




# Dividing Fractions

Find the answers to the following division questions

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1)   $\div$


2)   $\div$


3)   $\div$

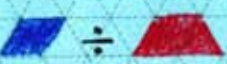
A 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20


Teacher notes: Ask students to find answers to the division questions. Give students a few minutes to work - even if puzzled. A hint to give: What's the answer to  $20 \div 5$ ? Ans=4. Ask them why. The 5 "fits into" the 20 four times. Once cued with the "fits into" idea, tell them to find the solutions to the picture problems.

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4)   $\div$

5)   $\div$

6)   $\div$

7)   $\div$



A 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



Teacher notes: On this page, the key point is to make sure the students understand the answers based on the visual images. You are trying to make them feel 100% confident in the solutions. This will help to reinforce their confidence in the division rule which is being established.



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1)  ÷  = 3

2)  ÷  = 2



3)  ÷  = 3



3 of the  fit into the red piece



2 of the  fit into the blue piece



3 of the  fit into the yellow piece

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4)  ÷  =  $\frac{1}{2}$


5)  ÷  =  $\frac{1}{2}$



6)  ÷  =  $\frac{2}{3}$


7)  ÷  =  $4\frac{1}{2}$

1 whole blue piece and another half of it fit into the red



Only  $\frac{1}{2}$  of the  is needed to cover the green piece

If you cut the  into 3 parts, 2 of them fit into the blue 

4 whole  and another half of one fit into the yellow/red.





Teacher notes: Here we start to revisit the fraction notation (based on yellow hexagon = 1 whole). Be sure to change mixed fractions to improper form as this helps them "see things" in the next step.



Also reinforce why answers are  $<$  or  $>$  than 1.



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2)   $\div$   = 2  
 $\frac{1}{3} \div \frac{1}{6}$



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



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4)   $\div$   =  $1\frac{1}{2}$  or  $\frac{3}{2}$   
 $\frac{1}{2} \div \frac{1}{3}$


5)   $\div$   =  $\frac{1}{2}$   
 $\frac{1}{6} \div \frac{1}{3}$



6)   $\div$   =  $\frac{2}{3}$   
 $\frac{1}{3} \div \frac{1}{2}$


7)   $\div$   =  $4\frac{1}{2}$  or  $\frac{9}{2}$   
 $1\frac{1}{2} \div \frac{1}{3}$

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$$1\frac{1}{2} \div \frac{1}{3}$$

$$\text{or } \frac{3}{2} \div \frac{1}{3}$$





Teacher notes: You want students to notice that the right hand denominator "ends up on top" to get to the final answers established via the concrete pieces. A hint would be to draw their attention to the bottom right denom.



## Dividing Fractions



Big piece  $\div$  smaller piece    ans  $> 1$   
 smaller piece  $\div$  bigger piece    ans  $< 1$   
 ( $0 < \text{ans} < 1$ )


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4)   $\div$   =  $1\frac{1}{2}$  or  $2\frac{3}{2}$   
 $\frac{1}{2} \div \frac{1}{3}$


5)   $\div$   =  $\frac{1}{2}$   
 $\frac{1}{6} \div \frac{1}{3}$



6)   $\div$   =  $\frac{2}{3}$   
 $\frac{1}{3} \div \frac{1}{2}$


7)   $\div$   =  $4\frac{1}{2}$  or  $9\frac{1}{2}$   
 $1 \div \frac{1}{3}$

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$$\frac{1}{2} \div \frac{1}{3}$$

$$\text{or } \frac{3}{2} \div \frac{1}{3}$$





Teacher notes: Now show them that a consistent rule works for all 7 questions to go from the fractions to the solutions they know to be true from the concrete pieces.



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 ( $0 < \text{ans} < 1$ )


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1)   $\div$   = 3  
 $\frac{1}{2} \div \frac{1}{6}$   
 $\frac{1}{2} \times \frac{6}{1}$

2)   $\div$   = 2  
 $\frac{1}{3} \div \frac{1}{6}$   
 $\frac{1}{3} \times \frac{6}{1}$



3)   $\div$   = 3  
 $1 \div \frac{1}{3}$   
 $1 \times \frac{3}{1}$



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 $\frac{1}{2} \times \frac{3}{1}$


5)   $\div$   =  $\frac{1}{2}$   
 $\frac{1}{6} \div \frac{1}{3}$   
 $\frac{1}{6} \times \frac{3}{1}$



6)   $\div$   =  $\frac{2}{3}$   
 $\frac{1}{3} \div \frac{1}{2}$   
 $\frac{1}{3} \times \frac{2}{1}$


7)   $\div$   =  $4\frac{1}{2}$  or  $\frac{9}{2}$   
 $1 \div \frac{1}{2}$   
 $1 \times \frac{2}{1}$

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$\frac{1}{2} \div \frac{1}{3}$   
 or  $\frac{3}{2} \div \frac{1}{3}$   
 $\frac{3}{2} \times \frac{3}{1}$



Teacher note: Now that students have either constructed/derived the algorithm or that at the least they see a concrete verification that the rule works, we can "give them" the rule and go through examples of its application.

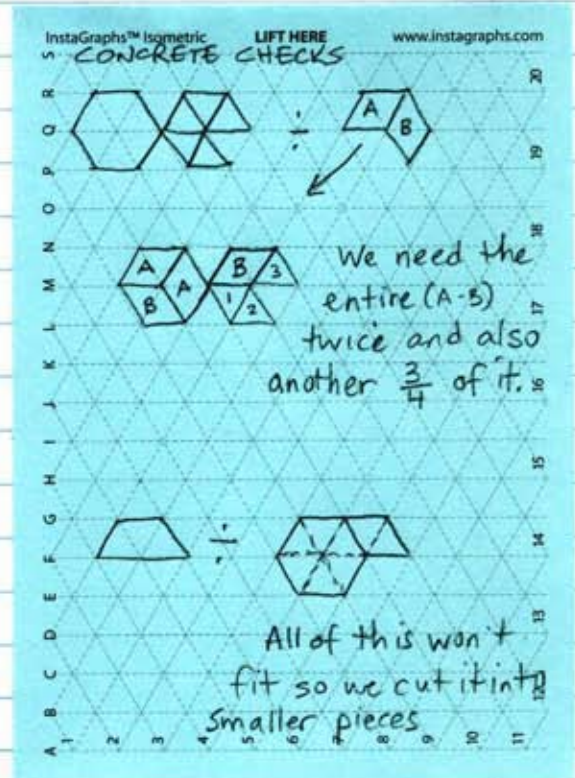
When dividing fractions, what does the rule appear to be?

Invert the second fraction and change  $\div$  to multiplication

Example 1:

$$1\frac{5}{6} \div \frac{2}{3} \quad (\text{answer should be } > 1)$$

$$\frac{11}{6} \times \frac{3}{2} = \frac{11}{4} \text{ or } 2\frac{3}{4}$$



Example 2:

$$\frac{1}{2} \div 1\frac{1}{3} \quad (\text{answer should be } < 1)$$

we need invert this fraction  $\rightarrow$  convert first!

$$\frac{1}{2} \div \frac{4}{3}$$

$$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$

3 of the 8 pieces are needed.

Example 3:

$$2\frac{3}{4} \div 1\frac{5}{6}$$

① convert to improper fractions

$$\frac{11}{4} \div \frac{11}{6}$$

② invert the second fraction and change to  $\times$

$$\frac{11}{4} \times \frac{6}{11} = \frac{3}{2} \text{ or } 1\frac{1}{2}$$

③ multiply