1-2 Prime Factors - Practice and Problem Solving

Tell whether each number is *prime*, *composite*, or *neither*.

11. 0

0 is neither prime nor composite.

13. 44

44 has more than 2 factors, 1, 2, 4, 11, 22, and 44, so it is composite.

15. 57

57 has more than 2 factors, 1, 3, 19, and 57, so it is composite.

17. 29

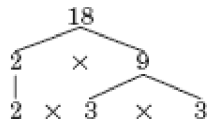29 has only 2 factors, 1 and 29, so it is prime.

19. 93

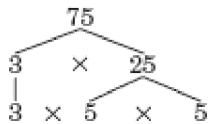93 has more than 2 factors, 1, 3, 31, and 93, so it is composite.

21. 31

31 has only 2 factors, 1 and 31, so it is prime.
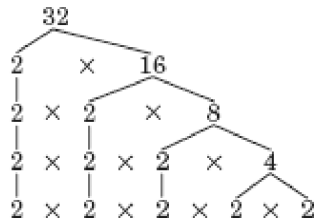
Find the prime factorization of each number.

23. 18

25. 75

27. 32
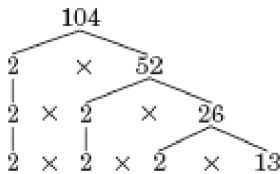
```
        32
      /    \
    2   ×    16
    |      /    \
    2  ×  2  ×    8
    |     |     /   \
    2  ×  2  ×  2  ×   4
    |     |     |    /  \
    2  ×  2  ×  2  × 2 × 2
```

29. 25

```
      25
     /  \
    5  × 5
```

31. 104

```
        104
      /     \
    2   ×    52
    |      /    \
    2  ×  2  ×    26
    |     |     /    \
    2  ×  2  ×  2  ×   13
```

33. 77

```
      77
     /   \
    7  ×  11
```

ANALYZE TABLES Use the table.

Breed	Weight (lb)	Breed	Weight (lb)
Cocker Spaniel	20	Siberian Husky	50
German Shepherd	81	Boxer	60
Labrador Retriever	67	Rottweiler	112
Beagle	25	Dalmatian	55
Golden Retriever	70	Poodle	57

Source: Dog Breed Info Center

35. Which weight(s) have a prime factorization with factors that are all the same number?

81

37. Of the Beagle, Golden Retriever, Siberian Husky, Rottweiler, and Dalmation breeds, which have weights that are composite numbers?

all

Tell whether each number is *prime*, *composite*, or *neither*.

39. 125

125 has more than 2 factors, 1, 5, 25, and 125, so it is composite.

41. 179

179 has only 2 factors, 1 and 179, so it is prime.

43. POSTCARDS Juliana bought packs of postcards that each had the same number of postcards. If she bought 20 postcards, find three possibilities for the number of packs and the number of postcards in each pack.

Sample answer: 2 packs with 10 cards each, 4 packs with 5 cards each, 5 packs with 4 cards each

45. REASONING All odd numbers greater than or equal to 7 can be expressed as the sum of three prime numbers. Which three prime numbers have a sum of 59? Justify your answer:

Sample answer: 7, 23, and 29; 7 + 23 + 29 = 59

47. CHALLENGE A *counterexample* is an example that shows a statement is not true. Find a counterexample for the statement below. Explain your reasoning.
   *All even numbers are composite numbers.*

The number 2 is a prime number because it has two factors, 1 and itself.

49. Find the prime factorization of 225?
   A $2 \times 3 \times 5 \times 5$
   B $3 \times 3 \times 3 \times 5 \times 5$
   C $3 \times 3 \times 5 \times 5$
   D $3 \times 5 \times 5 \times 7$

   C

51. The volume of a rectangular prism can be found by multiplying the length, width, and height of the prism. Which of the following could be the possible dimensions of the rectangular prism below?
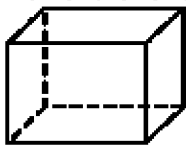
Volume = 75 ft³

   A 2 ft × 6 ft × 6 ft
   B 3 ft × 5 ft × 7 ft
   C 5 ft × 5 ft × 7 ft
   D 3 ft × 5 ft × 5 ft

   A $V = 2 \text{ ft} \times 6 \text{ ft} \times 6 \text{ ft} = 72 \text{ ft}^3$
   B $V = 3 \text{ ft} \times 5 \text{ ft} \times 7 \text{ ft} = 105 \text{ ft}^3$
   C $V = 5 \text{ ft} \times 5 \text{ ft} \times 7 \text{ ft} = 175 \text{ ft}^3$
   D $V = 3 \text{ ft} \times 5 \text{ ft} \times 5 \text{ ft} = 75 \text{ ft}^3$
   So, the correct answer is D.

53. **TIME** The Pintos family left their home at 11:45 a.m. They traveled 325 miles at 65 miles per hour. If they stopped for an hour to eat lunch, how many hours did it take them to reach their destination?

$325 \div 65 = 5$ add one hour for lunch. So $5 + 1 = 6$.

PREREQUISITE SKILL Multiply.

55. 5×5

$5 \times 5 = 25$

57. $10 \times 10 \times 10$

$10 \times 10 \times 10 = 100 \times 10 = 1,000$