

**Math 10 Unit 3 FACTORS AND PRODUCTS**

Name: Key  
Date: \_\_\_\_\_

**Assignment: 3.1**

1. List the first 6 multiples of each number.

a) 6  
6, 12, 18, 24, 30, 36

b) 13  
13, 26, 39, 52, 65, 78

c) 22  
22, 44, 66, 88, 110, 132

d) 31  
31, 62, 93, 124, 155, 186

e) 45  
45, 90, 135, 180, 225, 270

f) 27  
27, 54, 81, 108, 135, 162

2. List the prime factors of each number.

a)  $40 = 2^3 \cdot 5$

b)  $75 = 3 \cdot 5^2$

$$\begin{array}{r} 2 \overline{)40} \\ \underline{20} \\ 20 \\ \underline{20} \\ 0 \end{array} \quad \begin{array}{r} 7 \overline{)140} \\ \underline{70} \\ 70 \\ \underline{70} \\ 0 \end{array}$$

c)  $81 = 3^4$

d)  $120 = 2^3 \cdot 3 \cdot 5$

$$\begin{array}{r} 2 \overline{)20} \\ \underline{20} \\ 0 \end{array} \quad \begin{array}{r} 2 \overline{)20} \\ \underline{20} \\ 0 \end{array}$$

e)  $140 = 2^2 \cdot 5 \cdot 7$

f)  $192 = 2^6 \cdot 3$

$$\begin{array}{r} 2 \overline{)192} \\ \underline{20} \\ 172 \\ \underline{172} \\ 0 \end{array}$$

3. Write each number as a product of its prime factors.

a)  $45 = 3^2 \cdot 5$

b)  $80 = 2^4 \cdot 5$

$$\begin{array}{r} 4 \overline{)96} \\ \underline{40} \\ 56 \\ \underline{56} \\ 0 \end{array}$$

c)  $96 = 2^5 \cdot 3$

d)  $122 = 2 \cdot 61$

$$\begin{array}{r} 2 \overline{)122} \\ \underline{61} \\ 0 \end{array}$$

e)  $160 = 2^5 \cdot 5$

f)  $195 = 3 \cdot 5 \cdot 13$

$$\begin{array}{r} 5 \overline{)195} \\ \underline{39} \\ 13 \end{array}$$

4. Use powers to write each number as a product of its prime factors.

a)  $600 = 2^3 \cdot 3 \cdot 5^2$

b)  $1150 = 2 \cdot 5^2 \cdot 23$

$$\begin{array}{r} 3 \overline{)600} \\ \underline{200} \\ 400 \end{array} \quad \begin{array}{r} 5 \overline{)1150} \\ \underline{230} \\ 920 \end{array}$$

c)  $1022 = 2 \cdot 7 \cdot 73$

d)  $2250 = 2 \cdot 3^2 \cdot 5^3$

$$\begin{array}{r} 5 \overline{)200} \\ \underline{40} \\ 160 \end{array} \quad \begin{array}{r} 5 \overline{)230} \\ \underline{46} \\ 184 \end{array}$$

e)  $4500 = 2^2 \cdot 3^2 \cdot 5^3$

f)  $6125 = 5^3 \cdot 7^2$

$$\begin{array}{r} 5 \overline{)40} \\ \underline{8} \\ 32 \\ \underline{32} \\ 0 \end{array} \quad \begin{array}{r} 2 \overline{)46} \\ \underline{23} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \overline{)1022} \\ \underline{511} \\ 73 \end{array}$$

$$\begin{array}{r} 5 \overline{)4500} \\ \underline{900} \\ 300 \\ \underline{300} \\ 0 \end{array}$$

$$\begin{array}{r} 5 \overline{)2250} \\ \underline{450} \\ 390 \\ \underline{390} \\ 0 \end{array}$$

$$\begin{array}{r} 5 \overline{)6125} \\ \underline{1225} \\ 490 \\ \underline{490} \\ 0 \end{array}$$

## GCF

5. Determine the greatest common factor of each pair of numbers.

$$\begin{array}{r} 2 \overline{) 46, 84} \\ \underline{23, 42} \end{array}$$

a) 46, 84

$$GCF = \boxed{2}$$

b) 64, 120

$$GCF = \boxed{8}$$

$$\begin{array}{r} 4 \overline{) 64, 120} \\ 2 \overline{) 16, 30} \\ \underline{8, 15} \end{array}$$

$$\begin{array}{r} 9 \overline{) 81, 126} \\ \underline{9, 14} \end{array}$$

c) 81, 216

$$GCF = \boxed{9}$$

d) 180, 224

$$GCF = \boxed{4}$$

$$\begin{array}{r} 4 \overline{) 180, 224} \\ \underline{45, 56} \end{array}$$

$$\begin{array}{r} 4 \overline{) 160, 672} \\ 4 \overline{) 40, 168} \\ 2 \overline{) 10, 42} \\ \underline{5, 21} \end{array}$$

e) 160, 672

$$GCF = \boxed{32}$$

f) 220, 860

$$GCF = \boxed{20}$$

$$\begin{array}{r} 10 \overline{) 220, 860} \\ 2 \overline{) 22, 86} \\ \underline{11, 43} \end{array}$$

## GCF

6. Determine the greatest common factor of each set of numbers

a) 150, 275, 420

$$\begin{array}{r} 5 \overline{) 150, 275, 420} \\ \underline{30, 55, 84} \end{array}$$

$$GCF = \boxed{5}$$

b) 120, 960, 1400

$$GCF = \boxed{20}$$

$$\begin{array}{r} 10 \overline{) 120, 960, 1400} \\ 2 \overline{) 12, 96, 14} \\ \underline{6, 48, 7} \end{array}$$

c) 126, 210, 546, 714

$$\begin{array}{r} 6 \overline{) 126, 210, 546, 714} \\ 7 \overline{) 21, 35, 91, 119} \\ \underline{3, 5, 13, 17} \end{array}$$

$$GCF = \boxed{42}$$

d) 220, 308, 484, 988

$$GCF = \boxed{4}$$

$$\begin{array}{r} 4 \overline{) 220, 308, 484, 988} \\ \underline{55, 77, 121, 247} \end{array}$$

7. Determine the least common multiple of each pair of numbers.

a) 12, 14

$$\begin{array}{r} 2 \overline{) 12, 14} \\ \underline{6, 7} \end{array}$$

$$LCM = \boxed{84}$$

b) 21, 45

$$LCM = \boxed{315}$$

$$\begin{array}{r} 3 \overline{) 21, 45} \\ \underline{7, 15} \end{array}$$

c) 45, 60

$$\begin{array}{r} 5 \overline{) 45, 60} \\ 3 \overline{) 9, 12} \\ \underline{3, 4} \end{array}$$

$$LCM = \boxed{180}$$

d) 38, 42

$$LCM = \boxed{798}$$

$$\begin{array}{r} 2 \overline{) 38, 42} \\ \underline{19, 21} \end{array}$$

e) 32, 45

$$\underline{\underline{32, 45}}$$

$$LCM = \boxed{1440}$$

f) 28, 52

$$LCM = \boxed{364}$$

$$\begin{array}{r} 4 \overline{) 28, 52} \\ \underline{7, 13} \end{array}$$

8. Explain the difference between determining the greatest common factor and the least common multiple of 12 and 14.

$$GCF = 2,$$

2 is the greatest divisor that is used to divide both 12 and 14.

$$\begin{array}{r} 2 \overline{) 12, 14} \\ \underline{6} \quad \underline{7} \end{array}$$

$$LCM = 2 \cdot 6 \cdot 7 = 84$$

84 is the smallest number (dividend) that could be divisible by both 12 and 14.

9. Two marching bands are to be arranged in rectangular arrays with the same number of columns. One band has 42 members, the other has 36 members. What is the greatest number of columns in the array?

GCF

$$\begin{array}{r} 6 \overline{) 42, 36} \\ \underline{7} \quad \underline{6} \end{array}$$

Ans: The greatest number of columns in the array is "6".

10. How could you use the least common multiple to add, subtract, or divide fractions? Use this strategy to evaluate these fractions.

LCM = common denominator

$$\begin{array}{l} \text{a) } \frac{9}{14} + \frac{11}{16} = \frac{72+77}{112} \\ = \frac{149}{112} = 1 \frac{37}{112} \end{array}$$

$$\begin{array}{l} \text{b) } \frac{8}{15} + \frac{11}{20} = \frac{32+33}{60} \\ = \frac{65}{60} = 1 \frac{5}{60} \\ = 1 \frac{1}{12} \end{array}$$

$$\begin{array}{r} 5 \overline{) 15, 20} \\ \underline{3} \quad \underline{4} \end{array}$$

$$\begin{array}{l} \text{c) } \frac{5}{24} - \frac{1}{22} = \frac{55-12}{264} \\ = \frac{43}{264} \end{array}$$

$$\begin{array}{l} \text{d) } \frac{9}{10} + \frac{5}{14} + \frac{4}{21} \\ = \frac{189+75+40}{210} \\ = \frac{304}{210} = 1 \frac{94}{210} = 1 \frac{47}{105} \end{array}$$

$$\begin{array}{r} 7 \overline{) 10, 14, 21} \\ 2 \overline{) 10, 2, 3} \\ \underline{5} \quad \underline{1} \quad \underline{3} \end{array}$$

$$\begin{array}{r} 2 \overline{) 14, 16} \\ \underline{7} \quad \underline{8} \end{array}$$

$$\begin{array}{r} 2 \overline{) 24, 22} \\ \underline{12} \quad \underline{11} \end{array}$$

$$5 \overline{) 25, 15, 8} \\ \underline{5, 3, 8}$$

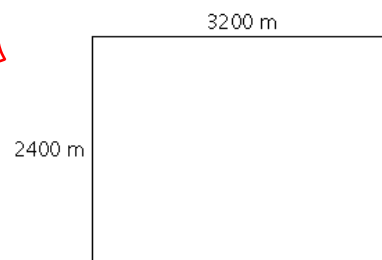
$$3 \overline{) 5, 18, 3} \\ \underline{5, 6, 1}$$

$$\begin{aligned} \text{e) } \frac{9}{25} + \frac{7}{15} - \frac{5}{8} \\ = \frac{216 + 280 - 375}{600} \\ = \frac{121}{600} \end{aligned}$$

$$\begin{aligned} \text{f) } \frac{3}{5} - \frac{5}{18} + \frac{7}{3} &= \frac{54 - 25 + 210}{90} \\ &= \frac{239}{90} = 2 \frac{59}{90} \end{aligned}$$

11. A developer wants to subdivide this rectangular plot of land into congruent square pieces. What is the side length of the largest possible square?

$$\underline{\text{GCF}} = \boxed{800}$$



$$\begin{array}{r} \textcircled{100} \overline{) 2400, 3200} \\ \underline{\phantom{00}0000} \\ \phantom{00}4000 \\ \textcircled{4} \overline{) 24, 32} \\ \underline{\phantom{00}00} \\ \phantom{00}32 \\ \textcircled{2} \overline{) 6, 8} \\ \underline{\phantom{00}00} \\ \phantom{00}3, 4 \end{array}$$

Ans: The largest possible square with the side length of  $\boxed{800\text{m}}$ .