

Dr. Taylor's Pedagogical Notes

— DIVIDING A MIXED NUMBER BY A FRACTION —

How many is $4\frac{2}{3} \div \frac{3}{5}$

THIS IS A COMPILATION OF NUMEROUS PREVIOUS STRATEGIES. TO KEEP THIS AS SHORT AS POSSIBLE I WILL SHOW PROCESS BUT REFER TO STRATEGY USED BY TITLE. YOU MAY "LOOK BACK" AT PREVIOUS NOTES BY TITLE TO GET EXTRA PROCESS NOTES FOR ANY SECTION WHICH CONFOUNDS YOU HERE.

FIRST WE SHALL "DECOMPOSE" THE MIXED NUMBER, THEN DO THE WHOLE PART DIVISION SEPARATE FROM THE FRACTIONAL PART. FINALLY WE SHALL RE-COMBINE THOSE VALUES TO ACHIEVE A FINAL ANSWER ...

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$$4\frac{2}{3} \div \frac{3}{5} \text{ CONTINUED...}$$

STARTING WE DECOMPOSE: $4\frac{2}{3} = 4 + \frac{2}{3}$

I LOOKING AT THE WHOLE PART:



① RIGHT NOW 4 CORRELATES TO $\frac{3}{5}$, BUT I CANNOT USE THAT VERY EASILY... TO HELP I WILL FIND THE "UNIT" FRACTION WHICH COMBINES TO MAKE UP MY $\frac{3}{5}$... BY LOOKING AT MY AREA MODEL ABOVE I CAN SEE IT IS " $\frac{1}{5}$ ".

② SINCE I CUT MY RIGHT SIDE AREA INTO 3rd's I NEED TO CUT MY LEFT INTO 3rd's ALSO...

③ NOW I MATCH MY LEFT AREA BOTTOM SLICE TO CORRELATE IT TO MY " $\frac{1}{5}$ " ON RIGHT...

$$\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{4}{3}$$

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$$4\frac{2}{3} \div \frac{3}{5} \text{ CONTINUED...}$$

④ NOW THAT I HAVE A NEW CORRELATION OF $\frac{4}{3} : \frac{1}{5}$ I NEED TO BRING MY RIGHT SIDE UP TO A "WHOLE", WHICH MEANS:

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{5}{5} = 1 \text{ WHOLE.}$$

THEREFORE I MUST MULTIPLY MY LEFT SIDE BY 5 (OR USE REPEATED ADDITION)

$$\frac{4}{3} + \frac{4}{3} + \frac{4}{3} + \frac{4}{3} + \frac{4}{3} = \frac{20}{3}$$

⑤ NOW I HAVE A USEFUL CORRELATION OF

$$\frac{20}{3} : 1$$

⑥ THIS COMPLETES MY "WHOLE PART" ANALYSIS

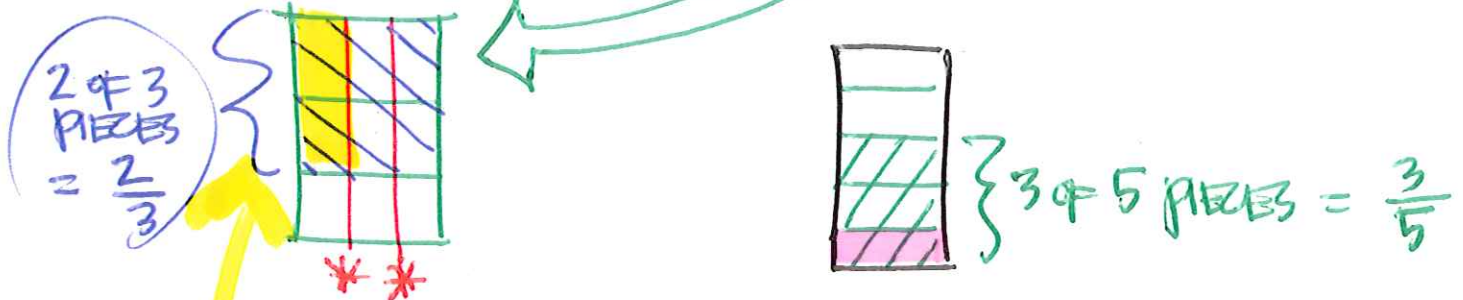
NOTE! YOU CAN FIND MORE
DETAIL ABOUT THIS
PROCESS IN THE —

"DIVIDE WHOLE NUMBER BY FRACTION"

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$$4\frac{2}{3} \div \frac{3}{5} \text{ CONTINUED...}$$

II LOOKING AT THE FRACTIONAL PART:



- ① RIGHT NOW $\frac{2}{3}$ CORRELATES TO $\frac{3}{5}$, BUT AGAIN I WANT A "UNIT FRACTION" WHICH COMBINES TO MAKE UP $\frac{3}{5}$... AND IT IS $\frac{1}{5}$.
- ② SINCE I CUT MY RIGHT SIDE INTO 3rd's, NOW I SHALL CUT MY LEFT SIDE INTO 3rd's ALSO... *
- ③ NOW I CAN SHADE MY NEW PIECE ON RIGHT SIDE AND I GET MY $\frac{1}{5}$ OF $\frac{2}{3}$ WHICH IS " $\frac{2}{9}$ "

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$$4\frac{2}{3} \div \frac{3}{5} \text{ CONTINUED ...}$$

- ④ NOW THAT I HAVE A NEW CORRELATION OF $\frac{2}{9} \div \frac{1}{5}$ I ONCE AGAIN NEED TO BRING MY RIGHT SIDE UP TO A "WHOLE":
- $$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{5}{5} = 1 \text{ WHOLE,}$$
- THEREFORE I MUST SIMILARLY MULTIPLY $\frac{2}{9}$ BY 5 $\rightarrow \frac{2}{9} + \frac{2}{9} + \frac{2}{9} + \frac{2}{9} + \frac{2}{9} = \frac{10}{9}$

- ⑤ NOW I HAVE A USEFUL CORRELATION OF
- $$\frac{10}{9} \div 1$$

- ⑥ THIS COMPLETES MY "FRACTIONAL PART" ANALYSIS. NOW I NEED TO LOOK AT HOW THEY RE-COMBINE TO GET MY FINAL ANSWER.

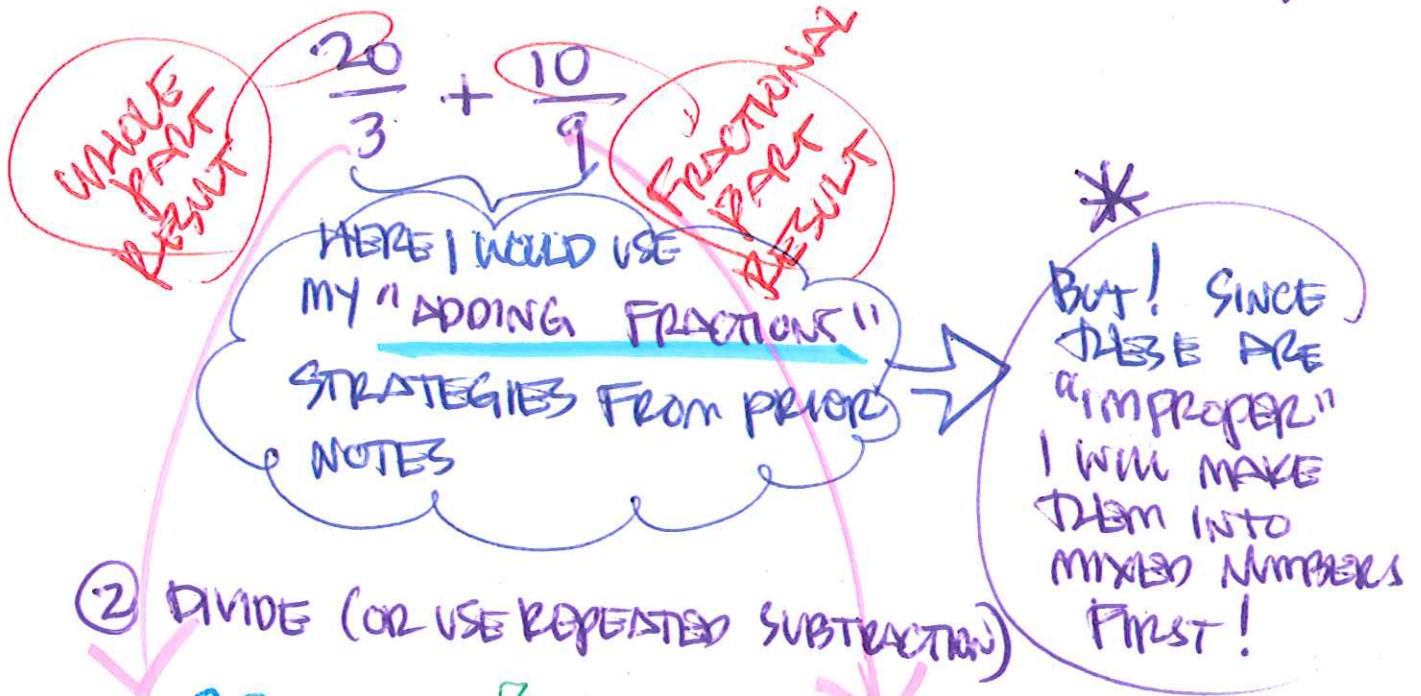
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$$4\frac{2}{3} \div \frac{3}{5} \text{ CONTINUED...}$$

III RECOMPOSING MY USEFUL CORRELATIONS:

① SINCE I HAVE: $\frac{20}{3} \div 1$ AND $\frac{10}{9} \div 1$

I WANT TO PUT $\frac{20}{3}$ TOGETHER WITH $\frac{10}{9}$



② DIVIDE (OR USE REPEATED SUBTRACTION)

$$\begin{aligned} \frac{20}{3} &\rightarrow 20 - 3 = 17 \\ &17 - 3 = 14 \\ &14 - 3 = 11 \\ &11 - 3 = 8 \\ &8 - 3 = 5 \\ &5 - 3 = 2 \end{aligned}$$

$$10 - 9 = 1 \leftarrow \text{REMAINDER}$$

THEREFORE
" $1\frac{1}{9}$ "

I WAS ABLE
TO REMOVE
6 OF THE "3'S"

$$6\frac{2}{3} + 1\frac{1}{9}$$

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IV COMBINING MY ANSWERS INTO ONE :

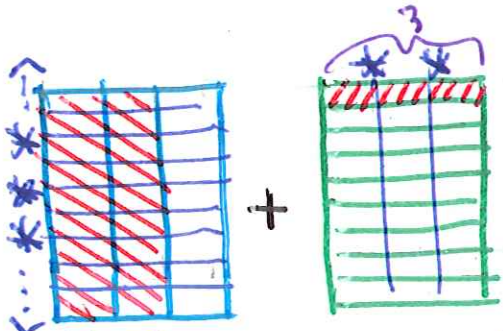
$$\underline{6\frac{2}{3}} + 1\frac{1}{9} = \text{FINAL ANSWER}$$

① EASILY WE CAN ADD THE WHOLE PARTS HERE (BASICALLY WE ARE DECONSTRUCTING TO RECONSTRUCT)

$$\underline{6} + \underline{1} = 7 + \frac{7}{9}$$

② HOWEVER WE WILL NOW USE OUR "ADDING FRACTIONS" STRATEGIES

TO DO THE FOLLOWING: $\frac{2}{3} + \frac{1}{9}$



- DRAW BOX FOR EACH
- HATCH FOR NUMERATOR
- TRANSFER PARTITIONS *
- COUNT HATCHED SQUARES
- CALCULATE DENOMINATOR (R x C)
- SIMPLIFY IF NEEDED

Common Factor

18

$$18 + 3 = 21$$

$$9 \times 3 = 27$$

$$\frac{21}{27} \begin{array}{l} \div 3 \\ \div 3 \end{array} = \frac{7}{9}$$

FINAL ANSWER:

$$\boxed{7\frac{7}{9}}$$