3. 1,631,000 > 1,586,000 or 1,586,000 < 1,631,000
4. −86
5. −28 > −86 or −86 < −28
6. Europe
7. Africa
8. **a.** 80; −80
   b. No; The numbers 80 and −80 are opposites. Opposite numbers are the same distance from zero. Therefore, the top of the cliff and the diver are at equal distances from the surface of the water.

1.2 Numbers as Factors

Finding Factors

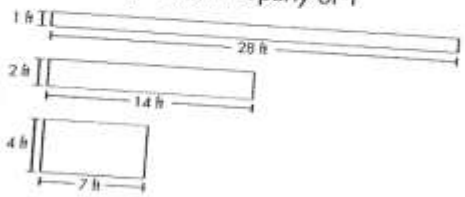
Student Logbook p. 10

1. to explore whole numbers and their products
2. **a.** 12 **b.** 3 and 4
3. multiplied; product
4. 3 × 4 = 12; 4 + 4 + 4 = 12; 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 12
5. unit squares; flat
6. length; width
7. 4
8. factors; product
9. 1 and 12, 2 and 6, 3 and 4
10.

Factor 1	×	Factor 2	=	Product
1	×	42	=	42
2	×	21	=	42
3	×	14	=	42
6	×	7	=	42

11. there is no whole number times 4 or 5 that equals 42
12. 4
13. 1, 2 and 3 and 6; 1
14. 1; number
15. 8; 4; 12; 24
16. equal to

Your Turn p. 19

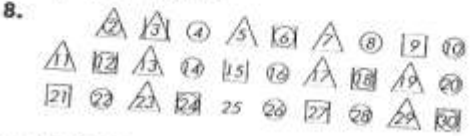
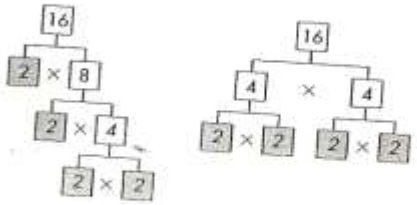
1. Answers may vary. For example: 3 × 6; 6 + 6 + 6; 1 × 18
2. 6; 3; 18
3. They have the same area because the product of the length and width of each rectangle equals 24. The Commutative Property of Multiplication states that if the positions of two factors are changed, their product remains the same.
4. **a.** 3; Commutative Property of Multiplication
   b. 1; Multiplication Property of 1
5. 

6.

Whole Number	Factor Pairs	Number of Different Pairs
20	1 and 20, 2 and 10, 4 and 5	3
30	1 and 30, 2 and 15, 3 and 10, 5 and 6	4
57	1 and 57, 3 and 19	2

Prime and Composite Numbers

Student Logbook p. 21

1. to discover how to use factors to sort the counting numbers
2. 1
3. 1 and 1; one
4. 1×4 and 2×2
5. two
6. two and 1 itself
7. 2, 3, 5, 7 and 11
8. 
9. 6, 12, 18, 24, 30
10. 31, 37, 41, 43, 47
11. composite
12. prime; composite; 1
13. prime factors
14. 

15. $2 \times 2 \times 5 \times 5$

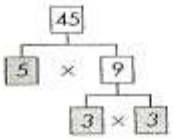
16. True

Your Turn p. 23

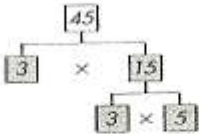
1.

	Different Factor Pairs	Number of Factors	Prime or Composite
11	1 and 11	2	P
12	1 and 12, 2 and 6, 3 and 4	6	C
13	1 and 13	2	P
14	1 and 14, 2 and 7	4	C
15	1 and 15, 3 and 5	4	C
16	1 and 16, 2 and 8, 4 and 4	6	C
17	1 and 17	2	P
18	1 and 18, 2 and 9, 3 and 6	6	C
19	1 and 19	2	P
20	1 and 20, 2 and 10, 4 and 5	6	C

2.

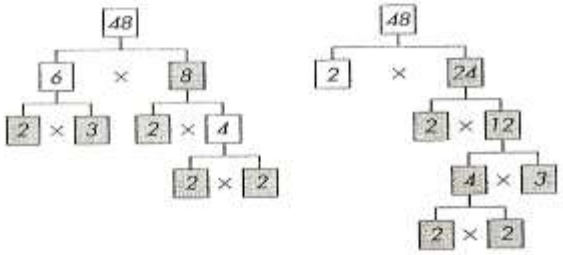


3.



4. Whether you begin the factor tree with 5×9 or 15×3, the prime factors of 45 are 3, 3, and 5, written in any order, $5 \times 3 \times 3$, or $3 \times 3 \times 5$ or $3 \times 5 \times 3$.

5. a.



b. $2 \times 3 \times 2 \times 2 \times 2$

6. Factors of 36: 1, 2, 3, 4, 9, 12, 18, 36

Prime Factors	Composite Factors
2, 3	4, 9, 12, 18, 36

Identifying Common Factors p. 25

Student Logbook

1. to investigate common factors of two counting numbers

2. No; Twelve is not a prime factor of 24 because 12 has more than 2 factors.

3. Prime factorization

4. $2 \times 2 \times 2 \times 3$

5. Venn

6. $2 \times 2 \times 2 \times 5$

7. 8

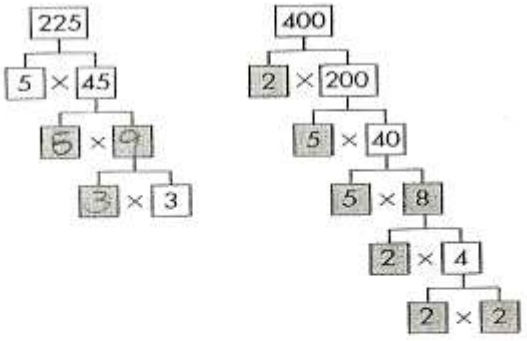
8. The numbers lie inside both loops. They are the factors that are common to the two numbers.

9. 24; 40

10. Greatest Common Factor

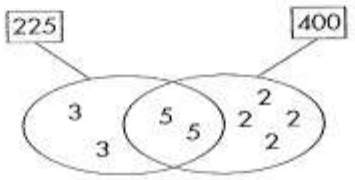
11. 2, 2, 2, 8

12. a.



b. $400 = 2 \times 2 \times 2 \times 2 \times 5 \times 5$
$225 = 3 \times 3 \times 5 \times 5$

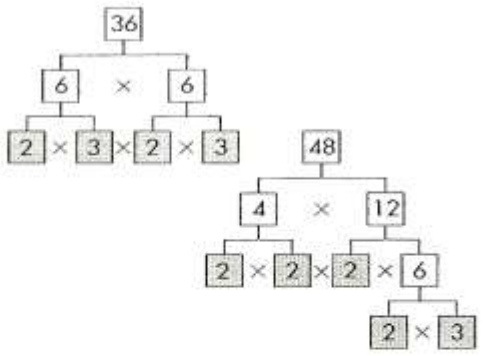
13.



14. 25

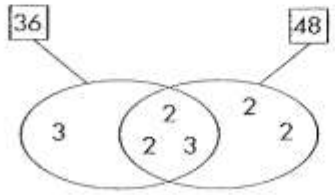
Your Turn p. 27

1.



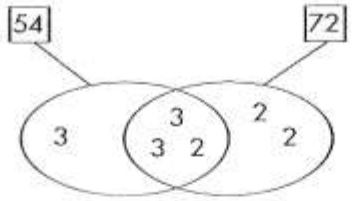
$36 = 2 \times 2 \times 3 \times 3$
$48 = 2 \times 2 \times 2 \times 2 \times 3$

2.

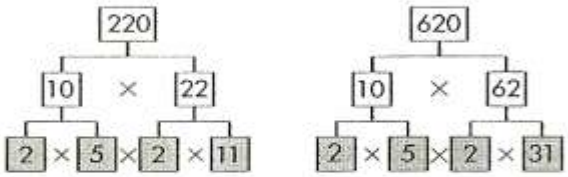


3. 12; Multiply the common prime factors of 36 and 48 ($2 \times 2 \times 3 = 12$).

4. 18; Factor trees may vary, but will reflect the factors in this Venn diagram.



5. Factor trees will vary. For example,



6. 2, 2 and 5

7. The GCF is the product of the common factors. $2 \times 2 \times 5 = 20$

8. **a.** Answers will vary. For example, the GCF of 6 and 15 is 3, and the GCF of 12 and 24 is 6.

b. Answers will vary. For example, 15 and 22

Unit Review

P. 29

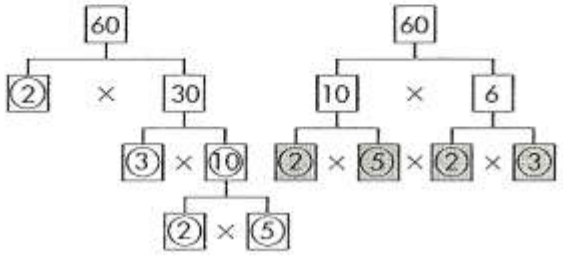
1. 1 and 32, 2 and 16, 4 and 8

a. 3

b. Multiplication is commutative. Both 2×16 and 16×2 equal 32. There is no difference between the products of the two factor pairs, so they are counted as one pair of factors.

2. Factor trees will vary but should show 2, 2, 3, and 5 circled as the prime factors of 60.

Sample factor trees:



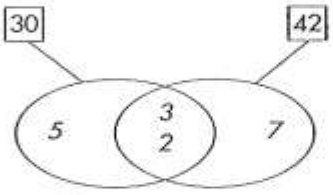
3.

Prime Numbers	Composite Numbers
3, 17, 23, 31, 43	8, 15, 27, 39, 49

A prime number has only itself and 1 as factors. A composite number has more than two factors. The numbers 8, 15, 27, 39, and 49 all have more than two factors, but 3, 17, 23, 31, and 43 have only 2 factors.

4. **a.** $2 \times 3 \times 5$; $2 \times 3 \times 7$

b.



c. 2 and 3

d. 6; The GCF is the product of the common factor

5. **a.** 6 **b.** 7; 8

c. The factors other than 1, common to 42 and 48 are 2, 3 and 6. The GCF is 6. So Terri can make a maximum of 6 bracelets, and each will contain 7 red beads and 8 gold beads.

Unit Assessment

P. 31

1. **a.** 8; The common factors other than 1 of 24, 64, and 48 are 2, 4, and 8. Since 8 is the GCF, the greatest number of birds one symbol can represent is 8.

   b. 3, 8, 6

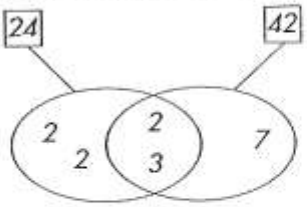
2. **a.** 4, 8; The Commutative Property of Multiplication

   b. The Multiplication Property of 1

3. 20; The prime numbers greater than 10 and less than 30 are 11, 13, 17, 19, 23, and 29. Twenty is 3 less than 23 and has six factors: 1, 2, 4, 5, 10, and 20.

4. 25 and 42; The numbers have these prime factors 10: 2 and 5; 18: 2 and 3; 22: 2 and 11; 25: 5; 42: 2, 3, and 7; 72: 2 and 3. A player must spin 25 or 42.

5. **a.**



   b. 6

6. **a.** 10

   b. 70

   c. 30

   d. 350 and 630