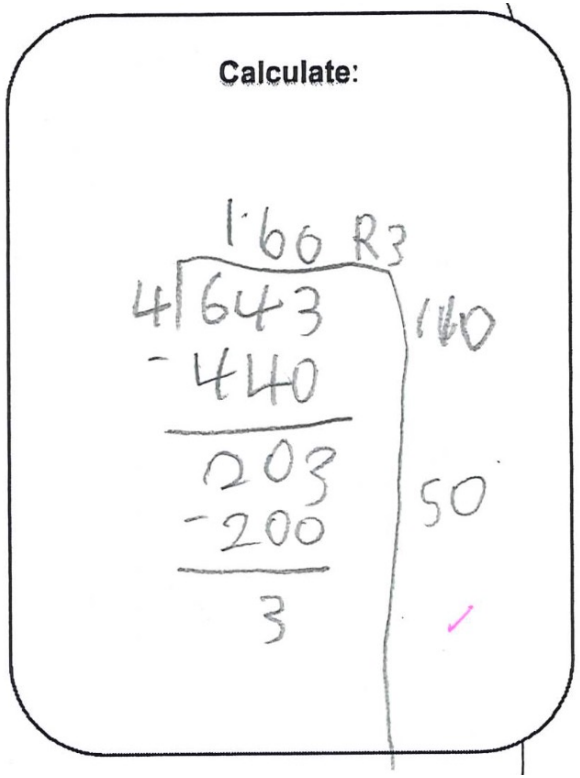
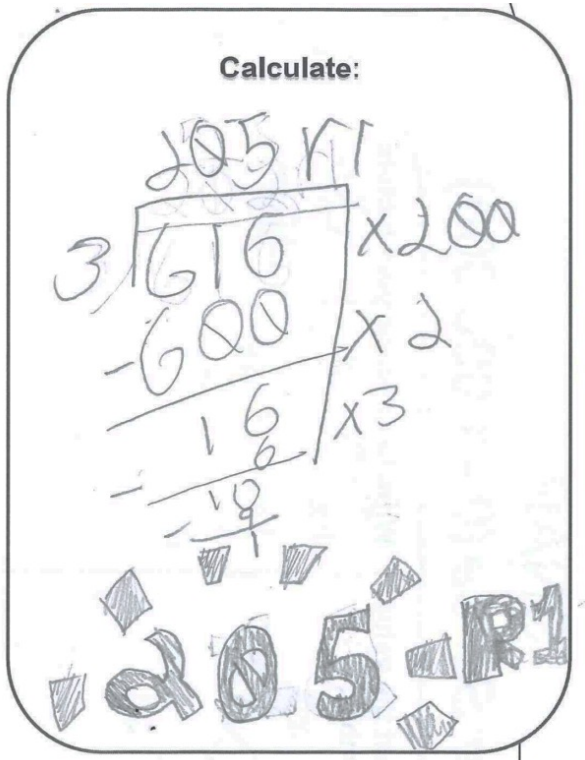
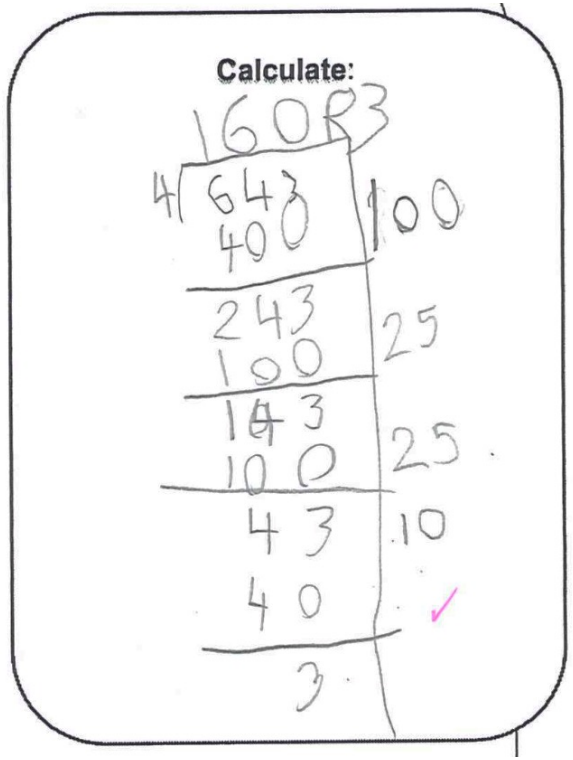
- GRADE 5 – OPERATIONS

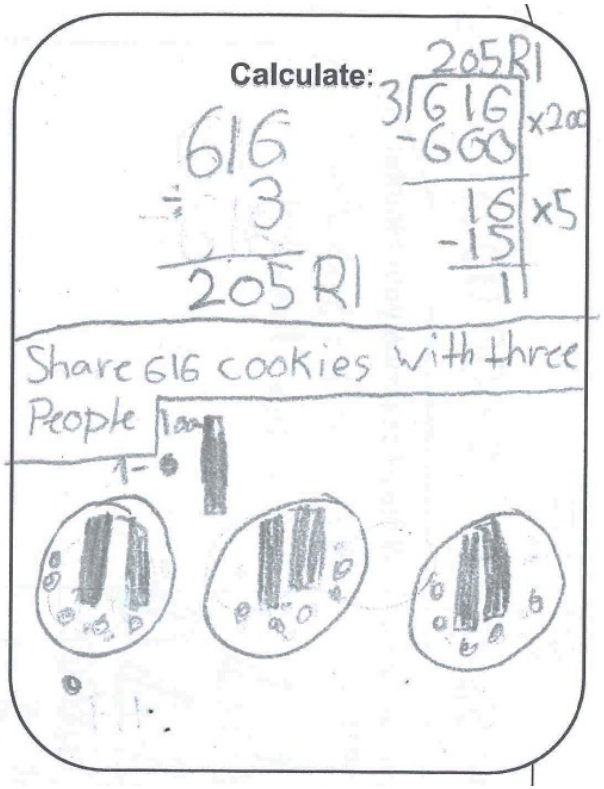


These three examples show the "Partial Quotient Method" in action. This algorithm is very flexible, clear, and tends to produce more consistently accurate answers at this grade level.

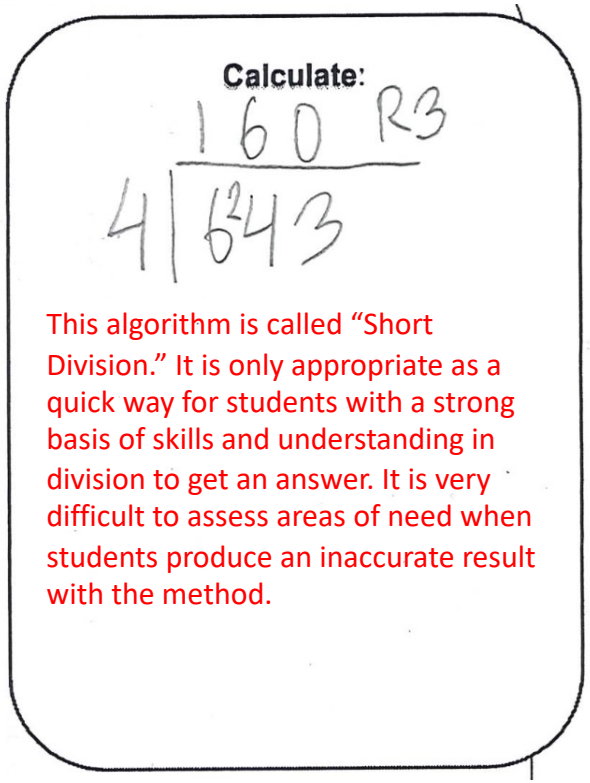


It's also much easier to assess students with this method. You can clearly see when there are gaps in foundational skills or a misunderstanding of division concepts.



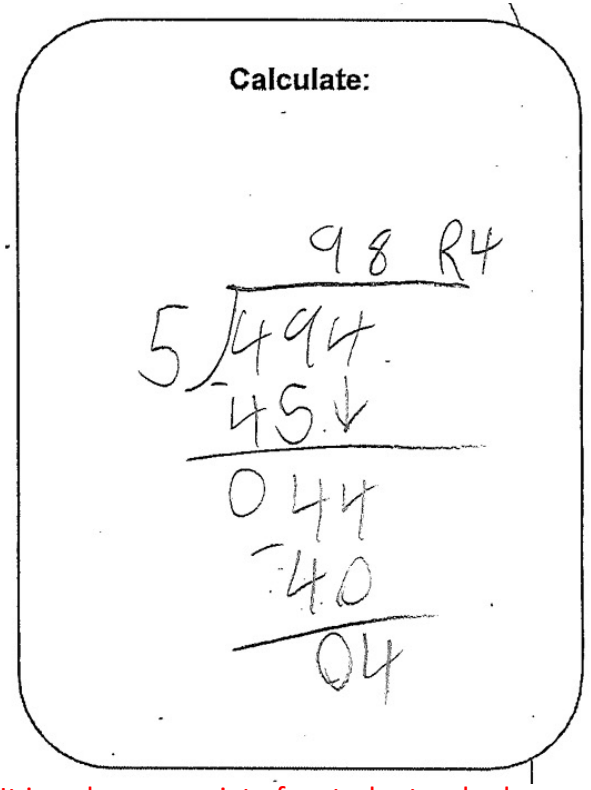


This student showed their understanding in many different ways. This is an example of ”4” level work.

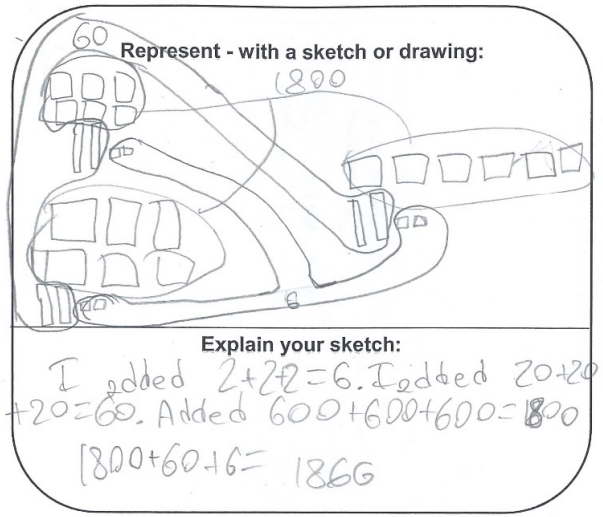


This algorithm is called “Short Division.” It is only appropriate as a quick way for students with a strong basis of skills and understanding in division to get an answer. It is very difficult to assess areas of need when students produce an inaccurate result with the method.

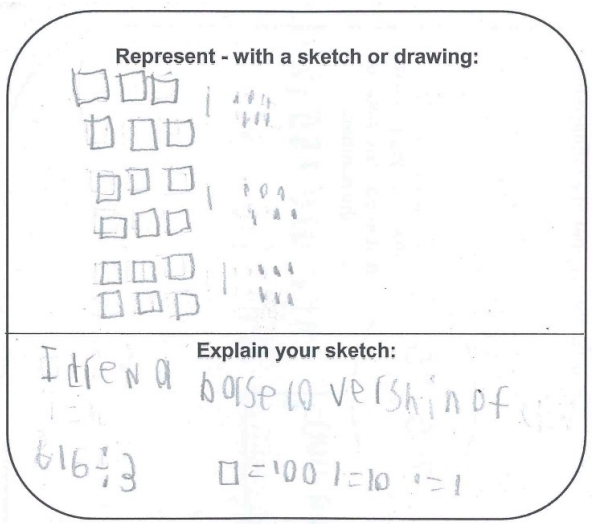
The ubiquitous “long division” algorithm. It has a minimum of 7 steps that all need to be done in the correct order and requires students to have full automaticity in multiplication right up to 9x9.



It is only appropriate for students who have gained a strong understanding of division through instruction that follows a concrete ->pictorial->abstraction progression that teaches students what is actually happening in division.

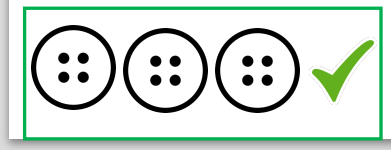


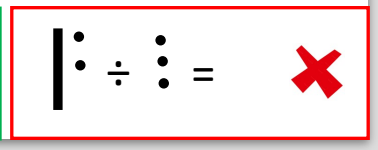
Pictorial representations of division must show the total (dividend) being divided into equal groups. There are many ways that students can do this successfully (See examples).

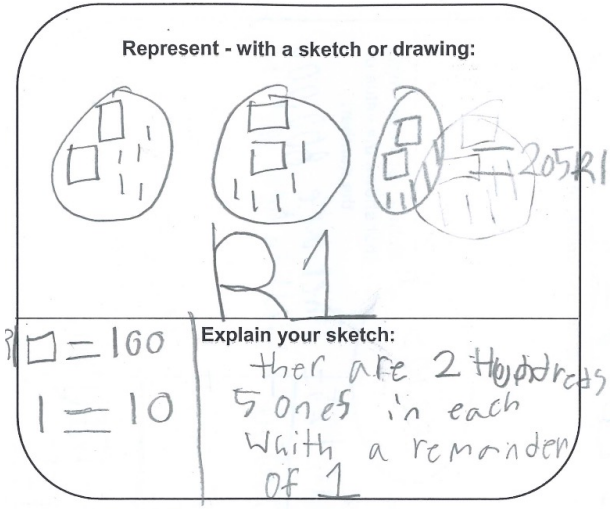


Replacing the numbers in the division expression with base ten does not show an understanding of division.

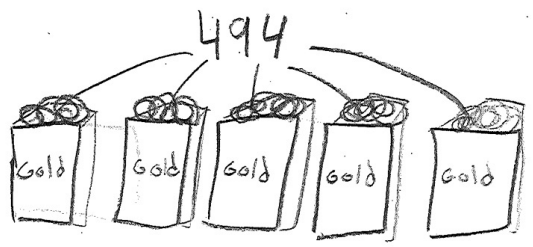
12÷3=







Represent - with a sketch or drawing:



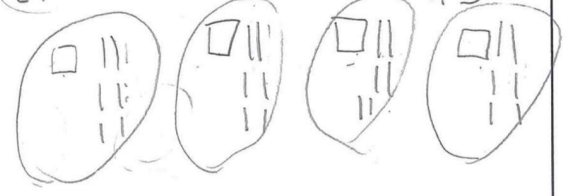
Explain your sketch:

There 494 pices of gold and 5 boxes to split it through. How many ~~pi~~ pieces per box.

20
4
24

Represent - with a sketch or drawing:

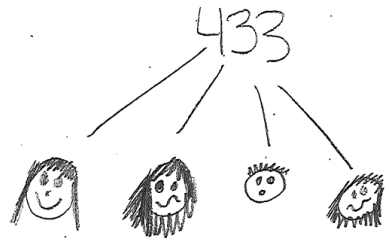
RB



Explain your sketch:

I Drew 4 sets with 100 and 60 in it so it equls up to 160. ✓

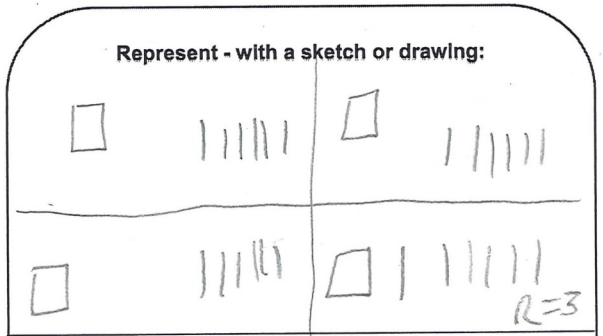
Represent - with a sketch or drawing:



Explain your sketch:

I split 433 jelly Beans to 4 people. Each person got 108 jelly Beans

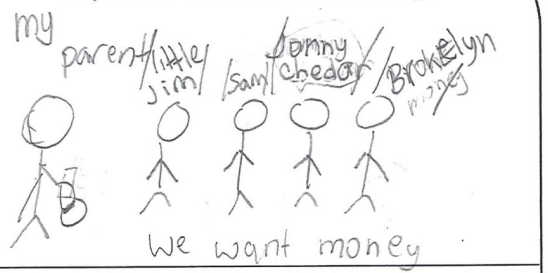
Represent - with a sketch or drawing:



Explain your sketch:

I divided 643 into 4 equal groups leaving 1 hundred and 6 tens in each group R=3 ✓

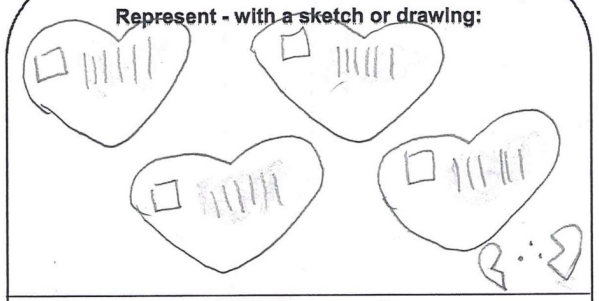
Represent - with a sketch or drawing:



Explain your sketch:

We were getting allowance. She had 643 cents to share with the 4 of us how many cents will we each get? ANSWER: 160 R3

Represent - with a sketch or drawing:



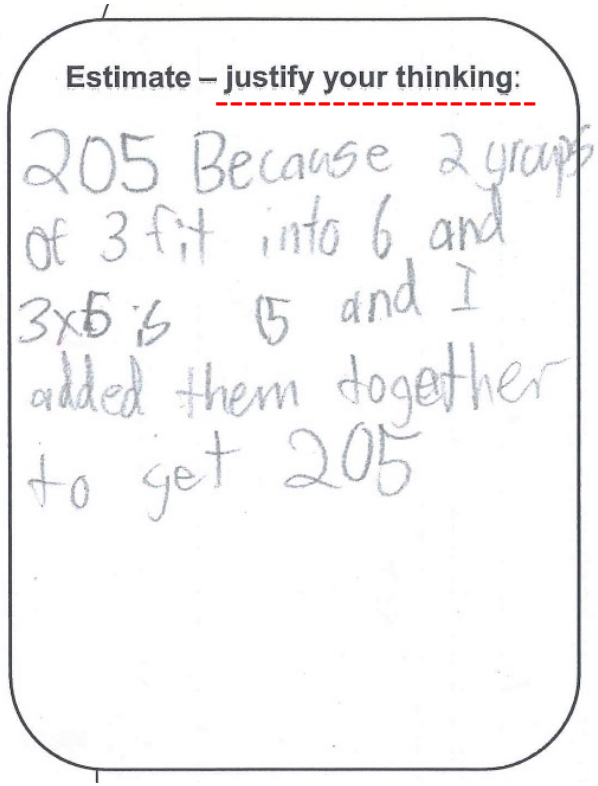
Explain your sketch:

there are 4 equal groups of 160. There are 3 ones left.

r3

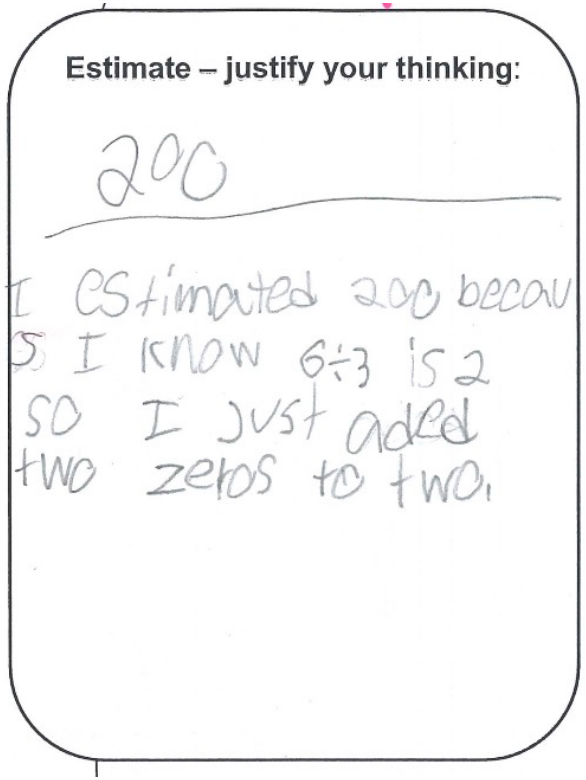
The justification can be any or all of:
-numbers and equations showing rounding and then mental math or simple calculation
-an explanation in words

A reasonable estimate with no justification should be scored as a 2.

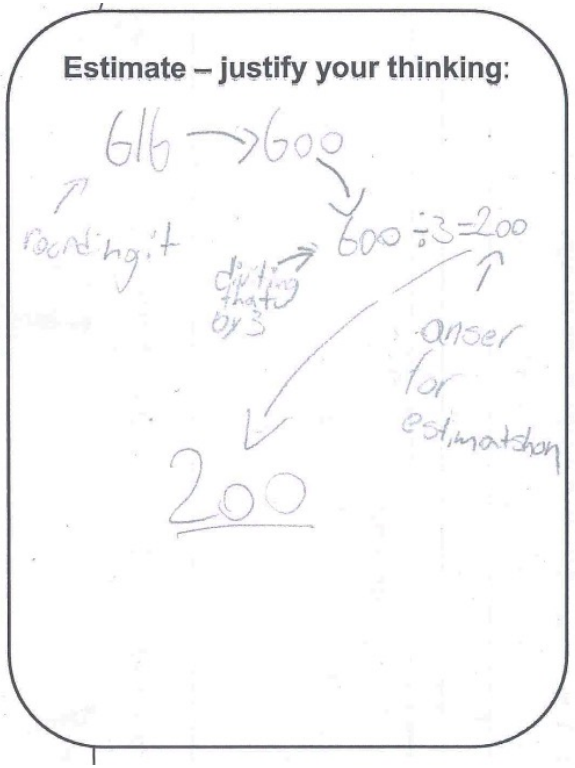


To find a reasonable estimate for division, the most effective strategy is to round the dividend to a multiple of the divisor. The divisor should not be rounded because it changes the quotient too much.

e.g. 339÷6 -→ 360÷6=60 or 300÷6=50 are both reasonable. 300÷10=30 is not.



If a student is rounding in such a way that they still have to apply a full algorithm in order to find a estimate, that shows a lack of understanding and should be scored as a 2. The purpose of rounding is to make the calculation of an estimate easy and quick, not just different.



Estimate – justify your thinking:

643 ÷ 4 =

600 ÷ 4 = 150

Estimate – justify your thinking:

160
4) 640

about 160 ✓

Estimate – justify your thinking:

150
4) 600

160
4) 640

640 ÷ 4 ≈ 160 r3

Real life examples should:
-prove that the student understands that division is the equal sharing of a quantity among a number of groups
-describe a situation that fits with the numbers in the division expression

Write a Real Life Example or Word Problem: I have 643 lego peices and I gave 160 to each of my friends. There are 3 left over (lego peices)

Write a Real Life Example or Word Problem: all the grade fives are going to middle school this year they have 4 options ~~each~~ school ~~x~~ gets equal amout of students if there were 643 grade five student how much students did each school get?

Write a Real Life Example or Word Problem: I had 643 blue baffles I have 4 bags to put them in ≠ need to put 160 barries in each bag.

Write a Real Life Example or Word Problem: Lary had 643 lego bricks and he needs to divide them between his 4 friends. I of each kind of lego strips gets given to a friend and split equally, but there's 3 left over. Each friend got 160 blocks

Write a Real Life Example or Word Problem: There were 643 kids in a school. There was a fire, and there were 4 exits. The principal had to seperate them into 4 diffrent groups. 3 kids went through the door to the roof and later the firefighters found them and got them down.

Write a Real Life Example or Word Problem: I have 616 dollars I gave three of my friends 205 dollars wich is 615 and I have 1 dollar left for my self

Write a Real Life Example or Word Problem: there were 616 doughnuts at the doughnut shop there were 3 groups of people who wanted to get doughnuts how way did each greap get?

Write a Real Life Example or Word Problem: rose planted 3 rows of 616 tulip seeds, how many are in each row? are there remainders? (answer 205 R1)

Reflect:

easy: Explain sketch because I had to explain my pic.
hard: Estimate because it is a bigger number,
goal: to get better at estimating

Reflect:

for "estimate" it was a little Hard to make estimates so it was a bit of a challenge. For "Represent" it was quite easy because all you have to do is draw then explain your sketch. for "calculate" it was also quite easy because i'm quite good w my 3's and I got to use my 3's for this question. for "real life example" it was very easy because all I had to do was think of a scenario where I could have ~~two~~ four of an item

Reflect:

easy: represend was easy because we practiced in school several times.	goal: try harder equations because it was easy.
Hard: word problem was hard because I had to write alot.	

Reflect:

easy: sketching because I usually am pretty good at dividing when drawing straights
hard: estimating cause I could not find a good strotgy.
goal: try other strags when calculating.

Reflect: the easy part was calculating because I know alot of good ways to solve the question and how way real life problem because I had to think of a real life example

Easy: Calculating using the partial quotients method because it was a friendly number to split. Hard: Finding an accurate real life example because it has to display division. Goal: to find multiple estimates.

easy	Reflect: Hard	goal
calculate because I know my facts	explaining my sketch because it's a lot of writing	to write a bit more every time

goal represent	Reflect: calculate	hard real life example
my goal is to draw better because it looks better.	this was easy because short division is easier.	this was hard because there were so many to choose from.