

Explain why dividing by a fraction inverts and multiplies

NAME	DATE	SCORE / 10
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- 1** Why is $\frac{1}{2} \div \frac{6}{7}$ equal to $\frac{1}{2} \times \frac{7}{6}$?
- ☐ $\frac{1}{2} \times \frac{7}{6}$, multiplied by $\frac{7}{6}$, gives back $\frac{1}{2}$, so it is the quotient.
- ☐ $\frac{1}{2} \times \frac{7}{6}$, multiplied by $\frac{6}{7}$, gives back $\frac{1}{2}$, so it is the quotient.
- ☐ $\frac{6}{7}$ of $\frac{1}{2}$ is the same as $\frac{1}{2} \times \frac{7}{6}$.
- ☐ Flipping the first fraction gives the same value: $\frac{2}{1} \times \frac{6}{7}$.

- 2** Each bar below is 1 whole, cut into 3 equal parts. Find $4 \div \frac{2}{3}$ by counting the groups of $\frac{2}{3}$ in the bars.

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3

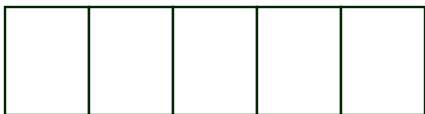
Explain why $2 \div \frac{2}{3}$ gives the same answer as $2 \times \frac{3}{2}$. Use a picture or what dividing means.

4

Why is $4 \div \frac{2}{3}$ equal to $4 \times \frac{3}{2}$?

- ☐ Dividing by $\frac{2}{3}$ is the same as multiplying by $\frac{2}{3}$.
- ☐ 4 wholes hold 12 parts of size $\frac{1}{3}$, and each group of $\frac{2}{3}$ uses 3 of those parts.
- ☐ Taking $\frac{2}{3}$ of 4 is the same as multiplying 4 by $\frac{3}{2}$.
- ☐ 4 wholes hold 12 parts of size $\frac{1}{3}$, and each group of $\frac{2}{3}$ uses 2 of those parts.

- 5** Each bar below is 1 whole, cut into 5 equal parts. Find $4 \div \frac{1}{5}$ by counting the groups of $\frac{1}{5}$ in the bars.



- 6** Explain why $4 \div \frac{2}{3}$ gives the same answer as $4 \times \frac{3}{2}$. Use a picture or what dividing means.

7

Why is $5 \div \frac{1}{4}$ equal to 5×4 ?

- ☐ Taking $\frac{1}{4}$ of 5 is the same as multiplying 5 by 4.
- ☐ Each whole holds 4 parts of size $\frac{1}{4}$, so 5 wholes hold $5 + 4$ parts.
- ☐ Dividing by $\frac{1}{4}$ is the same as dividing by 4.
- ☐ Each whole holds 4 parts of size $\frac{1}{4}$, so 5 wholes hold 5×4 parts.

8

Each bar below is 1 whole, cut into 2 equal parts. Find $2 \div \frac{1}{2}$ by counting the groups of $\frac{1}{2}$ in the bars.



9

Why is $\frac{1}{3} \div \frac{2}{7}$ equal to $\frac{1}{3} \times \frac{7}{2}$?

- ☐ $\frac{1}{3} \times \frac{7}{2}$, multiplied by $\frac{2}{7}$, gives back $\frac{1}{3}$, so it is the quotient.
- ☐ $\frac{1}{3} \times \frac{7}{2}$, multiplied by $\frac{7}{2}$, gives back $\frac{1}{3}$, so it is the quotient.
- ☐ $\frac{2}{7}$ of $\frac{1}{3}$ is the same as $\frac{1}{3} \times \frac{7}{2}$.
- ☐ Flipping the first fraction gives the same value: $\frac{3}{1} \times \frac{2}{7}$.

10 Why is $3 \div \frac{1}{2}$ equal to 3×2 ?

- ☐ Each whole holds 2 parts of size $\frac{1}{2}$, so 3 wholes hold $3 + 2$ parts.
- ☐ Each whole holds 2 parts of size $\frac{1}{2}$, so 3 wholes hold 3×2 parts.
- ☐ Taking $\frac{1}{2}$ of 3 is the same as multiplying 3 by 2.
- ☐ Dividing by $\frac{1}{2}$ is the same as dividing by 2.

Explain why dividing by a fraction inverts and multiplies

1	$1/2 \times 7/6$, multiplied by $6/7$, gives back $1/2$, so it is the quotient.	2	6
4	4 wholes hold 12 parts of size $1/3$, and each group of $2/3$ uses 2 of those parts.	5	20
7	Each whole holds 4 parts of size $1/4$, so 5 wholes hold 5×4 parts.	8	4
9	$1/3 \times 7/2$, multiplied by $2/7$, gives back $1/3$, so it is the quotient.	10	Each whole holds 2 parts of size $1/2$, so 3 wholes hold 3×2 parts.

3 A written explanation

A model answer: $2 \div 2/3$ asks how many groups of $2/3$ fit in 2. Each whole holds 3 parts of size $1/3$, so 2 wholes hold $2 \times 3 = 6$ parts. Each group of $2/3$ uses 2 of those parts, so there are $6 \div 2 = 3$ groups. Multiplying by 3 and then dividing by 2 is the same as multiplying by $3/2$, so $2 \div 2/3 = 2 \times 3/2 = 3$.

What counts as right: Counts as right if it makes these points: (1) $2 \div 2/3$ asks how many $2/3$ fit in 2; (2) 2 wholes hold 2×3 parts of size $1/3$; (3) each group uses 2 of the parts, so the number of groups is $2 \times 3 \div 2$, which is $2 \times 3/2$.

Working out both sides and showing they are both 3, with no reason, does not count.

6

A written explanation

A model answer: $4 \div \frac{2}{3}$ asks how many groups of $\frac{2}{3}$ fit in 4. Each whole holds 3 parts of size $\frac{1}{3}$, so 4 wholes hold $4 \times 3 = 12$ parts. Each group of $\frac{2}{3}$ uses 2 of those parts, so there are $12 \div 2 = 6$ groups. Multiplying by 3 and then dividing by 2 is the same as multiplying by $\frac{3}{2}$, so $4 \div \frac{2}{3} = 4 \times \frac{3}{2} = 6$.

What counts as right: Counts as right if it makes these points: (1) $4 \div \frac{2}{3}$ asks how many $\frac{2}{3}$ fit in 4; (2) 4 wholes hold 4×3 parts of size $\frac{1}{3}$; (3) each group uses 2 of the parts, so the number of groups is $4 \times 3 \div 2$, which is $4 \times \frac{3}{2}$. Working out both sides and showing they are both 6, with no reason, does not count.