Math Strategies We Use in 5th Grade

Strategies for Multiplying Whole Numbers & Unit Fractions

Use repeated addition.

$5 \times \frac{1}{4}$ $\quad \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{5}{4} = 1\frac{1}{4}$

Make the problem easier by cutting it into chunks you know how to solve.

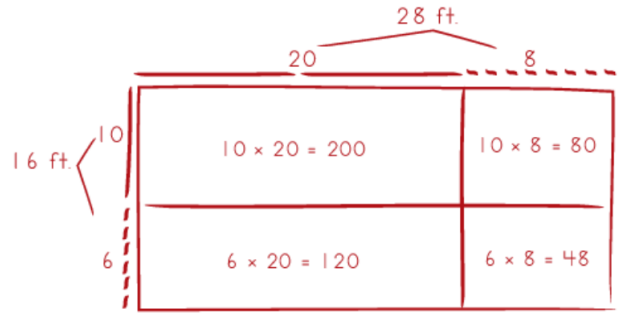
$\frac{1}{4} \times 5 = (\frac{1}{4} \times 4) + (\frac{1}{4} \times 1) = 1 + \frac{1}{4} = 1\frac{1}{4}$

If the combination involves fourths, you can find half, and then cut the result in half again.

$\frac{1}{2}$ of 5 is $2\frac{1}{2}$ and $\frac{1}{2}$ of $2\frac{1}{2}$ is $1\frac{1}{4}$

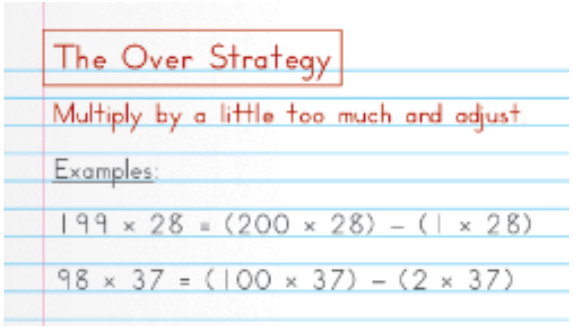
If the combination involves fourths, you can think about quarters.

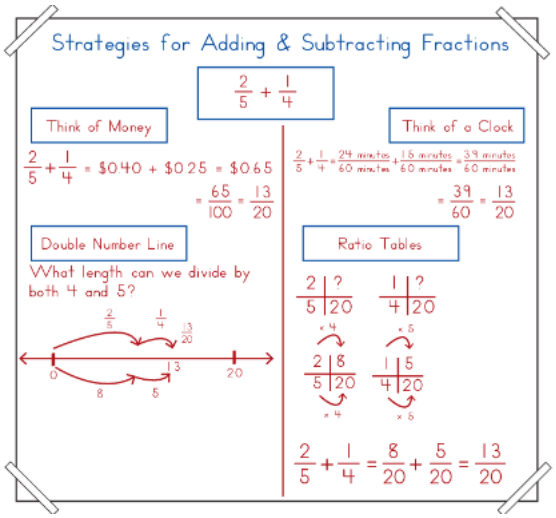
$5 \times \frac{1}{4}$ is the same as 5 quarters, and $5 \times 0.25 = 1.25$

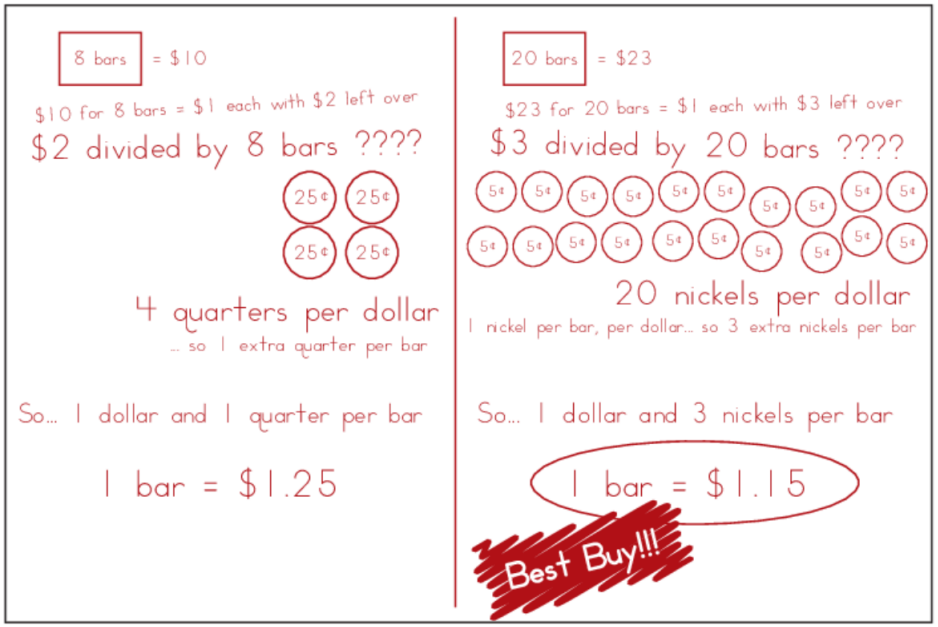


200
80
120
+ 48
448 sq. ft.

28
× 16
448 sq. ft.







This booklet will show you some of the strategies I have learned to be more successful at solving problems. As I become a stronger mathematician, I learn how and why problems can be solved in different ways. The more I learn and use these different strategies, the more efficient and accurate I will become.

Addition & Subtraction

I use my understanding of the relationships between addition and subtraction and apply it to solving problems with fractions and decimals.

Fractions

I can use different strategies to make fractions with common denominators in order to add and subtract them.

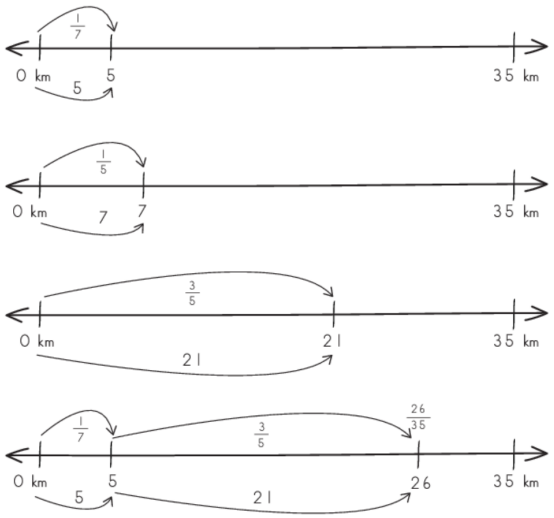
Money Model

$$\frac{3}{10} + \frac{7}{20} = \$0.30 + \$0.35 = \$0.65 = \frac{65}{100} = \frac{13 \text{ nickels}}{20 \text{ nickels}} = \frac{13}{20}$$

Clock Model

$$\frac{5}{6} + \frac{1}{12} \quad \frac{50 \text{ minutes}}{60 \text{ minutes}} + \frac{5 \text{ minutes}}{60 \text{ minutes}} = \frac{55 \text{ minutes}}{60 \text{ minutes}} = \frac{11 \text{ sets of 5 minutes}}{12 \text{ sets of 5 minutes}} = \frac{11}{12}$$

Double Number Line



Equivalent Fractions for $\frac{2}{3}$

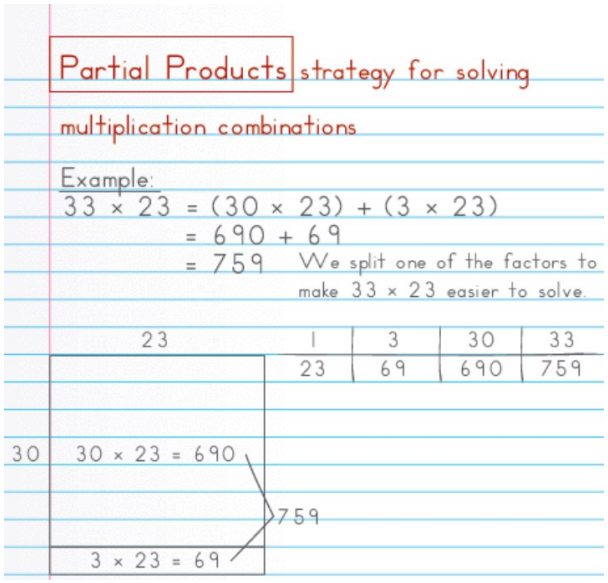
numerator	2	4	8	16
denominator	3	6	12	24

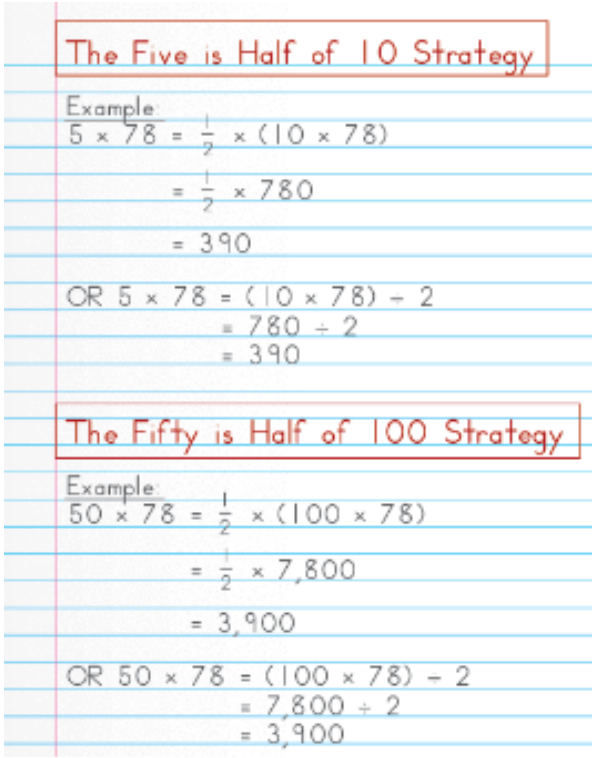
Equivalent Fractions for $\frac{5}{8}$

numerator	5	10	15
denominator	8	16	24

$$\frac{2}{3} + \frac{5}{8} = \frac{16}{24} + \frac{15}{24} = \frac{31}{24} \text{ or } 1\frac{7}{24}$$

Here are some example of students using different strategies:

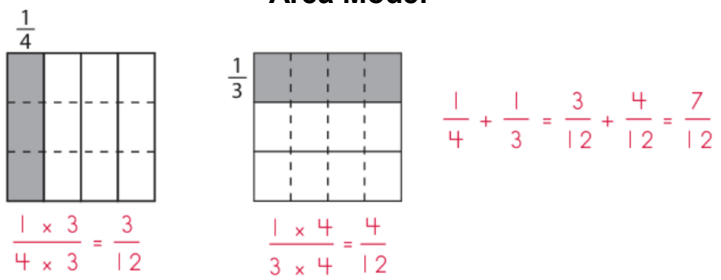




End of the Year Expectations

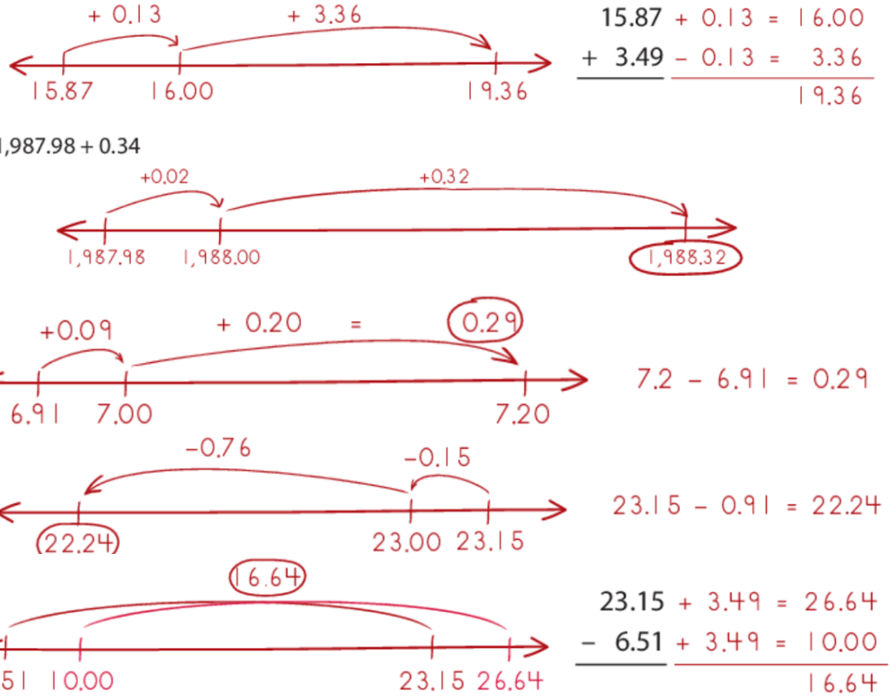
- Add and subtract fractions including mixed numbers with unlike denominators.
- Add and subtract decimals to the hundredths place.
- Multiply whole numbers using standard algorithm.
- Divide whole numbers with up to 4-digit dividends and 2-digit divisors using strategies.
- Multiply fraction and whole number by a fraction.
- Divide unit fractions (1/2, 1/3, 1/4…) by whole numbers and whole numbers by unit fractions
- Multiply and divide decimals to the hundredths place.

Area Model



Decimals

I use number lines and my understanding of place value to help me add and subtract decimals .

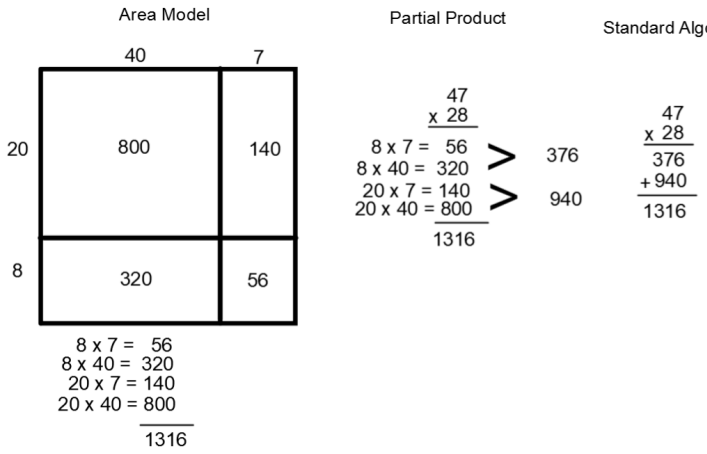


Fraction Decimal Relationships

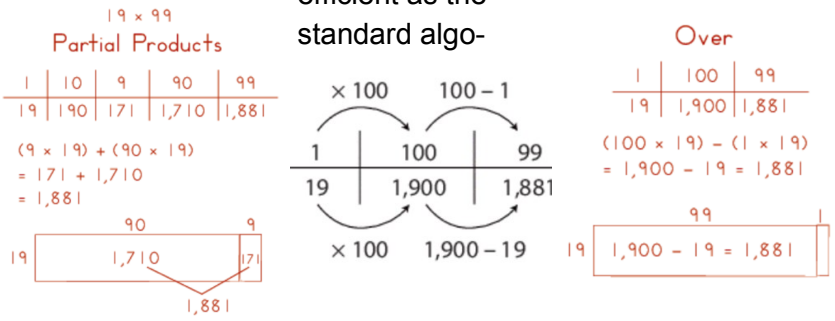
¼ + ½ = ¾	⅕ + ¼ = 9⁄20	¾ − ⅖ = 7⁄20
0.25 + 0.50 = 0.75	0.20 + 0.25 = 0.45	0.75 − 0.40 = 0.35

Multiplication

I can multiply whole numbers using strategies and the standard algorithm. I start by using the area model and then move toward the partial product strategy and finally I see the relationship to the standard algorithm.



Sometimes, I find that using a different strategy is just as efficient as the standard algo-



16 × 49

16 x 49
= 8 x 98
= 4 x 196
= 2 x 392
= 1 x 784 = 784

Doubling & Halving Strategy

16 x 100 = 1,600
16 x 50 = 800
16 x 49 = 800 – (1 x 16) = 784

Half-Tens facts
Fifty is half of one hundred

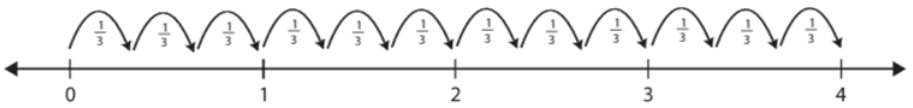
I use my understanding of division strategies to help me divide fractions.

Patterns

8 ÷ 4 = 2 people
8 ÷ 2 = 4 people
8 ÷ 1 = 8 people
8 ÷ $\frac{1}{2}$ = 16 people

Number Line

$4 \div \frac{1}{3} = 12$



Models

$4 \div \frac{1}{3} = 12$

$\frac{1}{3} \div 3 = ?$

If we split $\frac{1}{3}$ into 3 equal parts, we can see that each is $\frac{1}{9}$ of the pan.

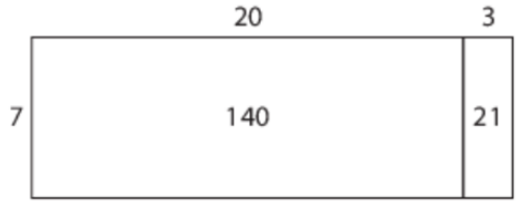
$\frac{1}{3} \div 3 = \frac{1}{9}$

Partial Quotients

I can break up the dividend into smaller numbers to make the

161 ÷ 7

If you split 161 into 140 + 21, this problem is easier.



$140 \div 7 = 20$
$21 \div 7 = 3$
$161 \div 7 = 23$

$(140 \div 7) + (21 \div 7)$
$20 + 3$

problem easier to follow.

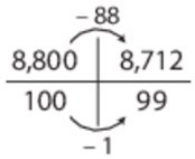
Over Under

Overs $858 \div 78 = 11$

1	10	11
78	780	858

$10 \times 78 = 780$
$+ 1 \times 78 = 78$
$11 \times 78 = 858$

Unders $8{,}712 \div 88$



$8{,}800 \div 88 = 100$
$- \quad 88 \div 88 = \quad 1$
$8{,}712 \div 88 = \quad 99$

I can solve a problem with a friendly number and then subtract or

It takes 352 cups of strawberries to make 88 fruit pizzas. How many cups of strawberries does it take to make 1 fruit pizza?

352 ÷ 88

		÷2	÷2	÷2	÷11
cups of strawberries	352	176	88	44	4
fruit pizzas	88	44	22	11	1
		÷2	÷2	÷2	÷11

It takes 1 cup of grapes to make ¼ of a fruit pizza. How many cups of grapes does it take to make a whole fruit pizza?

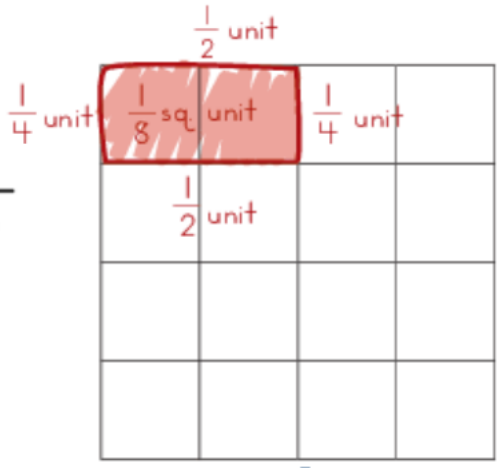
1 ÷ ¼

		×4	
cups of grapes	1		4
fruit pizzas	$\frac{1}{4}$		1
		×4	

I use my understanding of multiplication strategies to help me multiply fractions.

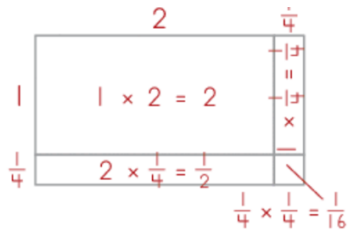
Array

$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$

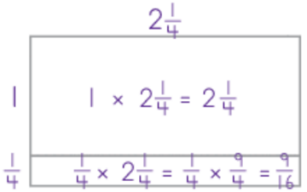


Area Model

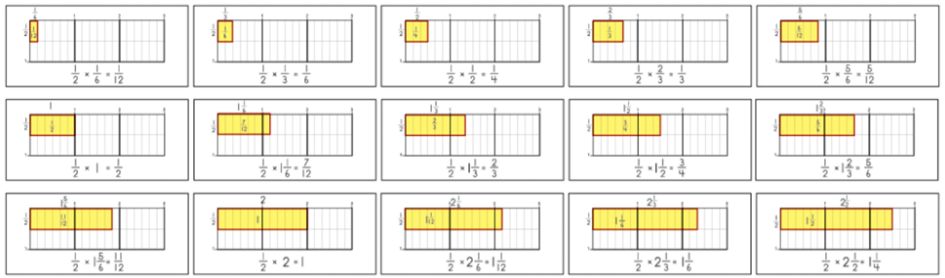
$1\frac{1}{4} \times 2\frac{1}{4} = 2\frac{13}{16}$



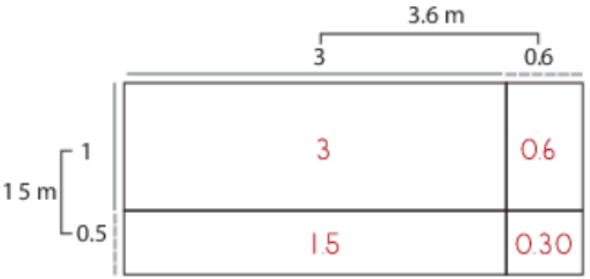
$2 + \frac{1}{2} + \frac{1}{4} + \frac{1}{16} = 2\frac{13}{16}$



$2\frac{1}{4} + \frac{9}{16} = 2\frac{13}{16}$



I use my understanding of multiplication strategies to help me multiply decimals.



1
3.0
0.6
1.5
+0.30
5.40 sq. m

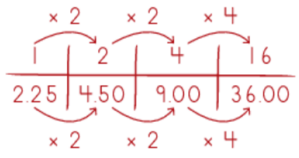
Area Model

Partial Product

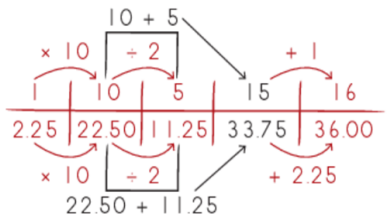
3.6
× 1.5
1 × 3 = 3
1 × 0.6 = 0.6
0.5 × 3 = 1.5
0.5 × 0.6 = 0.30
5.40 sq. m

Standard Algorithm

3
3.6
× 1.5
1.80
3.60
5.40 sq. m



16 × 2.25 solved by doubling twice and then multiplying by 4



16 × 2.25 solved using the Half-Tens facts

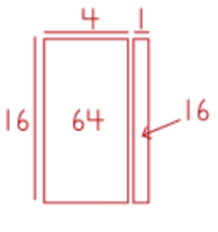
Division

I use strategies and my understanding of the relationship between multiplication and division to solve division problems.

Multiplying to Divide

I can use a ratio table, an area model , and my understanding of multiplication and division to solve problems.

80 ÷ 16



1
4 > 5 gallons
16)80
− 64
16
− 16
0

300 ÷ 12

5 + 20

1	10	5	20	25
12	120	60	240	300

60 + 240

5
20 } 25
12)300
− 240
60
− 60
0

$94.00 ÷ 8

10.00	1.00	.50	.20	.05
80.00	8.00	4.00	1.60	.40

10.00 + 1.00 + .50 + .20 + .05 = $11.75
$94.00 ÷ 8 = $11.75

0.05
0.20
0.50
1.00
10.00 > $11.75

8)94.00
− 80.00
14.00
− 8.00
6.00
− 4.00
2.00
− 1.60
0.40
− 0.40
0

Ratio Table for 8

1.00	8.00
2.00	16.00
10.00	80.00
0.50	4.00
0.20	1.60
0.05	0.40