Rounding and Comparing Whole Numbers

Objectives: 4.NBT.A.2, 4.NBT.A.3

Comparing whole numbers and rounding whole numbers.

Warm-up Problem: Use the numbers below to make the number **10** by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

3, 5, 2, 2

1. Round each number below to the nearest 10, 100, 1,000, and 100,000.

Round to the nearest	10	100	1,000	100,000
77	80	100	0	0
123	120	100	0	0
30,219	30,220	30,200	30,000	0
4,444	4,440	4,400	4,000	0
524,288	524,290	524,300	524,000	500,000
12,345,678	12,345,680	12,345,700	12,346,000	12,300,000

2. Compare each pair of numbers below by supplying the correct sign (<, >, or =).

344 __<__ 433
12,388 __>__ 12,299
3,213 __<__ 6,512
812,773 __>__ 812,601
524,288,378 __>__ 524,239,217
12,345,678 __>__ 9,266,404

3. Round to the nearest 10: 34,468 ≈ 34,470
4. Round to the nearest 10,000: 678,325 ≈ 680,000
5. Round to the nearest 10,000: 45,613,043 ≈ 45,610,000
6. Round to the nearest 100: 57,692 ≈ 57,700
7. Round to the nearest 1,000,000: 484,352,221 ≈ 484,000,000
8. Compare each pair of numbers below by supplying the correct sign (<, >, or =).

64 __>__ 46
1,338 __=__ 1,338
7,658 __>__ 6,442
810,453 __<__ 810,621
5,324,378 __>__ 5,315,217
127,888,345,678 __<__ 127,889,266,404

1. Round each number below to the nearest 10, 100, 10,000, and 1,000,000.

Round to the nearest	10	100	10,000	1,000,000
655	660	700	0	0
19,047	19,050	19,000	20,000	0
666,392	666,390	666,400	670,000	1,000,000
8,777,777	8,777,780	8,777,800	8,780,000	9,000,000
909,445,534	909,445,530	909,445,500	909,450,000	909,000,000
87,878,787	87,878,790	87,878,800	87,880,000	88,000,000

2. Compare each pair of numbers below by supplying the correct sign (<, >, or =).

545 ___<___ 611

32,355 ___>___ 32,349

183,213 ___<___ 187,902

43,773 ___=___ 43,773

668,378,321 ___>___ 668,374,689

839,938 ___<___ 389,892,121

16,121,456 ___<___ 16,121,546

34,678,318 ___<___ 43,890,405

3. Round to the nearest 100: 35,642 ≈ 35,600

4. Round to the nearest 10,000: 127,313 ≈ 130,000

5. Round to the nearest 1,000: 57,612,021 ≈ 57,612,000

6. Round to the nearest 100: 89,512 ≈ 89,500

7. Round to the nearest 1,000,000: 834,705,252 ≈ 835,000,000

Challenge Problem: What am I? 544

- I am a 3 digit number.
- When rounding to the nearest 10, I round to 540.
- If you add 6 to me and then round to the nearest 100, you get 600.

Addition Games

Objectives: Have fun while playing games with numbers

10-complements, place value, addition and subtraction of whole numbers

Warm-up Problem: Use the numbers below to make the number **7** by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

2, 3, 6, 8

3 Math Games: The three games below are designed to give you practice creating and comparing numbers while doing arithmetic. Give them a try and feel free to try invent your own variations.

Place Value Draw! 2-6 players, numbered cards 1-9.

Choose the number of digits the final number will have. Players alternate turns drawing cards and then declaring the place value for the card and then placing the card in the available slot. Once a card has been placed, it can't be moved. The player with the largest number when the slots are filled is the winner.

The sample game below was played with five cards. The player on the left was the winner.

Sum-to-10 Solitaire! 1 player or team, numbered cards 1-9.

Deal the cards face-up. Then remove cards in groups that sum to 10 with the goal of removing all the cards from the table.

Variation 1: Sum to a different target number such as 12.

Variation 2: Layer the cards in a pyramid or grid where only the cards on top are available to be taken.

Target 100: 2-6 players, numbered cards 1-9.

Choose a target number (usually 100). Each player draws four cards and uses them to create two 2-digit numbers. The player whose numbers sum the closest to 100 is the winner.

Suggested scoring: Play multiple rounds, where each player starts with 100 points but then loses points each round equal to how far the sum of their numbers is from 100.

Dungeon Maze +3,-2

In this dungeon maze, you have to navigate a grid of numbered cells following a set of rules.

- No diagonal moves are allowed.
- Your key can only open a door to a room that is numbered 3 more than your current room or 2 less than your current room.
- The doors lock behind you, so you can't travel to any room that isn't numbered 3 more or 2 less than your current room number

Sample Dungeon Maze Path

In the maze to the right, you can travel from the upper right corner to the bottom left corner using the path that is displayed.

Note that there is no way to travel from the bottom left to the top right.

6	10	12
7	8	6
10	12	9

Objective: Solve the dungeon maze by planning out a loop that visits all four corners and ends where it starts. If you don't plan out your path now, you might get to a cell that you can't get out of.

9	11	8	6	4	2	5	3	6	9
7	5	5	13	10	12	6	8	8	7
5	8	7	11	11	9	3	6	4	5
3	1	4	9	8	7	5	0	2	3
6	9	6	7	10	7	2	4	6	6
15	12	8	10	5	4	5	7	8	4
17	14	11	8	4	1	3	11	5	2
15	13	6	5	2	3	7	9	6	3
14	11	8	9	7	5	8	6	4	2
12	10	8	6	5	2	4	6	3	0

Adding and Subtracting Whole Numbers

Objectives: 4.NBT.B.4

Adding and subtracting whole numbers. The usual algorithms.

Warm-up Problem: Use the numbers below to make the number 4 by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

4, 6, 7, 2

1. $418 + 225 = 643$

2. $46{,}813 + 95{,}493 = 142{,}306$

3. $999{,}999 + 51{,}678 = 1{,}051{,}677$

4. $86 - 48 = 38$

5. $6{,}444 - 5{,}555 = 889$

6. $942{,}393 - 51{,}678 = 890{,}715$

7. $62{,}816 - 26{,}444 = 36{,}372$

8. $62{,}816 + 26{,}444 = 89{,}260$

1. $9,493 - 1,568 = 7,925$

2. $97,903 + 13,745 = 111,648$

3. $869,493 - 22,157 = 847,336$

4. $869,493 + 22,157 = 891,650$

5. $900,903 - 132,987 = 767,916$

6. $981,440 + 363,464 = 1344,904$

7. $74,643,122 + 36,091,464 = 110,734,586$

8. $74,643,122 - 36,091,464 = 38,551,658$

Challenge Problem: Use the digits, 3, 3, 3, 3, 4, 4, 4, 4 to make two 4-digit numbers whose difference is 990. (When you subtract the smaller from the larger, you get 990.)

$4334 - 3344 = 990$

Factors and Multiples

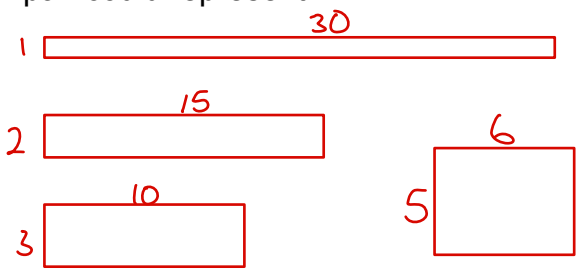
Objectives: 4.OA.B.4

Factor pairs and multiples, prime numbers

Warm-up Problem: Use the numbers below to make the number 3 by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

5, 1, 2, 2

1. What are the multiples of 4?
   0, 4, 8, 12, 16, 20, 24, ...
2. What are the multiples of 3?
   0, 3, 6, 9, 12, 15, 18, 21, 24, ...
3. Which numbers are multiples of both 3 and 4?
   The multiples of 12.
   0, 12, 24, 36, 48, ...
4. Find all factor pairs for the number 30. Draw a picture of a region each factor pair could represent.



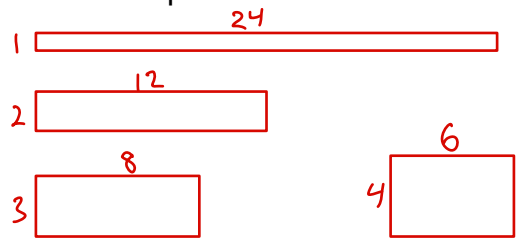
5. **Characteristics of Multiples.** Describe how you can determine whether numbers are multiples of each number.

- Multiples of 2 end in 0, 2, 4, 6, or 8.
- Multiples of 3 have digits that sum to a multiple of 3.
- Multiples of 5 end in 0 or 5.
- Multiples of 6 are multiples of 2 and 3.
- Multiples of 9 have digits that sum to a multiple of 9.
- Multiples of 10 end in 0.

6. Determine whether each number is prime.

- 132 is a multiple of 2, so no.
- 5,001 is a multiple of 3, so no.
- 91 = 7 × 13, so no.

7. The 5-digit number 6173a is a multiple of 9. What is a?
   The digits sum to a multiple of 9.
   6 + 1 + 7 + 3 + a = 18,
   so a = 1.
8. Find all factor pairs for the number 24. Draw a picture of a region each factor pair could represent.

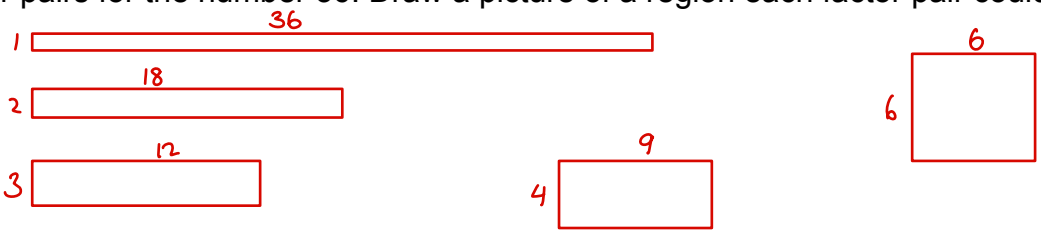


8. Is 61 prime? Yes!
9. Is 123,454,321 a multiple of 9?
   No, the digits sum to 25, which is not a multiple of 9.

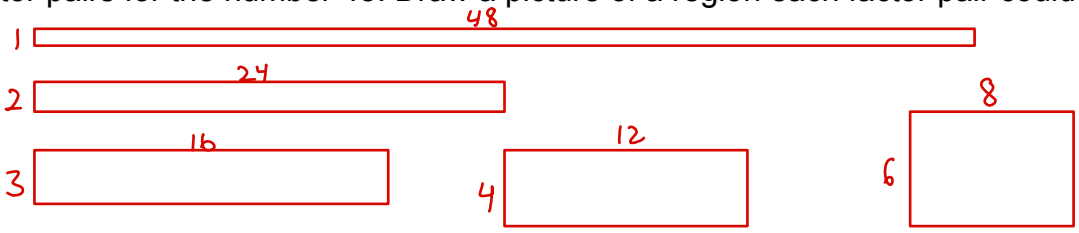
1. Find all prime numbers up to 100 by crossing off each number that isn't prime.

~~1~~	2	3	~~4~~	5	~~6~~	7	~~8~~	~~9~~	~~10~~
11	~~12~~	13	~~14~~	~~15~~	~~16~~	17	~~18~~	19	~~20~~
~~21~~	~~22~~	23	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~	29	~~30~~
31	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	37	~~38~~	~~39~~	~~40~~
41	~~42~~	43	~~44~~	~~45~~	~~46~~	47	~~48~~	~~49~~	~~50~~
~~51~~	~~52~~	53	~~54~~	~~55~~	~~56~~	~~57~~	~~58~~	59	~~60~~
61	~~62~~	~~63~~	~~64~~	~~65~~	~~66~~	67	~~68~~	~~69~~	~~70~~
71	~~72~~	73	~~74~~	~~75~~	~~76~~	~~77~~	~~78~~	79	~~80~~
~~81~~	~~82~~	83	~~84~~	~~85~~	~~86~~	~~87~~	~~88~~	89	~~90~~
~~91~~	~~92~~	~~93~~	~~94~~	~~95~~	~~96~~	97	~~98~~	~~99~~	~~100~~

2. Find all factor pairs for the number 36. Draw a picture of a region each factor pair could represent.



3. Find all factor pairs for the number 48. Draw a picture of a region each factor pair could represent.



4. Determine whether each number is prime.

- 111 = 3 × 37, so no.
- 44,326 is even, so no.
- 567 is a multiple of 3, so no.
- 12,345 is a multiple of 5, so no.
- 243 is a multiple of 3, so no.

Challenge Problem: The 6-digit number 4b6,26a is a multiple of 45. What are the possible values of the letters a and b? A multiple of 45 is a multiple of 5 and 9. Thus the digits sum to a multiple of 9, and a=0 or a=5. Sum the digits: 4+b+6+2+6+a = 18+b+a. If a=5, then b=4 If a=0, then b=0 or b=9. No other choice of digits sum to a multiple of 9. The possible numbers are:

406,260 496,260 446,265