

Dr. Taylor's Pedagogical Notes

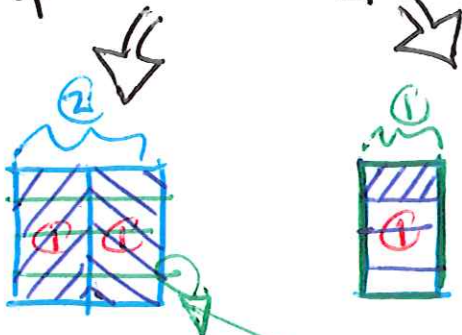
MULTIPLYING A MIXED NUMBER

BY A FRACTION

How many is: $2\frac{1}{4} \times \frac{1}{2}$

① WE SHALL APPROACH THIS IN TWO WAYS... THE "AREA" MODEL, AND USING STRIP DIAGRAMS. LET'S LOOK AT THE AREA MODEL FIRST.

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



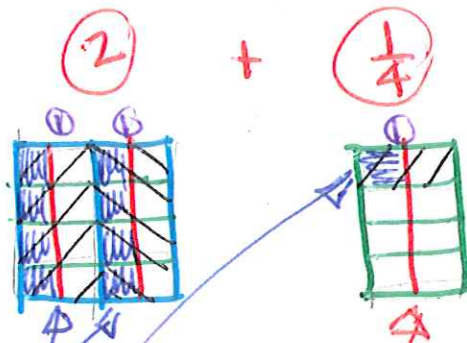
② HERE WE CAN NOW SEE "2" REPRESENTED ON THE LEFT, & " $\frac{1}{4}$ " REPRESENTED ON THE RIGHT. THE "HATCHES" SHOW "HOW MUCH" WE ACTUALLY HAVE.

③ SINCE I HAD TO BREAK THE "RIGHT" BOX INTO 4 PARTS... LET'S DO THAT TO BOTH UNITS OF THE "2" ON LEFT.

④ NOW WE HAVE "COMMON" FRAME OF REFERENCE, WE CAN THINK ABOUT FINDING " $\frac{1}{2}$ " OF EACH PART (LEFT & RIGHT)

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$2\frac{1}{4} \times \frac{1}{2}$ CONTINUED...



⑤ TAKING $\frac{1}{2}$ OF THE LEFT BOX IS EASY TO SEE AND DO... BUT!

... NOT ON THE RIGHT BOX. WE THEREFORE NEED TO "CUT" THE RIGHT BOX IN HALF! BUT IF WE

DO WE MUST CUT EACH OF THE "UNIT" BOXES IN HALF FOR OUR ANALYSIS.

LEFT BOX:

NUM: 8

RIGHT BOX:

NUM: 1

⑥ NOW WE CAN SHADE IN HALF OF THE "HATCHED" SQUARES, LEAVING BEHIND, AS UNSHADED, THE REMAINING HATCHED BOXES

UNIT BOX:

DEN: 8



$$\frac{8}{8} + \frac{1}{8}$$

⑦ COUNTING THE SQUARES ON THE LEFT GIVES US A "NUMERATOR" COUNTING. THE NUMBER OF SQUARES IN A "UNIT" BOX GIVES US A "DENOMINATOR"

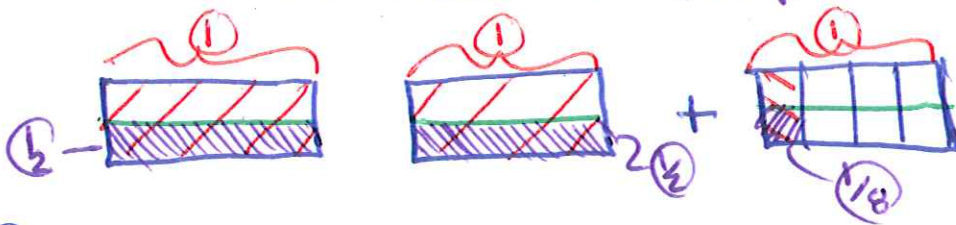
$$1\frac{1}{8} \text{ or } \frac{9}{8}$$

FINAL ANSWER: $1\frac{1}{8}$

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$$2\frac{1}{4} \times \frac{1}{2} \text{ CONTINUED ...}$$

⑧ USING THE "STRIP DIAGRAM" MODEL LET'S CONFIRM OUR FINAL ANSWER FROM OUR "AREA MODEL" METHOD



⑨ CAN YOU SEE THE TECHNIQUE IS BASICALLY THE SAME? LET'S CONTINUE BY CUTTING STRIPS IN HALF.

⑩ NOW WE CAN SHADE IN THE "HALVES" AND COUNT THEM UP...

$$\frac{1}{2} + \frac{1}{2} + \frac{1}{8} = 1 + \frac{1}{8} = 1\frac{1}{8}$$

⑪ "DOUBLING HALVES" GIVES US A WHOLE, THEN WE ADD THE FRACTIONAL PART ON. THE END.

FINAL ANSWER:

$$1\frac{1}{8}$$