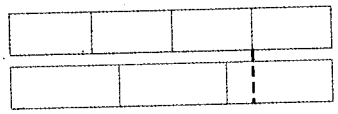
Show You Know

If one serving is $\frac{1}{6}$ of a tray of lasagna, how many servings are

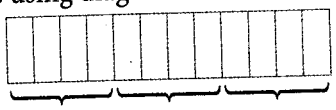
Connect and Reflect

Key Ideas

- You can estimate and determine the quotient of two fractions using diagrams.



$\frac{3}{4} \div \frac{1}{3}$ is between 2 and 3.



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

- You can estimate the quotient of two improper fractions or mixed numbers by dividing the whole numbers closest to them.

$$5\frac{1}{4} \div 3\frac{1}{2} \approx 5 \div 4$$
$$\approx \frac{5}{4} \text{ or } 1\frac{1}{4}$$

- To divide two fractions, you can write them with a common denominator and divide the numerators.

$$\frac{7}{10} \div \frac{3}{5} = \frac{7}{10} \div \frac{6}{10}$$
$$= \frac{7}{6} \text{ or } 1\frac{1}{6}$$

$$1\frac{3}{4} \div 2\frac{1}{2} = \frac{7}{4} \div \frac{5}{2}$$
$$= \frac{7}{4} \div \frac{10}{4}$$
$$= \frac{7}{10}$$

- To divide by a fraction, you can multiply by its reciprocal.

$$\frac{7}{10} \div \frac{3}{5} = \frac{7}{10} \times \frac{5}{3}$$
$$= \frac{35}{30}$$
$$= \frac{7}{6} \text{ or } 1\frac{1}{6}$$

$$1\frac{3}{4} \div 2\frac{1}{2} = \frac{7}{4} \div \frac{5}{2}$$
$$= \frac{7}{4} \times \frac{2}{5}$$
$$= \frac{14}{20}$$
$$= \frac{7}{10}$$

Practise

For help with #1 and #2, see Example 1 on page 157.

1. Determine each quotient using diagrams.

a) $\frac{5}{8} \div \frac{1}{4}$ **b)** $\frac{1}{4} \div \frac{1}{3}$

c) $1\frac{1}{2} \div \frac{2}{3}$ **d)** $2\frac{1}{3} \div \frac{5}{6}$

2. Use diagrams to determine each quotient.

a) $\frac{9}{10} \div \frac{1}{5}$ **b)** $\frac{1}{4} \div \frac{3}{8}$

c) $1\frac{2}{3} \div \frac{1}{2}$ **d)** $2\frac{3}{4} \div \frac{2}{3}$

For help with #3 to #5, see Example 3 on pages 159–160.

3. Divide using a common denominator.

a) $\frac{3}{5} \div \frac{9}{10}$ **b)** $1\frac{1}{2} \div \frac{5}{6}$

c) $3\frac{1}{3} \div 1\frac{5}{6}$ **d)** $1\frac{3}{8} \div 2\frac{3}{4}$

4. Divide using multiplication.

a) $\frac{5}{12} \div \frac{3}{4}$ **b)** $4\frac{1}{2} \div 1\frac{1}{4}$

c) $10 \div 2\frac{1}{2}$ **d)** $\frac{8}{11} \div \frac{4}{5}$

5. Divide.

a) $\frac{3}{4} \div \frac{4}{5}$

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

c) $12 \div 2\frac{3}{4}$

d) $1\frac{1}{12} \div 2\frac{1}{2}$

6. a) How could you determine how many $\frac{1}{4}$s there are in 2?

b) How would you show the solution using a number line?

7. a) How could you determine the number of $\frac{1}{6}$s in $\frac{2}{3}$?

b) Would you expect the number of $\frac{1}{6}$s in $\frac{2}{3}$ to be less than, greater than, or equal to 1? Why?

Apply

For help with #8 and #9, refer to Example 4 on pages 160–161.

8. In a comedy review, each performer has a $\frac{1}{4}$-h slot.

a) How many performers are there in a 2-h show?

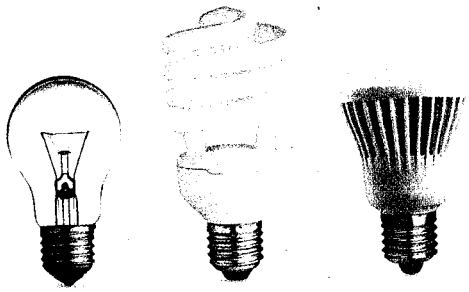
b) How would you explain your solution to a classmate who missed the dividing lesson?

9. It takes $2\frac{1}{2}$ scoops of flour to make 10 servings of bannock. How many servings of bannock can you make with 15 scoops of flour? Use two different methods to solve.

10. An incandescent light bulb uses about $4\frac{1}{2}$ times as much energy as a compact fluorescent light bulb to produce the same amount of light.

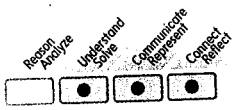
a) What fraction of the energy used by the incandescent bulb does the fluorescent light bulb use?

b) An LED bulb uses approximately $\frac{1}{2}$ as much energy as a compact fluorescent light bulb. How much less energy does an LED bulb use compared to an incandescent bulb?



11. Two students are solving this question: "Of all the land on Earth, about $\frac{3}{10}$ is in Asia and about $\frac{3}{25}$ is in South America. How many times as big as South America is Asia?" One student says the answer is $\frac{3}{10} \div \frac{3}{25}$. The other student says the answer is $\frac{3}{25} \div \frac{3}{10}$. Who is correct, and what is the answer? Explain your thinking.

12. **Competency Check** Use examples to explain your answer to each of the following.



a) Can the reciprocal of a proper fraction be a proper fraction?

b) Can the product of two proper fractions be greater than 1?

c) Can the quotient of two proper fractions be greater than 1?

13. The world's longest river is the Nile in Africa, with a length of 6825 km. This is about $1\frac{5}{8}$ times as long as the Mackenzie River, which is Canada's longest river.

a) How long is the Mackenzie River?

b) The Mackenzie River is about $2\frac{1}{10}$ times as long as the Columbia River. How long is the Columbia River?

14. Suppose a friend knows how to divide by whole numbers, but not by fractions.

a) How could you use the following pattern to show your friend how to calculate $4 \div \frac{1}{2}$?

$4 \div 8 = \frac{1}{2}$

$4 \div 4 = 1$

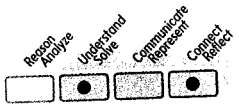
$4 \div 2 = 2$

$4 \div 1 = 4$

$4 \div \frac{1}{2} = \blacksquare$

b) Make up a pattern to show your friend how to calculate $9 \div \frac{1}{3}$.

15. Write a word problem that you can solve using the expression $3\frac{3}{4} \div 2\frac{1}{4}$.



Extend

16. It took Svend $9\frac{3}{4}$ min to ski up a slope on a cross-country ski trail and only $2\frac{1}{4}$ min to ski back down the same slope. How many times faster did he ski down the slope as he skied up it?

17. The three largest islands in Canada are all north of the Arctic Circle. Baffin Island has about $2\frac{1}{3}$ times the area of Victoria Island. Baffin Island has about $2\frac{3}{5}$ times the area of Ellesmere Island. What fraction of the area of Victoria Island is the area of Ellesmere Island?