

Name _____

Date _____

1.3 Lowest common multiples — worked answers

Find out about lowest common multiples. · 56 questions

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

- 1 Find the lowest common multiple of 4 and 6.

Answer: 12

Multiples of 6: 6, 12, 18 ... The first one that is also a multiple of 4 is 12, because $12 = 4 \times 3$.

- 2 Find the lowest common multiple of 5 and 8.

Answer: 40

Multiples of 8: 8, 16, 24, 32, 40, 48 ... The first one that is also a multiple of 5 is 40, because $40 = 5 \times 8$.

- 3 Find the lowest common multiple of 9 and 12.

Answer: 36

Multiples of 12: 12, 24, 36, 48 ... The first one that is also a multiple of 9 is 36, because $36 = 9 \times 4$.

- 4 Find the lowest common multiple of 10 and 15.

Answer: 30

Multiples of 15: 15, 30, 45 ... The first one that is also a multiple of 10 is 30, because $30 = 10 \times 3$.

- 5 Find the lowest common multiple of 6 and 7.

Answer: 42

Multiples of 7: 7, 14, 21, 28, 35, 42, 49 ... The first one that is also a multiple of 6 is 42, because $42 = 6 \times 7$.

- 6 Find the lowest common multiple of 8 and 12.

Answer: 24

Multiples of 12: 12, 24, 36 ... The first one that is also a multiple of 8 is 24, because $24 = 8 \times 3$.

- 7 Find the lowest common multiple of 14 and 21.

Answer: 42

Multiples of 21: 21, 42, 63 ... The first one that is also a multiple of 14 is 42, because $42 = 14 \times 3$.

- 8 Find the lowest common multiple of 6 and 10.

Answer: 30

Multiples of 10: 10, 20, 30, 40 ... The first one that is also a multiple of 6 is 30, because $30 = 6 \times 5$.

- 9 Find the lowest common multiple of 4 and 10.

Answer: 20

Multiples of 10: 10, 20, 30 ... The first one that is also a multiple of 4 is 20, because $20 = 4 \times 5$.

- 10** Find the lowest common multiple of 12 and 18.

Answer: 36

Multiples of 18: 18, 36, 54 ... The first one that is also a multiple of 12 is 36, because $36 = 12 \times 3$.

- 11** Find the lowest common multiple of 15 and 20.

Answer: 60

Multiples of 20: 20, 40, 60, 80 ... The first one that is also a multiple of 15 is 60, because $60 = 15 \times 4$.

- 12** Find the lowest common multiple of 9 and 15.

Answer: 45

Multiples of 15: 15, 30, 45, 60 ... The first one that is also a multiple of 9 is 45, because $45 = 9 \times 5$.

- 13** Find the lowest common multiple of 7 and 11.

Answer: 77

Multiples of 11: 11, 22, 33, 44, 55, 66, 77, 88 ... The first one that is also a multiple of 7 is 77, because $77 = 7 \times 11$.

- 14** Find the lowest common multiple of 16 and 24.

Answer: 48

Multiples of 24: 24, 48, 72 ... The first one that is also a multiple of 16 is 48, because $48 = 16 \times 3$.

- 15** Find the lowest common multiple of 25 and 30.

Answer: 150

Multiples of 30: 30, 60, 90, 120, 150, 180 ... The first one that is also a multiple of 25 is 150, because $150 = 25 \times 6$.

- 16** Find the lowest common multiple of 18 and 27.

Answer: 54

Multiples of 27: 27, 54, 81 ... The first one that is also a multiple of 18 is 54, because $54 = 18 \times 3$.

- 17** Find the lowest common multiple of 20 and 24.

Answer: 120

Multiples of 24: 24, 48, 72, 96, 120, 144 ... The first one that is also a multiple of 20 is 120, because $120 = 20 \times 6$.

- 18** Find the lowest common multiple of 8 and 20.

Answer: 40

Multiples of 20: 20, 40, 60 ... The first one that is also a multiple of 8 is 40, because $40 = 8 \times 5$.

- 19** Find the lowest common multiple of 2, 3 and 4.

Answer: 12

12 is divisible by 2, 3 and 4, and no smaller positive number is.

- 20** Find the lowest common multiple of 3, 4 and 5.

Answer: 60

60 is divisible by 3, 4 and 5, and no smaller positive number is.

- 21** Find the lowest common multiple of 2, 6 and 9.

Answer: 18

18 is divisible by 2, 6 and 9, and no smaller positive number is.

- 22** Find the lowest common multiple of 4, 6 and 8.

Answer: 24

24 is divisible by 4, 6 and 8, and no smaller positive number is.

- 23 Find the lowest common multiple of 5, 6 and 10.

Answer: 30

30 is divisible by 5, 6 and 10, and no smaller positive number is.

- 24 Find the lowest common multiple of 3, 5 and 9.

Answer: 45

45 is divisible by 3, 5 and 9, and no smaller positive number is.

B · Reasoning — Multiples, common multiples and true/false.

- 25 Write the first five multiples of 7, separated by commas.

Answer: 7, 14, 21, 28, 35

Multiply 7 by 1, 2, 3, 4 and 5.

- 26 Write the first five multiples of 12, separated by commas.

Answer: 12, 24, 36, 48, 60

Multiply 12 by 1, 2, 3, 4 and 5.

- 27 Write all the multiples of 6 that are less than 40, separated by commas.

Answer: 6, 12, 18, 24, 30, 36

Keep adding 6 until you pass 40.

- 28 What is the smallest number that appears in both the 6 times table and the 8 times table?

Answer: 24

That number is the LCM of 6 and 8, which is 24.

- 29 Is 48 a common multiple of 6 and 8?

☐ Yes

☐ No

Answer: Yes

$48 = 6 \times 8$ and $48 = 8 \times 6$, so it is a common multiple — but it is not the *lowest* one, which is 24.

- 30 Is 30 a common multiple of 4 and 5?

☐ Yes

☐ No

Answer: No

30 is a multiple of 5 but $30 \div 4 = 7.5$, so 30 is not a multiple of 4.

- 31 Two numbers have no common factor except 1. What is their LCM?

☐ Their sum

☐ Their product

☐ The larger number

☐ 1

Answer: Their product

When two numbers share no factors (they are co-prime), the LCM is simply $a \times b$. For example $\text{LCM}(5, 8) = 40$.

- 32 The LCM of 6 and n is 30. What is the largest possible value of n ?

Answer: 30

n must be a factor of 30 whose LCM with 6 is 30. $n = 30$ works ($\text{LCM}(6, 30) = 30$), and nothing larger can, because the LCM is always at least as big as n .

- 33** The LCM of 4 and n is 20, and n is not 20. What is n ?

Answer: 5

$n = 5$ gives $\text{LCM}(4, 5) = 20$. ($n = 10$ gives $\text{LCM}(4, 10) = 20$ as well — but 5 is the smallest such n .)

- 34** Marcus says “the LCM of two numbers is always bigger than both of them”. Is he right?

☐ Yes

☐ No

Answer: No

If one number is a multiple of the other, the LCM equals the larger number. For example $\text{LCM}(4, 12) = 12$, which is not bigger than 12.

- 35** Find the lowest common multiple of 2, 3, 4, 5 and 6.

Answer: 60

60 is divisible by 2, 3, 4, 5 and 6, and no smaller positive number is.

- 36** What is the smallest number greater than 1 that leaves a remainder of 1 when divided by 2, 3 and 4?

Answer: 13

The number must be one more than a common multiple of 2, 3 and 4. $\text{LCM}(2, 3, 4) = 12$, so the number is $12 + 1 = 13$.

C · Challenge — Work backwards from an LCM.

- 37** The LCM of two numbers is 36 and one of the numbers is 12. What is the largest the other number could be?

Answer: 36

The other number must be a factor of 36 (so that the LCM is 36). The largest factor of 36 is 36 itself, and $\text{LCM}(12, 36) = 36$ ✓

- 38** Find the smallest number that is a multiple of 8 and also a multiple of 12, and is greater than 100.

Answer: 120

$\text{LCM}(8, 12) = 24$. Multiples of 24: 24, 48, 72, 96, 120 — the first one over 100 is 120.

- 39** How many common multiples of 6 and 9 are there below 200?

Answer: 11

$\text{LCM}(6, 9) = 18$. Multiples of 18 below 200: 18, 36, ..., 198. $198 \div 18 = 11$, so there are 11 of them.

- 40** a and b are two different whole numbers between 1 and 10 inclusive. Their LCM is 24. What is the largest possible value of $a + b$?

Answer: 14

Both numbers must be factors of 24, so they come from 1, 2, 3, 4, 6, 8. The pairs whose LCM is 24 are $(3, 8) \rightarrow 11$ and $(6, 8) \rightarrow 14$. The largest sum is 14.

- 41** Two cogs have 12 and 18 teeth. They start with two marked teeth touching. After how many teeth of the smaller cog do the marks touch again?

Answer: 36

The marks meet again after $\text{LCM}(12, 18) = 36$ teeth.

- 42** The LCM of 9 and n is 63. Find n if n is not 63.

Answer: 7

$63 = 9 \times 7$. Taking $n = 7$ gives $\text{LCM}(9, 7) = 63$ ✓

- 43** Find the lowest common multiple of 15, 20 and 25.

Answer: 300

$\text{LCM}(15, 20) = 60$; $\text{LCM}(60, 25) = 300$.

- 44** A number leaves remainder 3 when divided by 5 and remainder 3 when divided by 7. What is the smallest such number greater than 3?

Answer: 38

The number is 3 more than a common multiple of 5 and 7. $\text{LCM}(5, 7) = 35$, so the number is $35 + 3 = 38$.

D · Word problems — Repeating events and packing problems.

- 45** One bus leaves the station every 12 minutes and another every 18 minutes. They leave together at 09:00. After how many minutes do they next leave together?

Answer: 36

$\text{LCM}(12, 18) = 36$ minutes, so they next leave together at 09:36.

- 46** Two lighthouses flash every 20 seconds and every 25 seconds. They flash together now. After how many seconds do they next flash together?

Answer: 100

$\text{LCM}(20, 25) = 100$ seconds.

- 47** Hot dogs come in packs of 10 and buns come in packs of 8. What is the smallest number of hot dogs you can buy so that none are left over?

Answer: 40

$\text{LCM}(10, 8) = 40$ — that is 4 packs of hot dogs and 5 packs of buns.

- 48** Ali swims every 4 days and cycles every 6 days. He does both today. In how many days will he next do both on the same day?

Answer: 12

$\text{LCM}(4, 6) = 12$ days.

- 49** A red light flashes every 6 seconds, a green light every 8 seconds and a blue light every 12 seconds. They all flash together now. After how many seconds do all three next flash together?

Answer: 24

$\text{LCM}(6, 8, 12) = 24$ seconds.

- 50** Tiles are 15 cm by 20 cm. What is the side length, in cm, of the smallest square that can be made from whole tiles?

Answer: 60

The side must be a multiple of both 15 and 20, so the smallest is $\text{LCM}(15, 20) = 60$ cm.

- 51** Trains to the airport leave every 9 minutes and trains to the port leave every 15 minutes. Both leave at 06:00. At what time do they next leave together? Give the answer in minutes after 06:00.

Answer: 45

$\text{LCM}(9, 15) = 45$ minutes, so at 06:45.

- 52** Pencils come in boxes of 12 and erasers in boxes of 16. A teacher wants the same number of each. What is the smallest number of pencils she can buy?

Answer: 48

$\text{LCM}(12, 16) = 48$.

- 53** A machine A is serviced every 30 days and machine B every 45 days. Both are serviced today. In how many days are they both serviced on the same day again?

Answer: 90

$\text{LCM}(30, 45) = 90$ days.

- 54** Runner A completes a lap in 40 seconds and runner B in 60 seconds. They start together. After how many seconds are they side by side at the start line again?

Answer: 120

$\text{LCM}(40, 60) = 120$ seconds, i.e. 2 minutes.

- 55** Sweets are sold in bags of 14 and party bags need 21 sweets each. What is the smallest number of sweets that fills whole bags of both kinds?

Answer: 42

$\text{LCM}(14, 21) = 42$.

- 56** Three friends visit a café: one every 2 days, one every 5 days and one every 8 days. They are all there today. In how many days will all three be there together again?

Answer: 40

$\text{LCM}(2, 5, 8) = 40$ days.