

Introducing the Greatest Common Factor

Lesson 2-1

$$40 = 1, 2, 4, 5, 8, 10, 20, 40$$
$$60 = 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60$$

Math Message

- 1 The Parents' Association wants to assemble identical packages of pens and pencils for sixth graders. They have a supply of 40 pens and 60 pencils. They want to make as many packages as possible using all of the pens and pencils.

How many packages can they make? 20

How many pens and pencils will be in each package?

2 pens

3 pencils

- 2 The notation for greatest common factor (GCF) is written with parentheses. The greatest common factor of 12 and 15 is written like this: GCF (12, 15).

$$\text{GCF}(12, 15) = 3$$

Find the greatest common factor for each pair of numbers.

a. $\text{GCF}(30, 75) =$ _____

b. $\text{GCF}(100, 225) =$ _____

c. $\text{GCF}(25, 40) =$ _____

d. $\text{GCF}(24, 72) =$ _____

e. $\text{GCF}(13, 19) =$ _____

f. $\text{GCF}(25, 42) =$ _____

- 3 a. Explain how Problems 2e–2f are different from Problems 2a–2d.

- b. Write another pair of numbers whose greatest common factor is 1.

Try This

- 4 $\text{GCF}(60, 75, 120) =$ _____

The Grid Method for Finding the GCF

Lesson 2-1

DATE

TIME

The grid method can make it easier to find the GCF of pairs of large numbers.

Study the examples below to see how the grid method works.

2	42	30
3	21	15
	7	5

$$\text{GCF}(42, 30) = 2 * 3 = 6$$

3	15	45
5	5	15
	1	3

$$\text{GCF}(15, 45) = 3 * 5 = 15$$

3	525	300
25	175	100
	7	4

$$\text{GCF}(525, 300) = 3 * 25 = 75$$

- 1 Make a grid to help you find the GCF of 32 and 36.

$$\text{GCF}(32, 36) = \underline{\hspace{2cm}}$$

Use the grid method to find the greatest common factors.

2 a. $\text{GCF}(30, 45) = \underline{\hspace{2cm}}$

b. $\text{GCF}(36, 48) = \underline{\hspace{2cm}}$

c. $\text{GCF}(55, 110) = \underline{\hspace{2cm}}$

d. $\text{GCF}(120, 144) = \underline{\hspace{2cm}}$

Grid Method GCF (42, 30)

2	42	30
3	21	15
	7	5

$$2 \cdot 3 = 6$$

$$\text{GCF} = 6$$

GCF (32, 36)

2	32	36
2	16	18
	8	9

$$2 \cdot 2 = 4$$

$$\text{GCF} = 4$$

4	32	36
	8	9

④

GCF 12, 15, 21

3	12	15	21
	4	5	7

3

P 53-56
SL 2.1

Show GCF work
in spiral

Using the Greatest Common Factor to Solve Problems

Lesson 2-1

DATE

TIME

The greatest common factor is useful for finding equivalent fractions efficiently.

Example: Find an equivalent fraction for $\frac{24}{36}$.

Since $\text{GCF}(24, 36) = 12$,

$$\frac{24 \div 12}{36 \div 12} = \frac{2}{3}$$

1 Use the GCF to find equivalent fractions in one step.

a. $\frac{12}{18}$

GCF (12, 18) = 6

b. $\frac{24}{72}$

GCF (_____, _____) = _____

c. $\frac{25}{65}$

GCF (_____, _____) = _____

12 :	6	=	2
18 :	6	=	3
24 :		=	
72 :		=	
25 :		=	
65 :		=	

$$\begin{array}{r} 6 \overline{) 12 \cancel{18}} \\ \underline{12} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

2 How do you know you have found an equivalent fraction for a given fraction that has the smallest possible numbers in the numerator and denominator?

3 A gym class of 30 boys and 45 girls is divided into groups. Each group has the same number of students. Each group has only boys or only girls.

What is the greatest possible group size if every student participates? _____

4 a. On Monday, a florist has 33 lilies and 44 orchids. He wants to use all of the flowers to make as many identical arrangements as possible.

How many arrangements can he make? _____

b. How many of each kind of flower will he use for each arrangement? _____

5 Two numbers are greater than 10 but less than 40. Their GCF is 17. What are the numbers? _____

6 Two numbers are less than 100. Their GCF is 15. The smaller number is $\frac{1}{3}$ of the larger number. What are the numbers? _____



1 Add or subtract.

a. $\frac{8}{9} - \underline{\hspace{2cm}} = \frac{4}{9}$

b. $\frac{2}{15} + \underline{\hspace{2cm}} = \frac{6}{15}$

c. $\underline{\hspace{2cm}} - \frac{5}{8} = \frac{3}{8}$

d. $\frac{9}{10} + \underline{\hspace{2cm}} + \frac{1}{10} = 1\frac{3}{10}$



2 Estimate the product. Record a number sentence to show how you estimated.

a. $34 * 99$

b. $208 * 615$

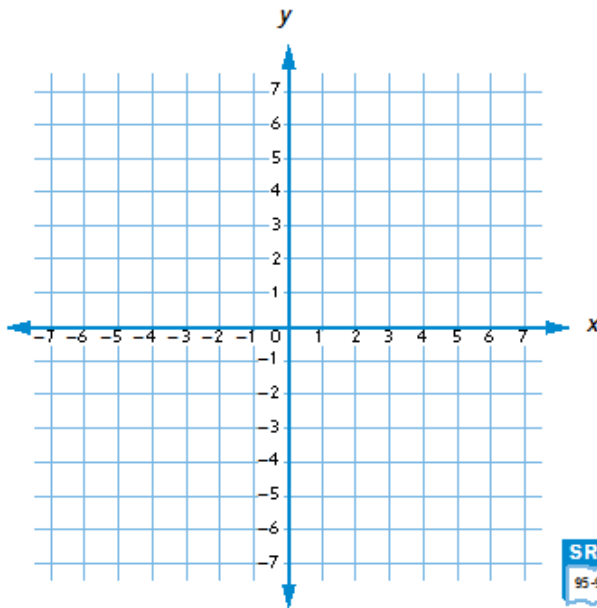
c. $785 * 340$

3 Plot and label the following points on the coordinate grid.

A: (4, 5) B: (-3, 6)

C: (2, -2) D: (0, 4)

E: (-6, -3) F: (1, 0)



4 **Writing/Reasoning** Use precise mathematical language to explain how you made one of your estimates in Problem 2. Predict whether your estimate will be greater than or less than the actual answer. Explain.

Finding the Greatest Common Factor

Home Link 2-1

NAME _____

DATE _____

TIME _____



- ① Use any method to find the greatest common factor for the number pairs.
- a. GCF (42, 56) = _____ b. GCF (32, 80) = _____
- c. GCF (72, 16) = _____ d. GCF (10, 40, 25) = _____

- ② Explain how you found GCF (42, 56) in Problem 1a.

- ③ Use the GCF to find an equivalent fraction for $\frac{48}{64}$. Show your work.

Answer: _____

- ④ Jenny will use 28 blue beads and 21 red beads to make identical bracelets.

- a. What is the greatest number of bracelets she can make?

- b. How many blue beads and how many red beads will be on each bracelet?

- ⑤ Explain how a set of numbers can have a GCF greater than 1.

Try This

- ⑥ GCF (12, 24, 30, 42) = _____

Practice

Insert the missing digits to make each number sentence true.

- ⑦ _____, _____ 63 - 3,9 _____ 9 = 2,83 _____ ⑧ 71, _____ 4 _____ - 4,8 _____ 6 = 6 _____, 270