

Name \_\_\_\_\_

Date \_\_\_\_\_

## 7.4 Dividing fractions — worked answers

Divide fractions by whole numbers and by fractions, using the reciprocal. · 46 questions

### A · Fluency — Divide by whole numbers and fractions.

1 Work out  $\frac{1}{2} \div 2$

**Answer:  $\frac{1}{4}$**

Dividing by 2 is multiplying by  $\frac{1}{2}$ :  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ .

2 Work out  $\frac{3}{4} \div 3$

**Answer:  $\frac{1}{4}$**

Dividing by 3 is multiplying by  $\frac{1}{3}$ :  $\frac{3}{4} \times \frac{1}{3} = \frac{3}{12} = \frac{1}{4}$ .

3 Work out  $\frac{2}{3} \div 4$

**Answer:  $\frac{1}{6}$**

Dividing by 4 is multiplying by  $\frac{1}{4}$ :  $\frac{2}{3} \times \frac{1}{4} = \frac{2}{12} = \frac{1}{6}$ .

4 Work out  $\frac{5}{6} \div 5$

**Answer:  $\frac{1}{6}$**

Dividing by 5 is multiplying by  $\frac{1}{5}$ :  $\frac{5}{6} \times \frac{1}{5} = \frac{5}{30} = \frac{1}{6}$ .

5 Work out  $\frac{4}{5} \div 2$

**Answer:  $\frac{2}{5}$**

Dividing by 2 is multiplying by  $\frac{1}{2}$ :  $\frac{4}{5} \times \frac{1}{2} = \frac{4}{10} = \frac{2}{5}$ .

6 Work out  $\frac{7}{8} \div 7$

**Answer:  $\frac{1}{8}$**

Dividing by 7 is multiplying by  $\frac{1}{7}$ :  $\frac{7}{8} \times \frac{1}{7} = \frac{7}{56} = \frac{1}{8}$ .

7 Work out  $\frac{6}{7} \div 3$

**Answer:  $\frac{2}{7}$**

Dividing by 3 is multiplying by  $\frac{1}{3}$ :  $\frac{6}{7} \times \frac{1}{3} = \frac{6}{21} = \frac{2}{7}$ .

8 Work out  $\frac{9}{10} \div 3$

**Answer:  $\frac{3}{10}$**

Dividing by 3 is multiplying by  $\frac{1}{3}$ :  $\frac{9}{10} \times \frac{1}{3} = \frac{9}{30} = \frac{3}{10}$ .

9 Work out  $6 \div \frac{1}{2}$

**Answer: 12**

Dividing by  $\frac{1}{2}$  is multiplying by its reciprocal  $\frac{2}{1}$ :  $6 \times \frac{2}{1} = 12$ .

10 Work out  $4 \div \frac{1}{3}$

**Answer: 12**

Dividing by  $\frac{1}{3}$  is multiplying by its reciprocal  $\frac{3}{1}$ :  $4 \times \frac{3}{1} = 12$ .

**11** Work out  $10 \div \frac{1}{5}$

**Answer: 50**

Dividing by  $\frac{1}{5}$  is multiplying by its reciprocal  $\frac{5}{1}$ :  $10 \times \frac{5}{1} = 50$ .

**12** Work out  $3 \div \frac{1}{4}$

**Answer: 12**

Dividing by  $\frac{1}{4}$  is multiplying by its reciprocal  $\frac{4}{1}$ :  $3 \times \frac{4}{1} = 12$ .

**13** Work out  $8 \div \frac{2}{3}$

**Answer: 12**

Dividing by  $\frac{2}{3}$  is multiplying by its reciprocal  $\frac{3}{2}$ :  $8 \times \frac{3}{2} = 12$ .

**14** Work out  $5 \div \frac{3}{4}$

**Answer:  $\frac{20}{3}$**

Dividing by  $\frac{3}{4}$  is multiplying by its reciprocal  $\frac{4}{3}$ :  $5 \times \frac{4}{3} = \frac{20}{3}$ .

**15** Work out  $12 \div \frac{3}{5}$

**Answer: 20**

Dividing by  $\frac{3}{5}$  is multiplying by its reciprocal  $\frac{5}{3}$ :  $12 \times \frac{5}{3} = 20$ .

**16** Work out  $9 \div \frac{2}{7}$

**Answer:  $\frac{63}{2}$**

Dividing by  $\frac{2}{7}$  is multiplying by its reciprocal  $\frac{7}{2}$ :  $9 \times \frac{7}{2} = \frac{63}{2}$ .

**17** Work out  $\frac{1}{2} \div \frac{1}{4}$

**Answer: 2**

Turn the second fraction upside down and multiply:  $\frac{1}{2} \times \frac{4}{1} = 2$ .

**18** Work out  $\frac{3}{4} \div \frac{1}{2}$

**Answer:  $\frac{3}{2}$**

Turn the second fraction upside down and multiply:  $\frac{3}{4} \times \frac{2}{1} = \frac{3}{2}$ .

**19** Work out  $\frac{2}{3} \div \frac{1}{6}$

**Answer: 4**

Turn the second fraction upside down and multiply:  $\frac{2}{3} \times \frac{6}{1} = 4$ .

**20** Work out  $\frac{5}{6} \div \frac{2}{3}$

**Answer:  $\frac{5}{4}$**

Turn the second fraction upside down and multiply:  $\frac{5}{6} \times \frac{3}{2} = \frac{5}{4}$ .

**21** Work out  $\frac{4}{5} \div \frac{2}{5}$

**Answer: 2**

Turn the second fraction upside down and multiply:  $\frac{4}{5} \times \frac{5}{2} = 2$ .

**22** Work out  $\frac{3}{8} \div \frac{3}{4}$

**Answer:  $\frac{1}{2}$**

Turn the second fraction upside down and multiply:  $\frac{3}{8} \times \frac{4}{3} = \frac{1}{2}$ .

**23** Work out  $\frac{7}{9} \div \frac{7}{3}$

**Answer:  $\frac{1}{3}$**

Turn the second fraction upside down and multiply:  $\frac{7}{9} \times \frac{3}{7} = \frac{1}{3}$ .

- 24 Work out  $5 \div 6$

**Answer: 1/2**

Turn the second fraction upside down and multiply:  $5/12 \times 6/5 = 1/2$ .

### B · Reasoning — Reciprocals and why answers grow.

- 25 What is the reciprocal of  $3/5$ ?

- ☐  $3/5$
- ☐  $5/3$
- ☐  $-3/5$
- ☐  $1/5$

**Answer: 5/3**

Turn it upside down. A number times its reciprocal is 1:  $3/5 \times 5/3 = 15/15 = 1$ .

- 26 Dividing by a fraction is the same as ...

- ☐ multiplying by it
- ☐ multiplying by its reciprocal
- ☐ subtracting it
- ☐ adding its reciprocal

**Answer: multiplying by its reciprocal**

That is the whole method: keep the first, flip the second, multiply.

- 27 Why is  $6 \div 1/2 = 12$  and not 3?

- ☐ Because  $6 \times 2 = 12$
- ☐ Because there are twelve halves in six
- ☐ Both of the above
- ☐ It is 3

**Answer: Both of the above**

Dividing asks “how many of these fit in?”, and twelve halves fit into six.

- 28 Dividing by a fraction less than 1 makes a number ...

- ☐ smaller
- ☐ bigger
- ☐ unchanged
- ☐ negative

**Answer: bigger**

You are asking how many small pieces fit in, and the answer is “lots”. This is the mirror image of multiplying.

- 29 Is  $1/2 \div 2$  the same as  $1/2 \times 1/2$ ?

- ☐ Yes
- ☐ No

**Answer: Yes**

Both give  $1/4$ . Dividing by 2 is multiplying by a half.

- 30 Is  $1/2 \div 2$  the same as  $1/2 \times 2$ ?

- ☐ Yes
- ☐ No

**Answer: No**

That gives 1, not  $1/4$ . Flip the number you are dividing **by**.

**31** What is the reciprocal of 4?

- ☐ 4
- ☐  $\frac{1}{4}$
- ☐  $-4$
- ☐ 0.4

**Answer:  $\frac{1}{4}$**

4 is  $\frac{4}{1}$ , so its reciprocal is  $\frac{1}{4}$ .

**32** Zara writes  $\frac{3}{4} \div \frac{1}{2} = \frac{3}{8}$ . What has she done wrong?

- ☐ Nothing
- ☐ She multiplied instead of flipping first
- ☐ She used the wrong reciprocal of  $\frac{3}{4}$
- ☐ She forgot to simplify

**Answer: She multiplied instead of flipping first**

$\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \times \frac{2}{1} = \frac{6}{4} = \frac{3}{2}$ . Dividing by a half should make the answer bigger, and  $\frac{3}{8}$  is smaller.

### C · Challenge — Working backwards, and how many fit.

**33** Work out  $3^4 \div 8^3$

**Answer: 2**

$\frac{3}{4} \times \frac{8}{3} = \frac{24}{12} = 2$ .

**34** How many quarter-litre cups can be filled from 3 litres?

**Answer: 12**

$3 \div \frac{1}{4} = 3 \times 4 = 12$ .

**35** How many pieces of ribbon  $\frac{2}{5}$  m long can be cut from 4 m?

**Answer: 10**

$4 \div \frac{2}{5} = 4 \times \frac{5}{2} = 10$ .

**36** Work out  $5^5 \div 5^6$

**Answer: 1**

Any non-zero number divided by itself is 1.

**37** A piece of wood  $2\frac{1}{4}$  m long is cut into 3 equal pieces. How long is each, in metres?

**Answer:  $\frac{3}{4}$**

$\frac{9}{4} \div 3 = \frac{9}{12} = \frac{3}{4}$  m.

**38** A number divided by  $\frac{1}{3}$  gives 15. What is the number?

**Answer: 5**

Dividing by  $\frac{1}{3}$  multiplies by 3, so the number is  $15 \div 3 = 5$ .

### D · Word problems — Sharing and cutting up.

**39** How many half-litre bottles can be filled from 8 litres?

**Answer: 16**

$8 \div \frac{1}{2} = 16$ .

**40** How many third-of-a-metre pieces come from 6 m of string?

**Answer: 18**

$6 \div \frac{1}{3} = 18$ .

- 41**  $3\frac{3}{4}$  litre of juice is shared equally between 6 people. How much does each get, in litres?

**Answer:  $\frac{1}{8}$**

$$3\frac{3}{4} \div 6 = \frac{3}{24} = \frac{1}{8} \text{ litre.}$$

- 42** A ribbon  $5\frac{5}{6}$  m long is cut into 5 equal pieces. How long is each, in metres?

**Answer:  $\frac{1}{6}$**

$$5\frac{5}{6} \div 5 = \frac{5}{30} = \frac{1}{6} \text{ m.}$$

- 43** How many  $\frac{3}{4}$ -cup servings are in 6 cups?

**Answer: 8**

$$6 \div \frac{3}{4} = 6 \times \frac{4}{3} = 8.$$

- 44** A 12 m rope is cut into  $\frac{2}{3}$  m lengths. How many pieces?

**Answer: 18**

$$12 \div \frac{2}{3} = 12 \times \frac{3}{2} = 18.$$

- 45**  $2\frac{2}{3}$  kg of rice fills 4 equal bags. How much is in each bag, in kg?

**Answer:  $\frac{1}{6}$**

$$2\frac{2}{3} \div 4 = \frac{2}{12} = \frac{1}{6} \text{ kg.}$$

- 46** How many quarter-hour slots fit into 3 hours?

**Answer: 12**

$$3 \div \frac{1}{4} = 12.$$