

Facts and Reminders

Multiples

A *multiple* is the product resulting when two or more factors are multiplied by each other.

$5 \times 4 = 20$ The number 20 is a multiple of 4 and 5.

$8 \times 6 = 48$ The number 48 is a multiple of 8 and 6.

The first five multiples of 4 are 4, 8, 12, 16, and 20.

The first five multiples of 3 are 3, 6, 9, 12, and 15.

The first five multiples of 8 are 8, 16, 24, 32, and 40.

Common Multiples

A *common multiple* is a multiple common to two or more different factors.

The number 8 is a common multiple of both 2 and 4.

The number 6 is a common multiple of both 2 and 3.

The number 12 is a common multiple of 2, 3, 4, and 6.

The first six multiples of 6 are 6, 12, 18, 24, 30, and 36.

The first eight multiples of 4 are 4, 8, 12, 16, 20, 24, 28, and 32.

The numbers 12, 24, and 36 are common multiples of both 4 and 6.

The first six multiples of 8 are 8, 16, 24, 32, 40, and 48.

The first four multiples of 12 are 12, 24, 36, and 48.

The numbers 24 and 48 are common multiples of both 8 and 12.

Least Common Multiple

The *least common multiple (LCM)* is the smallest common multiple of two or more factors.

In the examples above, you will find the following:

The least common multiple of 4 and 6 is 12.

The least common multiple of 8 and 12 is 24.

There are many larger common multiples of two factors.

Lowest Common Denominator

The least common multiple is used to determine the appropriate denominator for adding unlike fractions. In adding unlike fractions, it is important to find the *lowest common denominator* of the fractions. This is exactly the same thing as finding the least common multiple of the denominators.

$$\begin{array}{r} \frac{2}{4} = \frac{6}{12} \\ + \frac{1}{6} = \frac{2}{12} \\ \hline \frac{8}{12} = \frac{2}{3} \end{array}$$

The lowest common denominator (LCD) of 4 and 6 is 12.

Mighty Multiples

Working with Common Multiples



A *common multiple* is a multiple common to two or more different factors.

Multiples of 3: 3, 6, 9, (12), 15, 18, 21, (24)

Multiples of 4: 4, 8, (12), 16, 20, (24), 28, 32

Common multiples of 3 and 4: 12 and 24

Directions: Study the Facts and Reminders sheet for this unit. Write the first eight multiples of each factor listed here. The first one is done for you.

1. Multiples of 5: 5, 10, 15, 20, 25, 30, 35, 40
2. Multiples of 6: _____
3. Multiples of 7: _____
4. Multiples of 8: _____
5. Multiples of 9: _____
6. Multiples of 10: _____
7. Multiples of 11: _____
8. Multiples of 12: _____

Directions: Study the Facts and Reminders page for this unit. Write the multiples for each pair of factors listed below until you find the first three common multiples for each pair. Circle the three common multiples. The first one is done for you.

9. Multiples of 2: 2, 4, (6), 8, 10, (12), 14, 16, (18)
Multiples of 3: 3, (6), 9, (12), 15, (18)
10. Multiples of 4: _____
Multiples of 5: _____
11. Multiples of 6: _____
Multiples of 4: _____
12. Multiples of 9: _____
Multiples of 6: _____
13. Multiples of 8: _____
Multiples of 6: _____
14. Multiples of 8: _____
Multiples of 12: _____

Mighty Multiples

Least Common Multiple (LCM)



The *least common multiple (LCM)* is the lowest multiple which is common to two or more factors.

Multiples of 3: 3, (6), 9, (12), 15, (18)

Multiples of 2: 2, 4, (6), 8, 10, (12), 14, 16, (18)

The least common multiple (LCM) of 3 and 2 is 6.

Directions: Circle the common multiples for the pairs of factors named below. Name the *least common multiple (LCM)*. The first one has been done for you.

1. Multiples of 6: (6), (12), (18)

Multiples of 2: 2, 4, (6), 8, 10, (12), 14, 16, (18)

LCM: 6

2. Multiples of 4: 4, 8, 12, 16, 20

Multiples of 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

LCM: _____

3. Multiples of 6: 6, 12, 18, 24, 30, 36

Multiples of 9: 9, 18, 27, 36

LCM: _____

4. Multiples of 9: 9, 18, 27, 36

Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36

LCM: _____

5. Multiples of 12: 12, 24, 36, 48, 60, 72

Multiples of 9: 9, 18, 27, 36, 45, 54, 63, 72

LCM: _____

Directions: List the first eight multiples for each of the pairs of factors named below. Name the least common multiple (LCM).

6. Multiples of 9: _____

Multiples of 3: _____

LCM: _____

7. Multiples of 5: _____

Multiples of 10: _____

LCM: _____

8. Multiples of 3: _____

Multiples of 4: _____

Multiples of 6: _____

LCM: _____

9. Multiples of 3: _____

Multiples of 6: _____

Multiples of 8: _____

LCM: _____

Mighty Multiples

Lowest Common Denominator (LCD)

The *least common multiple (LCM)* is used to determine the appropriate denominator for adding unlike fractions. In adding unlike fractions, you need to find the lowest common denominator (LCD) of the two fractions. The lowest common denominator is the least common multiple of these two denominators. (LCM = LCD)

$$\begin{array}{r} \frac{2}{9} = \frac{4}{18} \\ + \frac{1}{6} = \frac{3}{18} \\ \hline \end{array}$$

The lowest common denominator (LCD) of 9 and 6 is 18.

Directions: Study the Facts and Reminders page for this unit. Find the lowest common denominator (LCD) for each set of fractions.

1.
$$\begin{array}{r} \frac{1}{9} \\ + \frac{3}{6} \\ \hline \end{array}$$

LCD: _____

2.
$$\begin{array}{r} \frac{3}{4} \\ + \frac{5}{9} \\ \hline \end{array}$$

LCD: _____

3.
$$\begin{array}{r} \frac{4}{7} \\ + \frac{1}{4} \\ \hline \end{array}$$

LCD: _____

4.
$$\begin{array}{r} \frac{1}{8} \\ + \frac{1}{6} \\ \hline \end{array}$$

LCD: _____

5.
$$\begin{array}{r} \frac{4}{5} \\ + \frac{1}{4} \\ \hline \end{array}$$

LCD: _____

6.
$$\begin{array}{r} \frac{3}{12} \\ + \frac{3}{4} \\ \hline \end{array}$$

LCD: _____

7.
$$\begin{array}{r} \frac{1}{5} \\ + \frac{4}{6} \\ \hline \end{array}$$

LCD: _____

8.
$$\begin{array}{r} \frac{4}{9} \\ + \frac{1}{3} \\ \hline \end{array}$$

LCD: _____

9.
$$\begin{array}{r} \frac{5}{8} \\ + \frac{1}{4} \\ \hline \end{array}$$

LCD: _____

10.
$$\begin{array}{r} \frac{1}{12} \\ + \frac{5}{10} \\ \hline \end{array}$$

LCD: _____

11.
$$\begin{array}{r} \frac{1}{9} \\ + \frac{5}{15} \\ \hline \end{array}$$

LCD: _____

12.
$$\begin{array}{r} \frac{7}{10} \\ + \frac{3}{15} \\ \hline \end{array}$$

LCD: _____

13.
$$\begin{array}{r} \frac{1}{16} \\ + \frac{1}{12} \\ \hline \end{array}$$

LCD: _____

14.
$$\begin{array}{r} \frac{3}{12} \\ + \frac{7}{15} \\ \hline \end{array}$$

LCD: _____

15.
$$\begin{array}{r} \frac{2}{8} \\ + \frac{3}{18} \\ \hline \end{array}$$

LCD: _____

Answer Key

- Common Factors:
1, 5
GCF: 5
2. Factors of 16:
1, 2, 4, 8, 16
Factors of 18:
1, 2, 3, 6, 9, 18
Common Factors:
1, 2
GCF: 2
3. Factors of 22:
1, 2, 11, 22
Factors of 32:
1, 2, 4, 8, 16, 32
Common Factors:
1, 2
GCF: 2
4. Factors of 10:
1, 2, 5, 10
Factors of 15:
1, 3, 5, 15
Common Factors:
1, 5
GCF: 5
5. Factors of 12:
1, 2, 3, 4, 6, 12
Factors of 20:
1, 2, 4, 5, 10, 20
Common Factors:
1, 2, 4
GCF: 4
6. Factors of 14:
1, 2, 7, 14
Factors of 21:
1, 3, 7, 21
Common Factors:
1, 7
GCF: 7
7. Factors of 40:
1, 2, 4, 5, 8, 10, 20, 40
Factors of 25:
1, 5, 25
Common Factors:
1, 5
GCF: 5
8. Factors of 32:
1, 2, 4, 8, 16, 32
Factors of 24:
1, 2, 3, 4, 6, 8, 12, 24
Common Factors:
1, 2, 4, 8
GCF: 8

9. Factors of 36:
1, 2, 3, 4, 6, 9, 12, 18, 36
Factors of 24:
1, 2, 3, 4, 6, 8, 12, 24
Common Factors:
1, 2, 3, 4, 6, 12
GCF: 12
10. Factors of 16:
1, 2, 4, 8, 16
Factors of 18:
1, 2, 3, 6, 9, 18
Factors of 12:
1, 2, 3, 4, 6, 12
Common Factors:
1, 2
GCF: 2
11. Factors of 36:
1, 2, 3, 4, 6, 9, 12, 18, 36
Factors of 72:
1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72
Factors of 60:
1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
Common Factors:
1, 2, 3, 4, 6, 12
GCF: 12
12. Factors of 48:
1, 2, 3, 4, 6, 8, 12, 16, 24, 48
Factors of 24:
1, 2, 3, 4, 6, 8, 12, 24
Factors of 30:
1, 2, 3, 5, 6, 10, 15, 30
Common Factors:
1, 2, 3, 6
GCF: 6

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1. GCF: 3
Fraction: $\frac{3}{4}$
2. GCF: 4
Fraction: $\frac{2}{3}$
3. GCF: 5
Fraction: $\frac{2}{3}$
4. GCF: 4
Fraction: $\frac{4}{5}$
5. GCF: 5
Fraction: $\frac{4}{5}$
6. GCF: 12
Fraction: $\frac{1}{2}$
7. GCF: 4

- Fraction: $\frac{3}{7}$
8. GCF: 14
Fraction: $\frac{2}{3}$
9. GCF: 11
Fraction: $\frac{1}{2}$
10. GCF: 3
Fraction: $\frac{7}{10}$
11. GCF: 12
Fraction: $\frac{2}{3}$
12. GCF: 5
Fraction: $\frac{5}{12}$
13. GCF: 36
Fraction: $\frac{1}{2}$
14. GCF: 12
Fraction: $\frac{2}{5}$
15. GCF: 19
Fraction: $\frac{1}{2}$
16. GCF: 1
Fraction: $\frac{17}{19}$
17. GCF: 4
Fraction: $\frac{7}{24}$
18. GCF: 1
Fraction: $\frac{13}{15}$

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1. (5, 10, 15, 20, 25, 30, 35, 40)
2. (6, 12, 18, 24, 30, 36, 42, 48)
3. (7, 14, 21, 28, 35, 42, 49, 56)
4. (8, 16, 24, 32, 40, 48, 56, 64)
5. (9, 18, 27, 36, 45, 54, 63, 72)
6. (10, 20, 30, 40, 50, 60, 70, 80)
7. (11, 22, 33, 44, 55, 66, 77, 88)
8. (12, 24, 36, 48, 60, 72, 84, 96)
9. Multiples of 2: (2, 4, 6, 8, 10, 12, 14, 16, 18)
Multiples of 3: (3, 6, 9, 12, 15, 18)
Common Multiples: (6, 12, 18)
10. Multiples of 4: (4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60)
Multiples of 5: (5, 10,

- 15, 20, 25, 30, 35, 40, 45, 50, 55, 60)
Common Multiples:
(20, 40, 60)
11. Multiples of 6: (6, 12, 18, 24, 30, 36)
Multiples of 4: (4, 8, 12, 16, 20, 24, 28, 32, 36)
Common Multiples:
(12, 24, 36)
12. Multiples of 9: (9, 18, 27, 36, 45, 54)
Multiples of 6: (6, 12, 18, 24, 30, 36, 42, 48, 54)
Common Multiples:
(18, 36, 54)
13. Multiples of 8: (8, 16, 24, 32, 40, 48, 56, 64, 72)
Multiples of 6: (6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72)
Common Multiples:
(24, 48, 72)
14. Multiples of 8: (8, 16, 24, 32, 40, 48, 56, 64, 72)
Multiples of 12: (12, 24, 36, 48, 60, 72)
Common Multiples:
(24, 48, 72)

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1. Common Multiples:
(6, 12, 18)
LCM: (6)
2. Common Multiples:
(4, 8, 12, 16, 20)
LCM: (4)
3. Common Multiples:
(18, 36)
LCM: (18)
4. Common Multiples:
(36)
LCM: (36)
5. Common Multiples:
(36, 72)
LCM: (36)
6. Multiples of 9: (9, 18, 27, 36, 45, 54, 63, 72)
Multiples of 3: (3, 6, 9, 12, 15, 18, 21, 24)
LCM: (9)
7. Multiples of 5: (5, 10, 15, 20, 25, 30, 35, 40)

Answer Key

- Multiples of 10: (10, 20, 30, 40, 50, 60, 70, 80) LCM: (10)
8. Multiples of 3: (3, 6, 9, 12, 15, 18, 21, 24)
Multiples of 4: (4, 8, 12, 16, 20, 24, 28, 32)
Multiples of 6: (6, 12, 18, 24, 30, 36, 42, 48)
LCM: (12)
9. Multiples of 3: (3, 6, 9, 12, 15, 18, 21, 24)
Multiples of 6: (6, 12, 18, 24, 30, 36, 42, 48)
Multiples of 8: (8, 16, 24, 32, 40, 48, 56, 64)
LCM: (24)

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- | | |
|-------|--------|
| 1. 18 | 9. 8 |
| 2. 36 | 10. 60 |
| 3. 28 | 11. 45 |
| 4. 24 | 12. 30 |
| 5. 20 | 13. 48 |
| 6. 12 | 14. 60 |
| 7. 30 | 15. 72 |
| 8. 9 | |

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Tetrahedron

faces: 4 edges: 6

vertices: 4

Hexahedron

faces: 6 edges: 12

vertices: 8

Octahedron

faces: 8 edges: 12

vertices: 6

Dodecahedron

faces: 12 edges: 30

vertices: 20

Icosahedron

faces: 20 edges: 30

vertices: 12

- 1.–7. Answers will vary depending on the size of model used.

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Answers will vary depending on the size of model used.

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The age of the monuments will vary.

- c. 2750 B.C. Stonehenge
c. 2600 B.C. Ziggurat at Ur

- c. 2580 B.C. Pyramids at Giza
c. 2550 B.C. The Great Sphinx
c. 1333 B.C. Tutankhamun's Tomb
c. 960 B.C. Solomon's Temple
c. 600 B.C. Hanging Gardens of Babylon
c. 550 B.C. Temple of Artemis/Ephesus
c. 456 B.C. Statue of Zeus
c. 447 B.C. Parthenon at Athens
c. 353 B.C. Mausoleum at Halicarnassus
c. 292 B.C. Colossus of Rhodes
c. 283 B.C. Lighthouse at Alexandria
c. 214 B.C. Great Wall of China
150 B.C. The Great Stupa at Sanchi, India
27 B.C. The Roman Pantheon
B.C.
A.D.
50 A.D. Aztec Pyramid of the Sun
80 A.D. Colosseum in Rome
c. 730 A.D. Jaguar Temple at Tikal
1067 A.D. Tower of London
1150 A.D. Angkor Wat Temples
1163 A.D. Cathedral of Notre Dame
1339 A.D. The Kremlin in Moscow
1599 A.D. Globe Theater in London
1629 A.D. Taj Majal
1662 A.D. Palace at Versailles
1675 A.D. New St. Paul's Cathedral
1703 A.D.

- Buckingham Palace
1884 A.D. Statue of Liberty
1889 A.D. Eiffel Tower
1931 A.D. Empire State Building

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The "Years Ago" calculation will depend on the current year.

- c. 8000 B.C. Agriculture was invented in Mesopotamia.
c. 5000 B.C. Crop irrigation was invented in Mesopotamia.
c. 3500 B.C. The potter's wheel was developed in Mesopotamia.
c. 3500 B.C. The plow was invented in Mesopotamia.
c. 3200 B.C. The Egyptians invented a form of ink.
c. 3100 B.C. The Egyptians invented an early form of writing.
c. 3000 B.C. The abacus was developed in China or Babylonia.
c. 1800 B.C. The Babylonians developed multiplication tables.
c. 1000 B.C. Scissors were invented in Europe and Asia.
c. 1000 B.C. Kites were developed in China.
c. 800 B.C. Coins were created in Near East.
c. 700 B.C. The Chinese began keeping records of comets.
c. 236 B.C. Archimedes invented the Archimedean screw for lifting water from lower levels.
B.C.
A.D.
c. 300 A.D. Stirrups for riding horses were developed in China.
c. 600 A.D. Chess was invented in India.
c. 644 A.D. The windmill was developed in Iran.
868 A.D. The first printed book was made in China.
c. 1000 A.D. Gunpowder was invented in China.
c. 1040 A.D. Movable type for printing books was invented in China.
c. 1280 A.D. Spectacles were developed in Italy.
1514 A.D. Plus (+) and minus (–) signs were first used.
1565 A.D. Pencils were designed by Gesner in Switzerland.
c. 1608 A.D. Hans Lippershey of Holland built the first telescope.
c. 1665 A.D. Isaac Newton discovered the universal law of gravitation.
1865 A.D. Louis Pasteur developed the germ theory of disease.
1879 A.D. Thomas Edison invented the first practical light bulb.
1903 A.D. The Wright brothers built and flew the first heavier-than-air plane.
1925 A.D. Television was invented by J. Baird of Scotland.