



# Writing Equivalent and Simplified Fractions

## Prior Knowledge:

- How to calculate the highest common factor of two numbers.
- Using inverse operations.

In a fraction, the denominator (the bottom part) tells you how many equal parts there are in a whole and the numerator (top part) tells you how many parts you have.

**Equivalent fractions** will have the **same value**, even though they make look different. For example,  $\frac{1}{2}$  and  $\frac{2}{4}$  are **equivalent**.

### Example 1

Write an equivalent fraction to  $\frac{1}{3}$ .

In this case, we can find an equivalent fraction by multiplying the numerator and denominator by the **same** number. For example, we could multiply both the numerator and denominator by 8.

$$1 \times 8 = 8$$

$$3 \times 8 = 24$$

Therefore,  $\frac{8}{24}$ , is equivalent to  $\frac{1}{3}$ .

### Example 2

Complete the equivalent fraction.

$$\text{a. } \frac{1}{4} = \frac{\boxed{\phantom{00}}}{\boxed{20}}$$

Start by working out what 4 has been multiplied by to reach 20 (you can use the inverse operation to calculate this).

$$20 \div 4 = 5$$

You should now multiply 1 by the same number.

$$1 \times 5 = 5$$

$$\frac{1}{4} = \frac{5}{20}$$



## Writing Equivalent and Simplified Fractions

A fraction is in its **simplest** form when the numerator and denominator are the smallest possible whole numbers that are **equivalent** to the original fraction. For example,  $\frac{2}{4}$  can be simplified to  $\frac{1}{2}$ .

To **simplify** or **cancel down** a fraction, you should divide the numerator and denominator by their **highest common factor**.

### Example 3

Express  $\frac{12}{30}$  in its simplest form.

The **highest common factor** of 12 and 30 is 6.

Divide both the numerator and denominator by 6.

$$12 \div 6 = 2$$

$$30 \div 6 = 5$$

$$\frac{12}{30} = \frac{2}{5}$$

If you don't spot the highest common factor straight away, simplifying can also be done in multiple steps:

$$12 \div 3 = 4$$

$$30 \div 3 = 10$$

$$\frac{12}{30} = \frac{4}{10}$$

$$4 \div 2 = 2$$

$$10 \div 2 = 5$$

$$\frac{4}{10} = \frac{2}{5}$$



**Your Turn**

1. Find the highest common factor for each pair of numbers.

a. 4 and 8

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d. 6 and 20

\_\_\_\_\_

g. 18 and 45

\_\_\_\_\_

b. 10 and 15

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e. 8 and 30

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h. 12 and 36

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c. 12 and 18

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f. 16 and 20

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2. Complete the following equivalent fractions.

a.  $\frac{1}{3} = \frac{2}{\quad} = \frac{\quad}{9} = \frac{\quad}{12} = \frac{5}{\quad} = \frac{6}{\quad} = \text{---}$

b.  $\frac{2}{8} = \frac{4}{16} = \frac{\quad}{24} = \frac{\quad}{32} = \frac{10}{\quad} = \frac{12}{\quad} = \text{---}$

c.  $\frac{4}{7} = \frac{8}{14} = \text{---} = \text{---} = \text{---} = \frac{24}{42} = \text{---}$

d.  $\frac{2}{5} = \frac{\quad}{10}$

e.  $\frac{3}{8} = \frac{\quad}{48}$

f.  $\frac{3}{5} = \frac{39}{\quad}$

g.  $\frac{\quad}{9} = \frac{15}{27}$

h.  $\frac{\quad}{14} = \frac{12}{56}$



3. Express each fraction in its simplest form.

a.  $\frac{5}{10}$

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f.  $\frac{42}{56}$

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b.  $\frac{2}{6}$

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g.  $\frac{72}{81}$

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c.  $\frac{8}{12}$

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h.  $\frac{96}{120}$

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d.  $\frac{12}{15}$

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i.  $\frac{230}{495}$

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e.  $\frac{18}{30}$

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j.  $\frac{96}{123}$

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**Challenge**

In a bag there are 80 counters.  
There are 32 yellow counters.  
There are 23 red counters.  
The rest of the counters are blue.

Work out what fraction of the counters are blue, giving your answer in its simplest form.

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