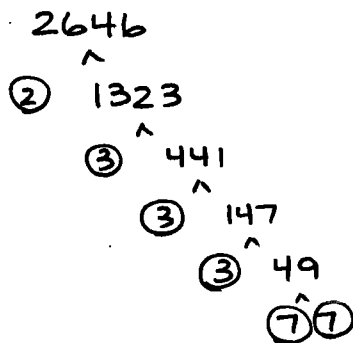


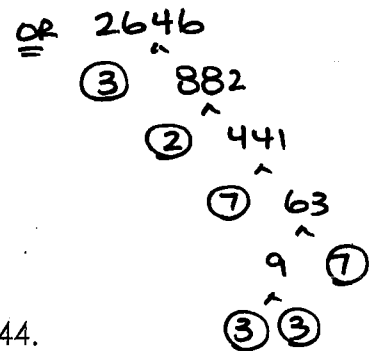
Lesson 3.1 ~ Prime Factorization

- Prime Factorization: writing a number as the product of its prime factors
- Greatest Common Factor: largest number a set of numbers can be divided by
- Lowest Common Multiple: smallest number that is a multiple of a set of numbers

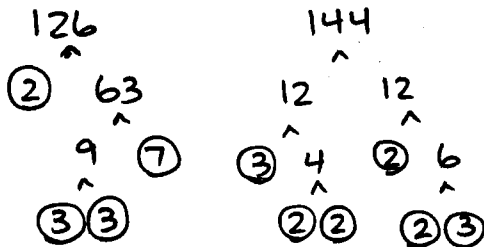
Example #1: Determine the prime factors of 2646.



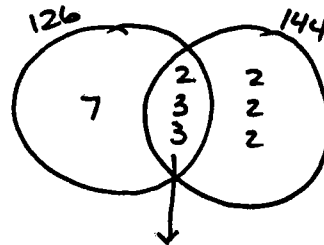
$$2646 = 2 \cdot 3^3 \cdot 7^2$$



Example #2: Determine the greatest common factor of 126 and 144.



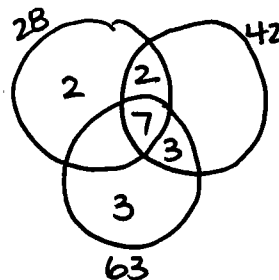
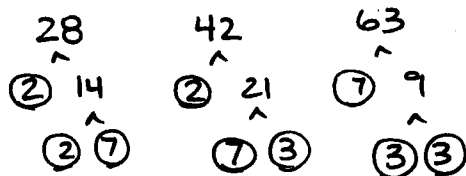
$$126 = 2 \cdot 3^2 \cdot 7 \quad 144 = 2^4 \cdot 3^2$$



$$\text{GCF} = 2 \times 3 \times 3 = \boxed{18}$$

$$(\text{LCM} = 7 \times 2 \times 3 \times 3 \times 2 \times 2 \times 2 = 1008)$$

Example #3: Determine the least common multiple of 28, 42, and 63.



$$\text{LCM} = 2 \times 2 \times 7 \times 3 \times 3 = \boxed{252}$$

$$(\text{GCF} = 7)$$

Name: _____

Prime Factor Tree

MS2

Draw a prime factor tree for each number.

1) $98 = 2 \times 7^2$

$\begin{array}{c} 2 \\ \wedge \\ 49 \\ \begin{array}{cc} \wedge & \wedge \\ 7 & 7 \end{array} \end{array}$

2) $70 = 2 \times 7 \times 5$

$\begin{array}{c} 7 \\ \wedge \\ 10 \\ \begin{array}{cc} \wedge & \wedge \\ 2 & 5 \end{array} \end{array}$

3) $84 = 2^2 \times 3 \times 7$

$\begin{array}{c} 4 \quad 21 \\ \wedge \quad \wedge \\ \begin{array}{ccc} 2 & 2 & 7 & 3 \end{array} \end{array}$

4) $50 = 2 \times 5^2$

$\begin{array}{c} 2 \\ \wedge \\ 25 \\ \begin{array}{cc} \wedge & \wedge \\ 5 & 5 \end{array} \end{array}$

5) $44 = 2^2 \times 11$

$\begin{array}{c} 4 \quad 11 \\ \wedge \quad \wedge \\ \begin{array}{cc} 2 & 2 \end{array} \end{array}$

6) $54 = 2 \times 3^3$

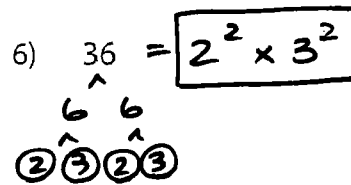
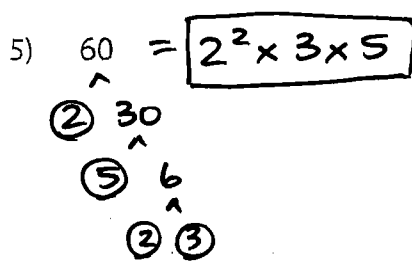
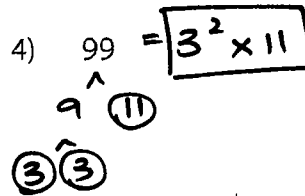
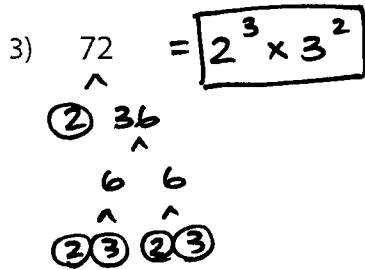
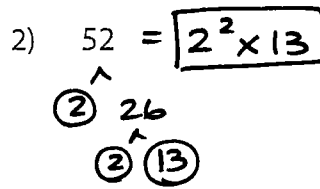
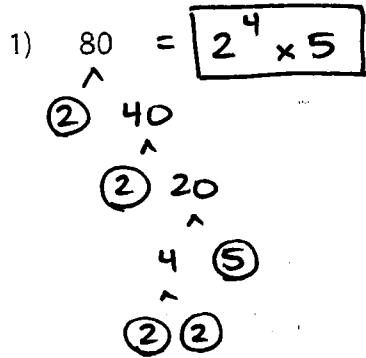
$\begin{array}{c} 6 \quad 9 \\ \wedge \quad \wedge \\ \begin{array}{cccc} 2 & 3 & 3 & 3 \end{array} \end{array}$

Name : _____

Prime Factor Tree

MS3

Draw a prime factor tree for each number.



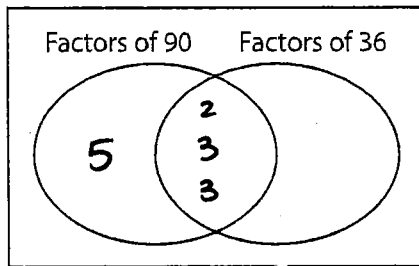
GCF/- Venn Diagram

LCM

Find the greatest common factor for each pair of numbers using Venn diagram.

1) 90, 36

a) Complete the venn diagram.

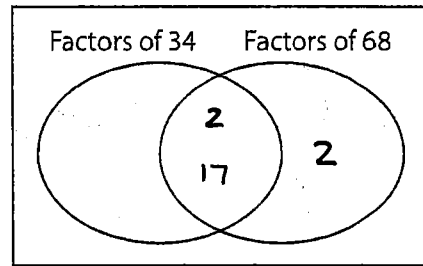


b) $LCM(90, 36) = 2^2 \times 3^2 \times 5 = 180$

c) $GCF(90, 36) = 2 \times 3^2 = 18$

2) 34, 68

a) Complete the venn diagram.

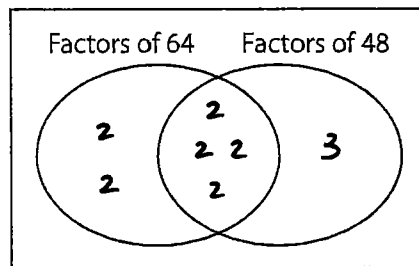


b) $LCM(34, 68) = 2^2 \times 17 = 68$

c) $GCF(34, 68) = 2 \times 17 = 34$

3) 64, 48

a) Complete the venn diagram.

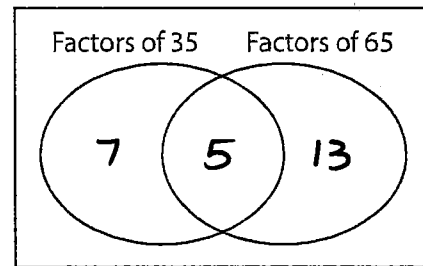


b) $LCM(64, 48) = 2^6 \times 3 = 192$

c) $GCF(64, 48) = 2^4 = 16$

4) 35, 65

a) Complete the venn diagram.

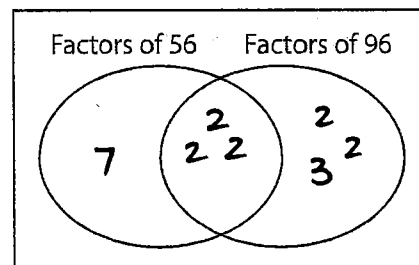


b) $LCM(35, 65) = 7 \times 5 \times 13 = 455$

c) $GCF(35, 65) = 5$

5) 56, 96

a) Complete the venn diagram.

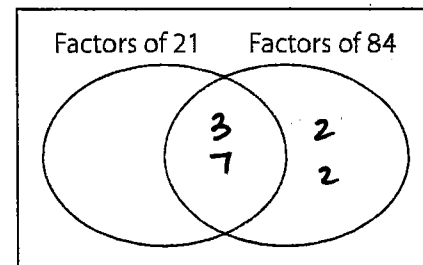


b) $LCM(56, 96) = 2^5 \times 7 \times 3 = 672$

c) $GCF(56, 96) = 2^3 = 8$

6) 21, 84

a) Complete the venn diagram.



b) $LCM(21, 84) = 2^2 \times 3 \times 7 = 84$

c) $GCF(21, 84) = 3 \times 7 = 21$

Name: _____

Greatest Common Factor

MS1

Find the greatest common factor for each set of numbers.

1) 28, 22, 90

$$28 = 2 \cdot 2 \cdot 7$$

$$22 = 2 \cdot 11$$

$$90 = 2 \cdot 3 \cdot 3 \cdot 5$$

$$\text{GCF}(28, 22, 90) = \underline{2}$$

2) 42, 35, 21

$$42 = 2 \cdot 3 \cdot 7$$

$$35 = 5 \cdot 7$$

$$21 = 3 \cdot 7$$

$$\text{GCF}(42, 35, 21) = \underline{7}$$

3) 75, 45, 60

$$75 = 5 \cdot 5 \cdot 3$$

$$45 = 5 \cdot 3 \cdot 3$$

$$60 = 5 \cdot 2 \cdot 2 \cdot 3$$

$$\text{GCF}(75, 45, 60) = \underline{5 \times 3 = 15}$$

4) 36, 90, 54

$$36 = 2 \cdot 2 \cdot 3 \cdot 3$$

$$90 = 2 \cdot 3 \cdot 3 \cdot 5$$

$$54 = 2 \cdot 3 \cdot 3 \cdot 3$$

$$\text{GCF}(36, 90, 54) = \underline{2 \cdot 3^2 = 18}$$

5) 24, 84, 48

$$24 = 2 \cdot 2 \cdot 2 \cdot 3$$

$$84 = 2 \cdot 2 \cdot 3 \cdot 7$$

$$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$$

$$\text{GCF}(24, 84, 48) = \underline{2^2 \times 3 = 12}$$

6) 12, 72, 18

$$12 = 2 \cdot 2 \cdot 3$$

$$72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$$

$$18 = 2 \cdot 3 \cdot 3$$

$$\text{GCF}(12, 72, 18) = \underline{2 \cdot 3 = 6}$$

7) 70, 14, 56

$$70 = 2 \cdot 5 \cdot 7$$

$$14 = 2 \cdot 7$$

$$56 = 2 \cdot 2 \cdot 2 \cdot 7$$

$$\text{GCF}(70, 14, 56) = \underline{2 \times 7 = 14}$$

8) 32, 76, 60

$$32 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$76 = 2 \cdot 2 \cdot 19$$

$$60 = 2 \cdot 2 \cdot 3 \cdot 5$$

$$\text{GCF}(32, 76, 60) = \underline{2^2 = 4}$$

9) 99, 42, 84

$$99 = 3 \cdot 3 \cdot 11$$

$$42 = 2 \cdot 3 \cdot 7$$

$$84 = 2 \cdot 2 \cdot 3 \cdot 7$$

$$\text{GCF}(99, 42, 84) = \underline{3}$$

10) 80, 50, 40

$$80 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5$$

$$50 = 2 \cdot 5 \cdot 5$$

$$40 = 2 \cdot 2 \cdot 2 \cdot 5$$

$$\text{GCF}(80, 50, 40) = \underline{2 \cdot 5 = 10}$$

Name: _____

Least Common Multiple

Sheet 1

Find the least common multiple of each set of numbers.

1) 6, 16, 8

$\text{LCM}(6, 16, 8) = 2^4 \times 3 = 48$

2) 4, 12, 20

$\text{LCM}(4, 12, 20) = 2^2 \cdot 3 \cdot 5 = 60$

3) 36, 18, 9

$\text{LCM}(36, 18, 9) = 2^2 \times 3^2 = 36$

4) 24, 72, 96

$\text{LCM}(24, 72, 96) = 2^5 \cdot 3^2 = 288$

5) 24, 18, 30

$\text{LCM}(24, 18, 30) = 2^3 \times 3^2 \times 5 = 360$

6) 40, 20, 60

$\text{LCM}(40, 20, 60) = 2^3 \cdot 3 \cdot 5 = 120$

7) 27, 36, 90

$\text{LCM}(27, 36, 90) = 2^2 \times 3^3 \times 5 = 540$

8) 14, 8, 16

$\text{LCM}(14, 8, 16) = 2^4 \cdot 7 = 112$

9) 15, 30, 45

$\text{LCM}(15, 30, 45) = 2 \times 3^2 \times 5 = 90$

10) 10, 4, 24

$\text{LCM}(10, 4, 24) = 2^3 \cdot 3 \cdot 5 = 120$