Name _____ Date _____ Class _____

LESSON 8-1

Practice B

Factors and Greatest Common Factors

Write the prime factorization of each number.

1. 18 _____

2. 120 _____

3. 56 _____

4. 390 _____

5. 144 _____

6. 153 _____

Find the GCF of each pair of numbers.

7. 16 and 20 _____

8. 9 and 36 _____

9. 15 and 28 _____

10. 35 and 42 _____

11. 33 and 66 _____

12. 100 and 120 _____

13. 78 and 30 _____

14. 84 and 42 _____

Find the GCF of each pair of monomials.

15. $15x^4$ and $35x^2$ _____

16. $12p^2$ and $30q^5$ _____

17. $-6t^3$ and $9t$ _____

18. $27y^3z$ and $45x^2y$ _____

19. $12ab$ and 12 _____

20. $-8d^3$ and $14d^4$ _____

21. $-m^8n^4$ and $3m^6n$ _____

22. $10gh^2$ and $5h$ _____

23. Kirstin is decorating her bedroom wall with photographs. She has 36 photographs of family and 28 photographs of friends. She wants to arrange the photographs in rows so that each row has the same number of photographs, and photographs of family and photographs of friends do not appear in the same row.

a. How many rows will there be if Kirstin puts the greatest possible number of photographs in each row?

_____

b. How many photographs will be in each row? _____

LESSON 8-1

Practice A

Factors and Greatest Common Factors

Complete the prime factorization of each number.

1. 36 = 3 · 12 = 3 · 4 = 2 · 2 → $3^2 \cdot 2^2$

2. 80 = 2 · 40 = 2 · 20 = 2 · 10 = 2 · 5 → $2^4 \cdot 5$

3. 125 = 5 · 25 = 5 · 5 → 5^3

Find the GCF of each pair of numbers.

4. 15 and 40: 5

5. 8 and 32: 8

6. 36 and 48: 12

7. 50 and 75: 25

Find the GCF of each pair of monomials.

8. $12y^3$ and $15y^2$: $3y^2$

9. $3p^4$ and $4p$: p

10. $18x^6$ and $24y^2$: 6

11. $14xy^2$ and $21y^3$: $7y^2$

Mrs. Graham is creating student envelopes for a math activity in her class. She has 64 problems written on pieces of blue paper and 48 problems written on pieces of red paper. She needs to sort the pieces of paper so that each envelope has the same number of pieces and no envelope has both red and blue pieces.

12. If Mrs. Graham puts the greatest possible number of papers in each envelope, how many papers will go in each envelope? 16

13. How many envelopes can Mrs. Graham create if she puts the greatest possible number of papers in each envelope? 7

LESSON 8-1

Practice B

Factors and Greatest Common Factors

Write the prime factorization of each number.

1. 18: $2 \cdot 3^2$

2. 120: $2^3 \cdot 3 \cdot 5$

3. 56: $2^3 \cdot 7$

4. 390: $2 \cdot 3 \cdot 5 \cdot 13$

5. 144: $2^4 \cdot 3^2$

6. 153: $3^2 \cdot 17$

Find the GCF of each pair of numbers.

7. 16 and 20: 4

8. 9 and 36: 9

9. 15 and 28: 1

10. 35 and 42: 7

11. 33 and 66: 33

12. 100 and 120: 20

13. 78 and 30: 6

14. 84 and 42: 42

Find the GCF of each pair of monomials.

15. $15x^4$ and $35x^2$: $5x^2$

16. $12p^2$ and $30q^5$: 6

17. $-6t^3$ and $9t$: $3t$

18. $27y^3z$ and $45x^2y$: $9y$

19. $12ab$ and 12: 12

20. $-8d^3$ and $14d^4$: $2d^3$

21. $-m^8n^4$ and $3m^6n$: m^6n

22. $10gh^2$ and $5h$: $5h$

23. Kirstin is decorating her bedroom wall with photographs. She has 36 photographs of family and 28 photographs of friends. She wants to arrange the photographs in rows so that each row has the same number of photographs, and photographs of family and photographs of friends do not appear in the same row.

a. How many rows will there be if Kirstin puts the greatest possible number of photographs in each row? 16

b. How many photographs will be in each row? 4

LESSON 8-1

Practice C

Factors and Greatest Common Factors

Write the prime factorization of each number.

1. 75: $3 \cdot 5^2$

2. 160: $2^5 \cdot 5$

3. 3500: $2^2 \cdot 5^3 \cdot 7$

Find the GCF of each set of numbers.

4. 18 and 36: 18

5. 54 and 60: 6

6. 30 and 49: 1

7. 72 and 54: 18

8. 12, 18, and 30: 6

9. 8, 20, and 28: 4

10. 15, 20, and 42: 1

11. 16, 24 and 56: 8

Find the GCF of each set of monomials.

12. $21m^3$ and $28m$: $7m$

13. $13x$ and 26: 13

14. $8x^2y$ and $-12x^3y^2$: $4x^2y$

15. $30s^4t^4$ and $36s^3t^5$: $6s^3t^4$

16. $18t^5$, $120s^4$, and $30t^2$: 6

17. $4x^2$, $2x^6$, and $-x^3$: x^2

18. $-6m^5$, $5n^6$, and $8n$: 1

19. $35y^4z$, $-14y^3z^2$, and $-7y^2$: $7y^2$

20. Emilio has 30 oranges, 45 apples, and 20 pears with which to make fruit baskets. He wants each fruit basket to contain the same number of each type of fruit. If he puts the greatest possible number of each type of fruit into each basket, how many fruit baskets can he make? How many pieces of each type of fruit will be in each basket?

5 baskets; each will have 6 oranges, 9 apples, and 4 pears.

21. Nina is babysitting a little boy who has a collection of small vehicles. He has 36 cars, 12 vans, and 27 trucks. The boy is trying to line up the vehicles in rows, with the same number of vehicles in each row. He does not want different types of vehicles to be in the same row. Describe the arrangement of the rows if Nina helps the boy put the greatest possible number of vehicles in each row.

There will be 25 rows with 3 vehicles in each row.

There will be 12 rows of cars, 4 rows of vans, and 9 rows of trucks.

LESSON 8-1

Reteach

Factors and Greatest Common Factors

A prime number has exactly two factors, itself and 1. The number 1 is not a prime number. To write the **prime factorization** of a number, factor the number into its prime factors only.

Find the prime factorization of 30.

Choose any prime number that is a factor of 30. Then divide.

5|30 → 5|30, 6 → 5|30, 2|6 → 5|30, 2|6, 3 → 5|30, 2|6, 3|3 → 5|30, 2|6, 3|3, 1 → $30 = 5 \cdot 2 \cdot 3$

Repeat the process with the quotient.

The prime factorization of 30 is $2 \cdot 3 \cdot 5$.

Find the prime factorization of 84.

2|84, 2|42, 3|21, 7|7, 1

Check by multiplying: $2 \cdot 2 \cdot 3 \cdot 7 = 84$

The prime factorization of 84 is $2 \cdot 2 \cdot 3 \cdot 7$ or $2^2 \cdot 3 \cdot 7$.

Fill in the blanks below to find the prime factorization of the given numbers.

1. 2|44, 2|22, 11|11, 1 → $2^2 \cdot 11$

2. 2|56, 2|28, 2|14, 7|7, 1 → $2^3 \cdot 7$

3. 3|81, 3|27, 3|9, 3|3, 1 → 3^4

Write the prime factorization of each number.

4. 99: $3^2 \cdot 11$

5. 75: $3 \cdot 5^2$

6. 84: $2^2 \cdot 3 \cdot 7$