

Explain why dividing by a fraction inverts and multiplies

NAME	DATE	SCORE / 10
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1

Why is $6 \div \frac{1}{7}$ equal to 6×7 ?

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Each whole holds 7 parts of size $\frac{1}{7}$, so 6 wholes hold 6×7 parts.

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Each whole holds 7 parts of size $\frac{1}{7}$, so 6 wholes hold $6 + 7$ parts.☐☐

2

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.

Explain why dividing by a fraction inverts and multiplies · Grade 6

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3

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

4

Why is $4 \div \frac{5}{6}$ equal to $4 \times \frac{6}{5}$?

- ☐ Taking $\frac{5}{6}$ of 4 is the same as multiplying 4 by $\frac{6}{5}$.
- ☐ 4 wholes hold 24 parts of size $\frac{1}{6}$, and each group of $\frac{5}{6}$ uses 6 of those parts.
- ☐ Dividing by $\frac{5}{6}$ is the same as multiplying by $\frac{5}{6}$.
- ☐ 4 wholes hold 24 parts of size $\frac{1}{6}$, and each group of $\frac{5}{6}$ uses 5 of those parts.

5

Each bar below is 1 whole, cut into 5 equal parts. Find $2 \div \frac{1}{5}$ by counting the groups of $\frac{1}{5}$ in the bars.

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6

Explain why $4 \div \frac{2}{5}$ gives the same answer as $4 \times \frac{5}{2}$. Use a picture or what dividing means.

7

Why is $\frac{3}{8} \div \frac{1}{2}$ equal to $\frac{3}{8} \times \frac{2}{1}$?

- ☐ $\frac{3}{8} \times \frac{2}{1}$, multiplied by $\frac{2}{1}$, gives back $\frac{3}{8}$, so it is the quotient.
- ☐ Flipping the first fraction gives the same value: $\frac{8}{3} \times \frac{1}{2}$.
- ☐ $\frac{1}{2}$ of $\frac{3}{8}$ is the same as $\frac{3}{8} \times \frac{2}{1}$.
- ☐ $\frac{3}{8} \times \frac{2}{1}$, multiplied by $\frac{1}{2}$, gives back $\frac{3}{8}$, so it is the quotient.

- 8** 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.

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- 9** Why is $3 \div \frac{1}{5}$ equal to 3×5 ?

- ☐ Taking $\frac{1}{5}$ of 3 is the same as multiplying 3 by 5.
- ☐ Each whole holds 5 parts of size $\frac{1}{5}$, so 3 wholes hold 3 + 5 parts.
- ☐ Each whole holds 5 parts of size $\frac{1}{5}$, so 3 wholes hold 3×5 parts.
- ☐ Dividing by $\frac{1}{5}$ is the same as dividing by 5.

- 10** Why is $3 \div \frac{7}{8}$ equal to $3 \times \frac{8}{7}$?

- ☐ Dividing by $\frac{7}{8}$ is the same as multiplying by $\frac{7}{8}$.
- ☐ 3 wholes hold 24 parts of size $\frac{1}{8}$, and each group of $\frac{7}{8}$ uses 8 of those parts.
- ☐ 3 wholes hold 24 parts of size $\frac{1}{8}$, and each group of $\frac{7}{8}$ uses 7 of those parts.
- ☐ Taking $\frac{7}{8}$ of 3 is the same as multiplying 3 by $\frac{8}{7}$.

Explain why dividing by a fraction inverts and multiplies

1 Each whole holds 7 parts of size $\frac{1}{7}$, so 6 wholes hold 6×7 parts.

2 4

4 4 wholes hold 24 parts of size $\frac{1}{6}$, and each group of $\frac{5}{6}$ uses 5 of those parts.

5 10

7 $\frac{3}{8} \times \frac{2}{1}$, multiplied by $\frac{1}{2}$, gives back $\frac{3}{8}$, so it is the quotient.

8 20

9 Each whole holds 5 parts of size $\frac{1}{5}$, so 3 wholes hold 3×5 parts.

10 3 wholes hold 24 parts of size $\frac{1}{8}$, and each group of $\frac{7}{8}$ uses 7 of those parts.

3

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.

6

A written explanation

A model answer: $4 \div \frac{2}{5}$ asks how many groups of $\frac{2}{5}$ fit in 4. Each whole holds 5 parts of size $\frac{1}{5}$, so 4 wholes hold $4 \times 5 = 20$ parts. Each group of $\frac{2}{5}$ uses 2 of those parts, so there are $20 \div 2 = 10$ groups. Multiplying by 5 and then dividing by 2 is the same as multiplying by $\frac{5}{2}$, so $4 \div \frac{2}{5} = 4 \times \frac{5}{2} = 10$.

What counts as right: Counts as right if it makes these points: (1) $4 \div \frac{2}{5}$ asks how many $\frac{2}{5}$ fit in 4; (2) 4 wholes hold 4×5 parts of size $\frac{1}{5}$; (3) each group uses 2 of the parts, so the number of groups is $4 \times 5 \div 2$, which is $4 \times \frac{5}{2}$.

Working out both sides and showing they are both 10, with no reason, does not count.