

Name _____

Date _____

1.4 Highest common factors — worksheet

Find out about highest common factors. · 56 questions · Show your working.

Remember

- A **factor** divides exactly into a number: the factors of 12 are 1, 2, 3, 4, 6, 12.
- A **common factor** divides into both numbers.
- The **highest common factor (HCF)** is the biggest of them.
- Method: list the factors of the **smaller** number, then work downwards and stop at the first one that also divides the larger number.
- If one number is a factor of the other, the HCF is the smaller number, e.g. $\text{HCF}(6, 18) = 6$.
- Useful fact: $\text{HCF} \times \text{LCM} = a \times b$, e.g. for 8 and 12: $4 \times 24 = 96 = 8 \times 12$.
- Dividing a fraction's numerator and denominator by their HCF simplifies it in one step.

A · Fluency — Find the HCF of pairs and triples.

1 Find the highest common factor of 12 and 18.

2 Find the highest common factor of 24 and 36.

3 Find the highest common factor of 15 and 25.

4 Find the highest common factor of 16 and 24.

5 Find the highest common factor of 21 and 28.

6 Find the highest common factor of 9 and 20.

7 Find the highest common factor of 30 and 45.

8 Find the highest common factor of 100 and 75.

9 Find the highest common factor of 42 and 56.

10 Find the highest common factor of 18 and 27.

11 Find the highest common factor of 36 and 60.

12 Find the highest common factor of 14 and 35.

13 Find the highest common factor of 8 and 27.

14 Find the highest common factor of 48 and 72.

15 Find the highest common factor of 26 and 39.

16 Find the highest common factor of 33 and 44.

17 Find the highest common factor of 50 and 80.

18 Find the highest common factor of 64 and 96.

19 Find the highest common factor of 12, 18 and 30.

20 Find the highest common factor of 24, 36 and 60.

21 Find the highest common factor of 16, 40 and 24.

22 Find the highest common factor of 45, 75 and 90.

23 Find the highest common factor of 14, 28 and 42.

24 Find the highest common factor of 20, 50 and 35.

B · Reasoning — Factors, common factors and simplifying.

25 List all the factors of 24, in order, separated by commas.

26 List all the factors of 36, in order, separated by commas.

27 List the common factors of 12 and 18, separated by commas.

28 How many common factors do 24 and 36 have?

29 Is 8 a common factor of 24 and 36?

☐ Yes

☐ No

30 Are 9 and 20 co-prime ($\text{HCF} = 1$)?

☐ Yes

☐ No

31 Use the HCF to simplify $24/36$. What is the new numerator?

32 Use the HCF to simplify $45/60$. What is the new denominator?

- 33 Why can the fraction $\frac{25}{36}$ not be simplified?
- ☐ Because 25 is smaller than 36
 - ☐ Because the HCF of 25 and 36 is 1
 - ☐ Because 36 is a square number
 - ☐ Because 25 is not a factor of 36
- 34 Zara says “the HCF of two numbers is always smaller than both of them”. Is she right?
- ☐ Yes
 - ☐ No
- 35 The HCF of 12 and n is 12, and n is between 20 and 30. What is n ?
- _____
- _____
- 36 Two numbers have HCF 6 and LCM 72. One number is 24. What is the other?
- _____
- _____

C · Challenge — Work backwards from an HCF.

- 37 Two numbers have a highest common factor of 4. The first number is 12 and the second is greater than 20 and less than 40. What is the smallest possible value of the second number?
- _____
- _____
- 38 The HCF of two numbers is 3 and their LCM is 45. What is the larger of the two numbers?
- _____
- _____
- 39 The HCF of two numbers is 3 and their LCM is 45. What is the smaller of the two numbers?
- _____
- _____
- 40 Find the HCF of 8 and 12, then the LCM of 8 and 12, then multiply them together. What do you get?
- _____
- _____
- 41 n is a number between 1 and 100. The HCF of n and 30 is 15. What is the largest possible n ?
- _____
- _____
- 42 What is the HCF of two consecutive whole numbers, such as 14 and 15?
- _____
- _____
- 43 The HCF of 36 and n is 9. What is the smallest possible value of n if n is greater than 9?
- _____
- _____
- 44 A rectangle is 84 cm by 60 cm. It is cut into identical squares with no waste. What is the largest possible side length, in cm?
- _____
- _____

D · Word problems — Sharing into the largest equal groups.

- 45 Anya has 48 red pens and 36 blue pens. She makes identical packs using all the pens. What is the greatest number of packs she can make?
- _____
- _____

- 46** A florist has 30 roses and 45 tulips. She makes identical bunches using all the flowers. What is the largest number of bunches?
-
-
- 47** In the question above, how many roses are in each bunch?
-
-
- 48** A room is 3 m 60 cm long and 2 m 40 cm wide. It is tiled with identical square tiles with no cutting. What is the largest tile side length, in cm?
-
-
- 49** Two ribbons are 72 cm and 120 cm long. They are cut into equal pieces as long as possible with none left over. How long is each piece, in cm?
-
-
- 50** In the question above, how many pieces are there altogether?
-
-
- 51** A teacher has 84 pencils and 63 rulers. She makes identical sets. What is the greatest number of sets?
-
-
- 52** Two lengths of rope, 90 m and 126 m, are cut into equal pieces as long as possible. How long is each piece, in metres?
-
-
- 53** A baker has 56 muffins and 98 cookies. He fills identical boxes. What is the greatest number of boxes he can fill?
-
-
- 54** 150 boys and 225 girls take part in a parade. They march in identical rows, each row containing only boys or only girls. What is the greatest number of students in a row?
-
-
- 55** Three bells ring 24, 36 and 60 times an hour. A student groups the rings into identical blocks. What is the largest block size that works for all three?
-
-
- 56** A shop packs 48 apples, 72 oranges and 96 pears into identical fruit boxes using all the fruit. What is the greatest number of boxes?
-
-