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?

2. How do we say the number 83,243,765,432?

3. How do we say the number 626,490,000,156,712,154?

4. Decompose the number 3,576 into a sum of parts.

5. Decompose the number 104,329 into a sum of parts.

6. Multiply the number 457 by 10.

7. Divide the number 2,440 by 10.

Recap Problems:

1. How do we say the number 62,305,956,411,042,333?

2. Decompose the number 36,871 into a sum of parts.

3. Multiply the number 5,892 by 10.

4. Divide the number 657,360 by 10.

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

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

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

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

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

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

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

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

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

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

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				
123				
30,219				
4,444				
524,288				
12,345,678				

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
4. Round to the nearest 10,000: 678,325
5. Round to the nearest 10,000: 45,613,043
6. Round to the nearest 100: 57,692
7. Round to the nearest 1,000,000: 484,352,221
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				
19,047				
666,392				
8,777,777				
909,445,534				
87,878,787				

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

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

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

6. Round to the nearest 100: 89,512

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

Challenge Problem: What am I?

- 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

2. 46,813 + 95,493

3. 999,999 + 51,678

4. 86 - 48

5. 6,444 - 5,555

6. 942,393 - 51,678

7. 62,816 - 26,444

8. 62,816 + 26,444

1. 9,493 - 1,568

2. 97,903 + 13,745

3. 869,493 - 22,157

4. 869,493 + 22,157

5. 900,903 - 132,987

6. 981,440 + 363,464

7. 74,643,122 + 36,091,464

8. 74,643,122 - 36,091,464

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.)

____ - ____ = 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?
2. What are the multiples of 3?
3. Which numbers are multiples of both 3 and 4?
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
- Multiples of 3
- Multiples of 5
- Multiples of 6
- Multiples of 9
- Multiples of 10

6. Determine whether each number is prime.

- 132
- 5,001
- 91

7. The 5-digit number 6173a is a multiple of 9. What is a?
8. Find all factor pairs for the number 24. Draw a picture of a region each factor pair could represent.

8. Is 61 prime?
9. Is 123,454,321 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
- 44,326
- 567
- 12,345
- 243

Challenge Problem: The 6-digit number 4b6,26a is a multiple of 45. What are the possible values of the letters a and b?

Multi-digit Multiplication

Objectives: 4.NBT.B.5

Multiplying multi-digit numbers. The usual algorithm.

Warm-up Problem: Use the numbers below to make the number 6 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, 7, 2, 4

1.
$$\begin{array}{r} 9{,}345 \\ \times \quad 7 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 67 \\ \times 33 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 2{,}571 \\ \times \quad 449 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 3{,}045 \\ \times \quad 382 \\ \hline \end{array}$$

1. 292×8

2. $5{,}215 \times 9$

3. 45×47

4. $9{,}004 \times 38$

5. 45×507

6. 465×93

7. $80{,}936 \times 7{,}220$

8. $1{,}234 \times 5{,}678$

Challenge Problem: Calculate how many days old you are. Multiply your age by 365. Add the number of days since your birthday. Also add in an extra day for each leap day (Feb 29) that you have lived through. (Can you also figure out how many minutes old you are?)

Multiplication Problems

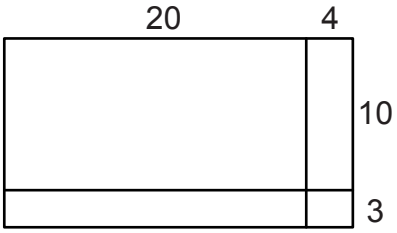
Objectives: 4.MD.A.3, 4.OA.A.3

Area models, lattice multiplication, two-step word problems

Warm-up Problem: Use the numbers below to make the number 8 by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

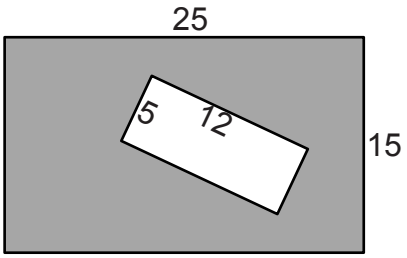
6, 3, 1, 3

1. Show how the multiplication algorithm corresponds to finding area of a rectangle. 24×13

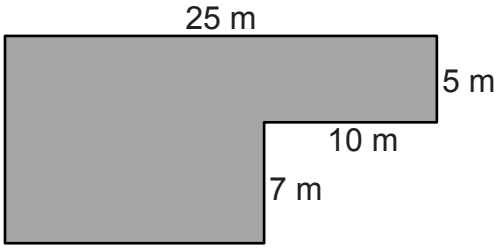


2. Use the lattice method to multiply 672×46.

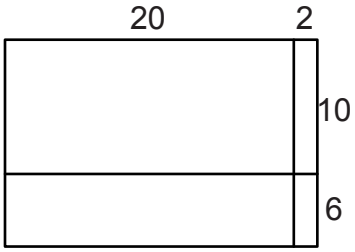
3. Find the area of the shaded region.



4. It costs $3 per m² to plant sod. How much will it cost to plant sod on the lawn below?



5. Show how the multiplication algorithm corresponds to finding area of a rectangle. 16×22

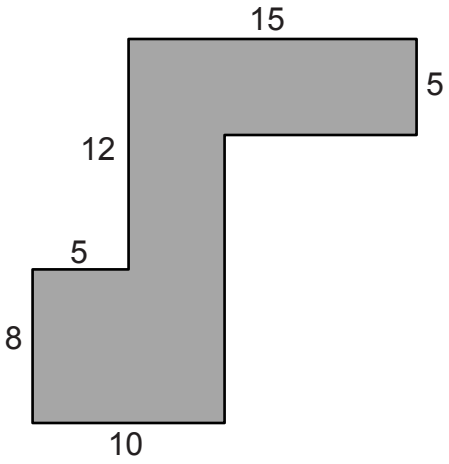


6. Use the lattice method to multiply 512×256.

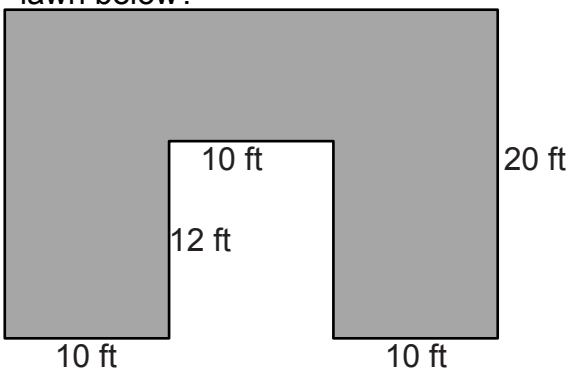
1. Show how the multiplication algorithm corresponds to finding area of a rectangle. 38×25

2. Use the lattice method to multiply 569×32.

3. Find the area of the shaded region.



4. It costs \$2 per ft² to lay artificial turf. How much will it cost to lay artificial turf on the lawn below?



5. Show how the multiplication algorithm corresponds to finding area of a rectangle. 56×36

6. Use the lattice method to multiply 243×625.

Challenge Problem: Consider all the rectangles that have whole number length sides and a perimeter of 40 units. Which rectangle has the greatest area?

Long Division

Objectives: 4.NBT.B.6

Long division

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.

5, 3, 4, 1

1. 524÷3

2. 52,088÷7

3. 47,333÷12

4. 1,000,000÷11

5. 9,301÷8

1. 724÷6

2. 6,294÷7

3. 60,813÷5

4. 1,020,304÷9

5. 987,654,321÷12

Challenge Problem: Find the value of the digit D in the long division calculation below.

$$6\overline{)2D8D}\quad \text{quotient: } D1D$$

Division Problems

Objectives: 4.NBT.B.6, 4.OA.A.3

Division Word Problems

Warm-up Problem: Use the numbers below to make the number 6 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, 8, 4, 2

1. Use division to find the number of weeks in one year. What does the remainder mean?

2. Bab wants to read a 328-page book and a 233-page book in the next 8 days. How many pages must Bab read each day to complete both books?

3. Clucky lays an egg every 3 days. How many eggs can Clucky lay in 50 days?

4. Eliza makes 36 banana muffins for her family of 5. How many muffins should each person get?

1. Syl has been saving quarters in her drawer. She counts and finds that she has 326 quarters. How many dollars does Syl have?

2. It takes 3 hours to crochet a hat. Chris will spend 2 hours per day crocheting hats for each day in March. How many hats will Chris crochet?

3. A football team has 11 players. A football league has 833 players to divide up into teams. How many teams can the league create?

4. Orson bakes 45 sugar cookies, 19 chocolate chip cookies, and 32 pumpkin cookies. He plans to deliver an equal number of cookies to each of his 8 friends. How many cookies will each friend get?

Challenge Problem: A bin contains 37,990 marbles that need to be divided into bags of 12 marbles each. How many marbles will be left over once the bags are filled?

Angle Measure

Objectives: 4.MD.C.5, 4.MD.C.6

Division Word Problems

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.

6, 2, 2, 2

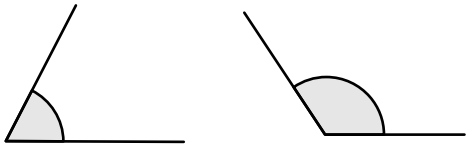
1. Draw an example of each type of angle.

- A right angle measures 90°.

- An acute angle measures less than 90°.

- An obtuse angle measures more than 90°.

2. Measure each angle.

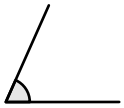


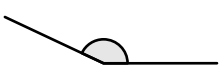
3. Draw your best estimate for a 75° angle.

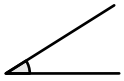
4. Can an angle measure more than 180°?

5. Draw your best estimate for a 100° angle.

6. Classify each angle as acute, obtuse, or right.



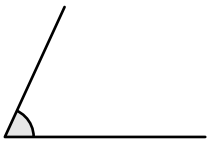


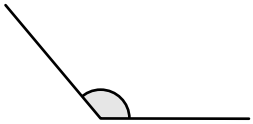


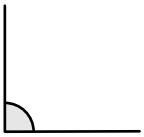
1. Draw an angle of the indicated size.

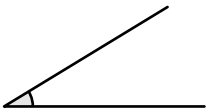
- 45°
- 150°
- 60°
- 225°
- 270°
- 10°

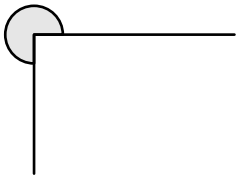
2. Estimate the size of each angle. Then classify it as an acute angle, a right angle, or an obtuse angle.











Challenge Problem: A circular pizza is sliced into 12 congruent pieces. What is the angle formed by each slice?

Triangles and Quadrilaterals

Objectives: 4.G.A.2

Division Word Problems

Warm-up Problem: Use the numbers below to make the number 15 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, 8, 1, 4

1. Draw an acute triangle.

2. Draw an obtuse triangle.

3. Draw a right triangle.

4. Draw an equilateral triangle.

5. Draw an isosceles triangle.

6. Draw a scalene triangle.

7. Which characteristics can go together?

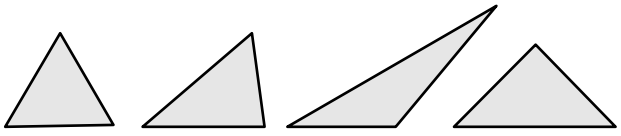
Equilateral	Acute
Isosceles	Right
Scalene	Obtuse

8. Types of quadrilaterals

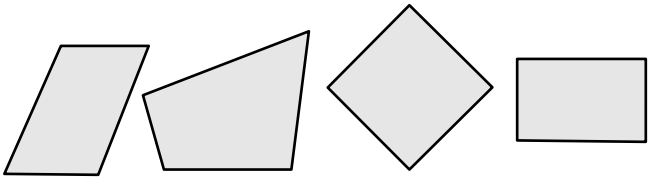
- Trapezoid
- Parallelogram
- Rhombus
- Rectangle
- Square

9. Draw a Venn diagram for the types of quadrilaterals.

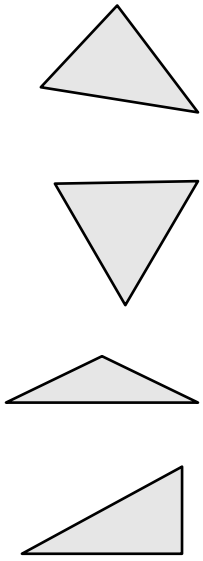
10. Classify each triangle.



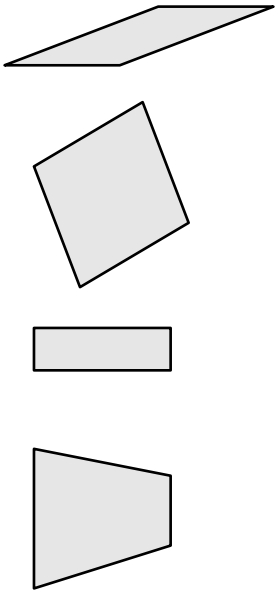
11. Classify each quadrilateral.



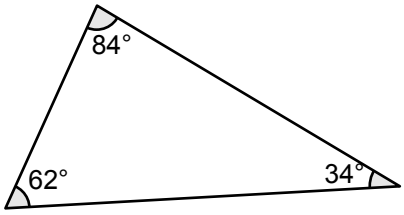
1. Classify each triangle (as scalene, isosceles, or equilateral and as acute, obtuse, or right).

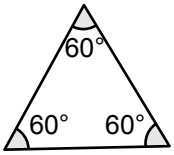


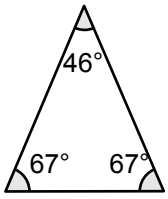
2. Classify each quadrilateral (as a square, rectangle, parallelogram, trapezoid, rhombus, or none).



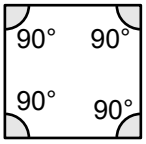
1. Add up the total angles for each triangle. What pattern do you notice?

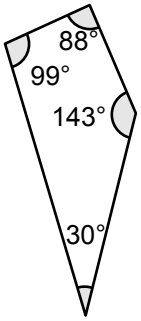


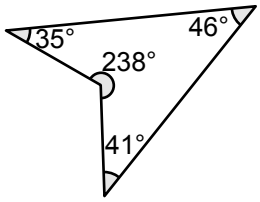




2. Add up the total angles for each quadrilateral. What do you notice?







Challenge Problem: Add up the measures of the angles in a triangle, and you'll get 180° every time. A quadrilateral has 360° as the sum of its angles. How many degrees are in a pentagon? (Hint: Chop the pentagon into triangles. You know what the angles of the triangle sum to already.)

Identifying Fractions

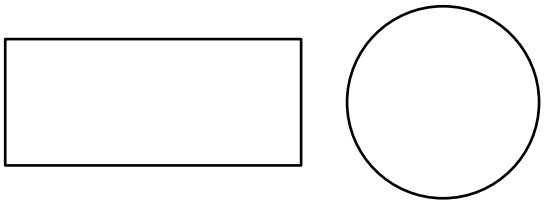
Objectives: 4.NF.A.1

Identify fractions visually, estimate the value of a fraction

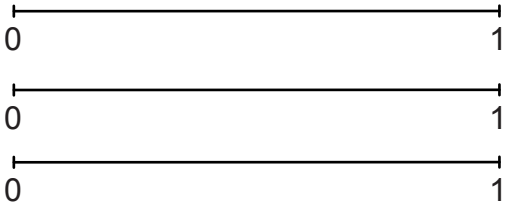
Warm-up Problem: Use the numbers below to make the number 11 by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

1, 3, 4, 3

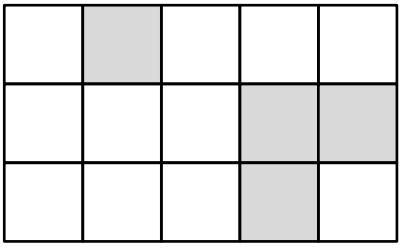
1. Shade 2/3 of each shape.



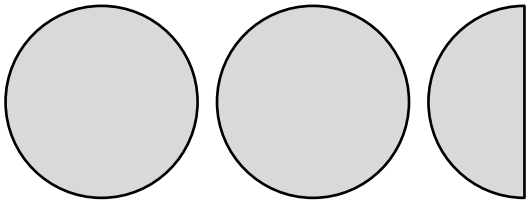
1. Label each fraction on a number line.
   1/4, 3/5, 5/8



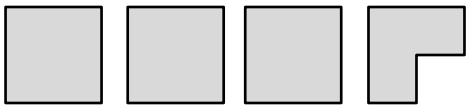
3. What fraction of the figure is shaded?



4. How many pizzas are below?



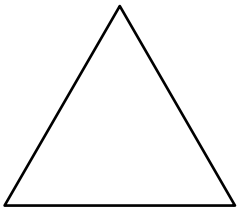
5. How many squares are below?



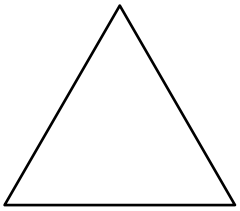
6. Slice the line at 2/5. What are the lengths of the two segments?

1. Shade each portion of the triangle.

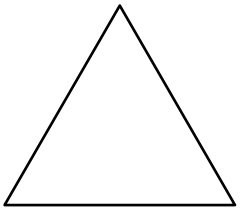
- ½ shaded



- 2/3 shaded



- ¾ shaded



2. Draw a visual representation of each fraction.

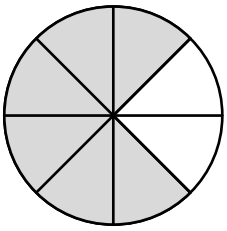
- 3/5

- 6/8

- 8/9

- 10/3

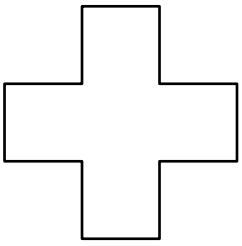
6. What fraction of the figure is shaded?



6. Slice the line at 3/8. What are the lengths of the two segments created by the cut?

7. Slice the line at 1/6. What are the lengths of the two segments created by the cut?

Challenge Problem: Shade exactly ¼ of the cross.



Equivalent Fractions

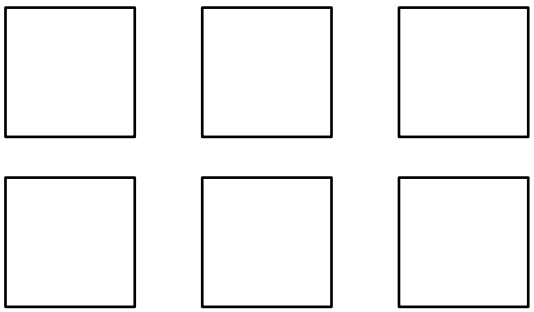
Objectives: 4.NF.A.1

Identify equivalent fractions, reduce fractions to lowest terms

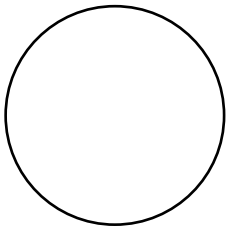
Warm-up Problem: Use the numbers below to make the number 9 by combining them with appropriate mathematical symbols. You can rearrange them in any way you want, but be sure to use all 4 numbers.

7, 4, 1, 2

1. Find six different ways to shade ½ of a square.



2. Andrew ate 4 out of the 8 slices of pizza. What fraction of the pizza did he eat?



3. Find 5 fractions that are equal to 2/3. (We call them equivalent fractions.)

4. Use a picture to show whether 6/8 is the same as as 9/12.

5. Write each fraction in simplest terms.

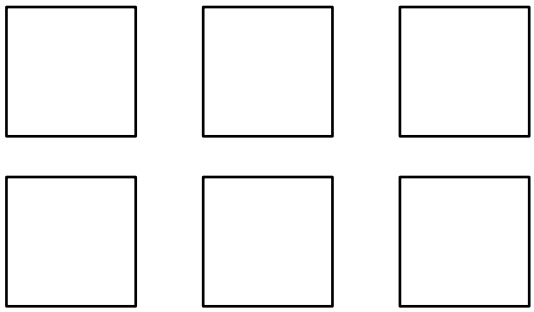
- $\frac{20}{25}$
- $\frac{24}{30}$
- $\frac{16}{36}$

6. Write each fraction in simplest terms.

- $\frac{12}{32}$
- $\frac{15}{24}$
- $\frac{28}{48}$

7. Use a picture to show whether 6/10 is the same as as 4/6.

1. Find 6 different ways to shade ¼ of a square.



2. Find 5 fractions that are equivalent to 3/5.

3. Use a picture to show whether 10/25 is the same as 5/12.

4. Write each fraction in simplest form.
   - $\frac{8}{20}$
   - $\frac{24}{42}$
   - $\frac{20}{32}$
   - $\frac{40}{25}$
   - $\frac{24}{60}$
   - $\frac{32}{100}$
   - $\frac{45}{60}$
   - $\frac{48}{20}$
   - $\frac{21}{49}$

Challenge Problem: What is the meaning of the following fraction? $\frac{\frac{1}{2}}{2}$