

Prime Factoring

When a number written as the product of prime factors, it is called the prime factorization of a number.

$$48 = 3 * 2 * 2 * 2 * 2 = 3 * 2^4$$

To make finding the prime factors easy, you need to be a master of “**The Factor Facts**” and **Divisibility Rules** for 2, 3, 5, 7 and 11. This workbook will review those skills before showing you the strategies for finding prime factors.

There are 2 attack strategies for quickly and easily finding the prime factors of a given number.

1. Easy Primes
2. Ladder

Factor Facts

There are 32 numbers that are supposed to be quick and easy to recognize the factors of. Math6.org calls these numbers, “Factor Facts” and offers matching exercises and drills to help you learn them quickly and easily.

| | | | | | | | |
|----|----|----|----|----|----|----|-----|
| 12 | 18 | 25 | 32 | 42 | 50 | 63 | 80 |
| 14 | 20 | 27 | 35 | 45 | 54 | 64 | 81 |
| 15 | 21 | 28 | 36 | 48 | 56 | 70 | 90 |
| 16 | 24 | 30 | 40 | 49 | 60 | 72 | 100 |

Easy Factors

Often called the tree method, easy primes involves learning to think of an easy factor and write it as the product of its prime factors. Students will think 6 and write $2*3$. So when they are thinking $6*8$, they write $3*2 * 2*2*2$. This process isn’t difficult, but it does take practice to make it so easy that it’s second nature.

$$4 = 2 * 2$$

$$6 = 3 * 2$$

$$8 = 2 * 2 * 2$$

$$9 = 3 * 3$$

$$10 = 5 * 2$$

Take a look at the “Factor Facts” and notice that **all of them** are made out factors that can be easily primed.

$$28 \text{ is } 7 * 4 = 7 * 2 * 2; \quad 56 \text{ is } 7 * 8 = 7 * 2 * 2 * 2; \quad 90 \text{ is } 9 * 10 = 3 * 3 * 5 * 2$$

Ladders

When you don’t know the “easy factors” of a number, you use the divisibility rules for 2, 3, 5, 7, and 11 to begin breaking a number down. Using the divisibility rules and short division, you can quickly find all of the prime factors of any number.

$$\begin{array}{r} 17 \\ 3 \overline{) 51} \\ 2 \overline{) 102} \\ 2 \overline{) 204} \end{array}$$

$$204 = 17 * 3 * 2 * 2$$

The “Factor Facts”

Lesson Box

The following numbers are numbers that you should be able to look at and instantly **know** the factors of.

| | | | |
|----|----|----|-----|
| 12 | 25 | 42 | 63 |
| 14 | 27 | 45 | 64 |
| 15 | 28 | 48 | 70 |
| 16 | 30 | 49 | 72 |
| 18 | 32 | 50 | 80 |
| 20 | 35 | 54 | 81 |
| 21 | 36 | 56 | 90 |
| 24 | 40 | 60 | 100 |

If **any** of these multiplication facts are still giving you pause and stumbles, please make flash cards, study “Factor Facts” @ Math6.org, or copy them 10 times each until you are able to instantly declare the factors for these numbers.

Models

| | | | |
|--------------|----|----------------|-----|
| <u>4 • 3</u> | 12 | <u>9 • 6</u> | 54 |
| <u>7 • 2</u> | 14 | <u>6 • 5</u> | 30 |
| <u>5 • 3</u> | 15 | <u>8 • 4</u> | 32 |
| <u>4 • 4</u> | 16 | <u>7 • 5</u> | 35 |
| <u>9 • 2</u> | 18 | <u>6 • 6</u> | 36 |
| <u>5 • 4</u> | 20 | <u>8 • 5</u> | 40 |
| <u>7 • 3</u> | 21 | <u>7 • 6</u> | 42 |
| <u>6 • 4</u> | 24 | <u>9 • 5</u> | 45 |
| <u>5 • 5</u> | 25 | <u>8 • 6</u> | 48 |
| <u>9 • 3</u> | 27 | <u>9 • 5</u> | 49 |
| <u>7 • 4</u> | 28 | <u>10 • 5</u> | 50 |
| | | <u>10 • 6</u> | 60 |
| | | <u>8 • 7</u> | 56 |
| | | <u>9 • 7</u> | 63 |
| | | <u>8 • 8</u> | 64 |
| | | <u>10 • 7</u> | 70 |
| | | <u>9 • 8</u> | 72 |
| | | <u>10 • 8</u> | 80 |
| | | <u>9 • 9</u> | 81 |
| | | <u>10 • 9</u> | 90 |
| | | <u>10 • 10</u> | 100 |

I want you to be **much faster** and make this skill **even easier**. I don’t think you need to use the multiplication sign between the factors the way that I did. As you complete the drill on this page and the drills on the next, you may drop the multiplication sign **and** remember that multiplication is commutative – **order** doesn’t matter! $120 = 12 \cdot 10$; you may write 12 10 on your paper and leave the multiplication sign out.

| | | | |
|----------|----------|-----------|----------|
| _____ 42 | _____ 40 | _____ 18 | _____ 70 |
| _____ 60 | _____ 24 | _____ 28 | _____ 35 |
| _____ 54 | _____ 64 | _____ 100 | _____ 42 |
| _____ 56 | _____ 20 | _____ 63 | _____ 64 |
| _____ 30 | _____ 25 | _____ 50 | _____ 48 |
| _____ 21 | _____ 45 | _____ 12 | _____ 15 |
| _____ 70 | _____ 35 | _____ 16 | _____ 60 |
| _____ 27 | _____ 80 | _____ 72 | _____ 72 |
| _____ 49 | _____ 81 | _____ 14 | _____ 56 |
| _____ 48 | _____ 90 | _____ 36 | _____ 28 |
| _____ 32 | _____ 15 | _____ 90 | _____ 81 |

[use **Key 1** to check your answers]

Factor Facts Drills

Use one drill each day as a warm-up before completing the assignments for the next 3 sections of the workbook.

| [Key 3] | [Key 4] | [Key 5] | [Key 6] |
|-----------|----------|----------|----------|
| _____ 70 | _____ 64 | _____ 90 | _____ 14 |
| _____ 72 | _____ 70 | _____ 60 | _____ 32 |
| _____ 48 | _____ 72 | _____ 50 | _____ 25 |
| _____ 45 | _____ 12 | _____ 54 | _____ 56 |
| _____ 25 | _____ 40 | _____ 49 | _____ 90 |
| _____ 14 | _____ 15 | _____ 20 | _____ 21 |
| _____ 54 | _____ 45 | _____ 12 | _____ 45 |
| _____ 15 | _____ 48 | _____ 80 | _____ 16 |
| _____ 27 | _____ 42 | _____ 16 | _____ 20 |
| _____ 60 | _____ 24 | _____ 63 | _____ 28 |
| _____ 81 | _____ 56 | _____ 70 | _____ 24 |
| _____ 100 | _____ 60 | _____ 40 | _____ 60 |
| _____ 64 | _____ 32 | _____ 35 | _____ 54 |
| _____ 40 | _____ 18 | _____ 15 | _____ 72 |
| _____ 24 | _____ 30 | _____ 72 | _____ 48 |
| _____ 56 | _____ 49 | _____ 27 | _____ 70 |
| _____ 16 | _____ 25 | _____ 28 | _____ 35 |
| _____ 32 | _____ 27 | _____ 36 | _____ 18 |
| _____ 20 | _____ 80 | _____ 32 | _____ 40 |
| _____ 36 | _____ 90 | _____ 14 | _____ 36 |
| _____ 63 | _____ 14 | _____ 45 | _____ 64 |
| _____ 42 | _____ 28 | _____ 48 | _____ 42 |
| _____ 12 | _____ 16 | _____ 24 | _____ 15 |
| _____ 18 | _____ 50 | _____ 18 | _____ 63 |
| _____ 49 | _____ 20 | _____ 64 | _____ 81 |

The “Easy Primes”

Lesson Box

We need to learn to think of a few numbers as the product of their primes. The easy primes are 4, 6, 8, 9, and 10!

$$4 = 2 \cdot 2$$

$$6 = 3 \cdot 2$$

$$8 = 2 \cdot 2 \cdot 2$$

$$9 = 3 \cdot 3$$

$$10 = 5 \cdot 2$$

When you get good at thinking “10” and writing $5 \cdot 2$, the rest of the prime factoring skill will be much easier. Use the drills on this page and/or practice “[Easy Primes](#)” @ Math6.org!

Models

$$\underline{\quad 2 \quad} = 2$$

$$\underline{\quad 3 \quad} = 3$$

$$\underline{\quad 2 \cdot 2 \quad} = 4$$

$$\underline{\quad 5 \quad} = 5$$

$$\underline{\quad 3 \cdot 2 \quad} = 6$$

$$\underline{\quad 7 \quad} = 7$$

$$\underline{\quad 2 \cdot 2 \cdot 2 \quad} = 8$$

$$\underline{\quad 3 \cdot 3 \quad} = 9$$

$$\underline{\quad 5 \cdot 2 \quad} = 10$$

I want you to be **much faster** and make this skill **even easier**. I don’t think you need to use the multiplication sign between the factors the way that I did. As you complete the drill on this page, you may drop the multiplication sign **and** remember that multiplication is commutative – **order** doesn’t matter! $6 = 3 \cdot 2$; you may write 3 2 on your paper and leave the multiplication sign out.

| | | | |
|-----------|------------|-----------|-----------|
| _____ = 5 | _____ = 10 | _____ = 2 | _____ = 3 |
|-----------|------------|-----------|-----------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 8 | _____ = 4 | _____ = 4 | _____ = 9 |
|-----------|-----------|-----------|-----------|

| | | | |
|------------|-----------|-----------|-----------|
| _____ = 10 | _____ = 3 | _____ = 9 | _____ = 4 |
|------------|-----------|-----------|-----------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 4 | _____ = 2 | _____ = 3 | _____ = 5 |
|-----------|-----------|-----------|-----------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 9 | _____ = 8 | _____ = 7 | _____ = 6 |
|-----------|-----------|-----------|-----------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 2 | _____ = 6 | _____ = 6 | _____ = 8 |
|-----------|-----------|-----------|-----------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 3 | _____ = 5 | _____ = 5 | _____ = 4 |
|-----------|-----------|-----------|-----------|

| | | | |
|-----------|------------|-----------|-----------|
| _____ = 7 | _____ = 10 | _____ = 2 | _____ = 2 |
|-----------|------------|-----------|-----------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 6 | _____ = 5 | _____ = 8 | _____ = 7 |
|-----------|-----------|-----------|-----------|

| | | | |
|-----------|-----------|------------|------------|
| _____ = 7 | _____ = 8 | _____ = 10 | _____ = 10 |
|-----------|-----------|------------|------------|

| | | | |
|-----------|-----------|-----------|-----------|
| _____ = 9 | _____ = 6 | _____ = 7 | _____ = 9 |
|-----------|-----------|-----------|-----------|

[use **Key 7** to check your answers]

The “Easy Factors”

Lesson Box

Now that we know the “Easy Primes”, we put it together with the “Factor Facts” and easily factor these numbers! When you see a “Factor Fact” you will know the prime factorization!

$$40 = 8 \cdot 5 = 2 \cdot 2 \cdot 2 \cdot 5$$

$$42 = 7 \cdot 6 = 7 \cdot 3 \cdot 2$$

$$63 = 9 \cdot 7 = 3 \cdot 3 \cdot 7$$

$$72 = 9 \cdot 8 = 3 \cdot 3 \cdot 2 \cdot 2 \cdot 2$$

Think of the factors and write those factors as easy primes. You will quickly and easily be able to factor most of the fractions that you will soon face! Use the drills on this page and/or practice “Easy Factors” @ Math6.org!

Models

$$\underline{7 \cdot 5} = 35$$

$$\underline{3 \cdot 3 \cdot 7} = 63$$

$$\underline{5 \cdot 3} = 15$$

$$\underline{5 \cdot 2 \cdot 3 \cdot 3} = 90$$

$$\underline{2 \cdot 2 \cdot 2 \cdot 2} = 16$$

$$\underline{7 \cdot 2} = 14$$

$$\underline{3 \cdot 2 \cdot 2 \cdot 2} = 24$$

I want you to be **much faster** and make this skill **even easier**. I don’t think you need to use the multiplication sign between the factors the way that I did. As you complete the drills on this page and the next, you may drop the multiplication sign **and** remember that multiplication is commutative – **order** doesn’t matter! $6 = 3 \cdot 2$; you may write 3 2 on your paper and leave the multiplication sign out.

$$\underline{\hspace{2cm}} = 30$$

$$\underline{\hspace{2cm}} = 36$$

$$\underline{\hspace{2cm}} = 18$$

$$\underline{\hspace{2cm}} = 56$$

$$\underline{\hspace{2cm}} = 21$$

$$\underline{\hspace{2cm}} = 35$$

$$\underline{\hspace{2cm}} = 48$$

$$\underline{\hspace{2cm}} = 25$$

$$\underline{\hspace{2cm}} = 40$$

$$\underline{\hspace{2cm}} = 24$$

$$\underline{\hspace{2cm}} = 63$$

$$\underline{\hspace{2cm}} = 42$$

$$\underline{\hspace{2cm}} = 16$$

$$\underline{\hspace{2cm}} = 81$$

$$\underline{\hspace{2cm}} = 54$$

$$\underline{\hspace{2cm}} = 45$$

$$\underline{\hspace{2cm}} = 70$$

$$\underline{\hspace{2cm}} = 80$$

$$\underline{\hspace{2cm}} = 15$$

$$\underline{\hspace{2cm}} = 32$$

$$\underline{\hspace{2cm}} = 12$$

$$\underline{\hspace{2cm}} = 14$$

$$\underline{\hspace{2cm}} = 50$$

$$\underline{\hspace{2cm}} = 64$$

$$\underline{\hspace{2cm}} = 60$$

$$\underline{\hspace{2cm}} = 90$$

$$\underline{\hspace{2cm}} = 100$$

$$\underline{\hspace{2cm}} = 72$$

$$\underline{\hspace{2cm}} = 20$$

$$\underline{\hspace{2cm}} = 49$$

$$\underline{\hspace{2cm}} = 28$$

$$\underline{\hspace{2cm}} = 27$$

$$\underline{\hspace{2cm}} = 24$$

[use **Key 8** to check your answers]

Easy Factor Drills

Use one drill each day as a warm-up before completing the assignments for the next 3 sections of the workbook.

[Key 9]

_____ = 15
_____ = 35
_____ = 54
_____ = 16
_____ = 36
_____ = 49
_____ = 12
_____ = 24
_____ = 81
_____ = 32
_____ = 72
_____ = 45
_____ = 100
_____ = 27
_____ = 20
_____ = 60
_____ = 42
_____ = 30
_____ = 28
_____ = 70
_____ = 14
_____ = 50
_____ = 48
_____ = 56
_____ = 21

[Key 10]

_____ = 40
_____ = 80
_____ = 24
_____ = 14
_____ = 81
_____ = 12
_____ = 30
_____ = 28
_____ = 42
_____ = 60
_____ = 27
_____ = 64
_____ = 100
_____ = 25
_____ = 15
_____ = 21
_____ = 90
_____ = 50
_____ = 16
_____ = 20
_____ = 70
_____ = 72
_____ = 45
_____ = 36
_____ = 48

[Key 11]

_____ = 100
_____ = 25
_____ = 35
_____ = 36
_____ = 81
_____ = 80
_____ = 21
_____ = 56
_____ = 70
_____ = 64
_____ = 24
_____ = 27
_____ = 30
_____ = 50
_____ = 16
_____ = 60
_____ = 28
_____ = 49
_____ = 14
_____ = 90
_____ = 15
_____ = 45
_____ = 20
_____ = 12
_____ = 42

Factor Ladders

Lesson Box

When a the prime factorization of a number is not easily known using “Factor Facts”, you apply the divisibility rules for 2, 3, 5, 7, and 11 to find a divisor. Use short division to build a “Factor Ladder”.

1. Check for divisibility by 2, 3, 5, 7, and/or 11.
2. Use short division to find the quotient.
3. Repeat steps 1 and 2 on the quotient.

Continue until the quotient is a prime number.

Models

$$\begin{array}{r} 113 \\ 2 \overline{) 226} \end{array}$$

$$226 = 113 \cdot 2$$

$$\begin{array}{r} 53 \\ 3 \overline{) 159} \end{array}$$

$$159 = 53 \cdot 3$$

$$\begin{array}{r} 23 \\ 2 \overline{) 46} \\ 5 \overline{) 230} \end{array}$$

$$230 = 23 \cdot 5 \cdot 2$$

$$\begin{array}{r} 23 \\ 7 \overline{) 161} \\ 2 \overline{) 322} \end{array}$$

$$322 = 23 \cdot 7 \cdot 2$$

Use factor ladders to find the prime factorization of each of these numbers. Write the prime factorization on the line and check your work. Remember that multiplication is commutative so the **order** of your answers will not matter.

_____ = 129

_____ = 74

_____ = 127

_____ = 143

_____ = 133

_____ = 84

_____ = 147

_____ = 96

_____ = 118

_____ = 86

_____ = 171

_____ = 166

_____ = 58

_____ = 51

_____ = 122

_____ = 164

_____ = 156

_____ = 56

_____ = 102

_____ = 126

_____ = 34

_____ = 69

_____ = 152

_____ = 132

_____ = 144

_____ = 180

_____ = 38

_____ = 148

_____ = 159

_____ = 168

_____ = 26

_____ = 177

_____ = 172

_____ = 170

_____ = 93

_____ = 46

[use **Key 12** to check your answers]

Find the Prime Factorization of each of the numbers below. You should use exponents to make writing and checking your work easier.

Drill A

_____ = 24

_____ = 25

_____ = 32

_____ = 40

_____ = 42

_____ = 51

_____ = 78

_____ = 80

_____ = 81

_____ = 82

_____ = 84

_____ = 90

_____ = 91

_____ = 94

_____ = 210

_____ = 500

Drill B

_____ = 17

_____ = 18

_____ = 20

_____ = 21

_____ = 44

_____ = 49

_____ = 50

_____ = 58

_____ = 63

_____ = 72

_____ = 87

_____ = 95

_____ = 98

_____ = 220

_____ = 225

_____ = 400

Drill C

_____ = 8

_____ = 12

_____ = 16

_____ = 22

_____ = 30

_____ = 34

_____ = 45

_____ = 48

_____ = 64

_____ = 66

_____ = 76

_____ = 88

_____ = 100

_____ = 102

_____ = 350

_____ = 474

Several of these problems have **more than one** possible answer. Make sure you want your answer is actually wrong before you mark it wrong. Also, remember that multiplication is commutative so the order you chose doesn't matter!

[Key 1]

| | | | |
|----------------------------|-----------------------------|----------------------------|--------------|
| $7 \cdot 6$ | $8 \cdot 5$ or $10 \cdot 4$ | $9 \cdot 2$ or $6 \cdot 3$ | $10 \cdot 7$ |
| $10 \cdot 6$ | $8 \cdot 3$ or $6 \cdot 4$ | $7 \cdot 4$ | $7 \cdot 5$ |
| $6 \cdot 6$ or $9 \cdot 4$ | $8 \cdot 8$ | $10 \cdot 10$ | $7 \cdot 6$ |
| $8 \cdot 7$ | $5 \cdot 4$ or $10 \cdot 2$ | $9 \cdot 3$ | $8 \cdot 8$ |
| $6 \cdot 5$ | $5 \cdot 5$ | $10 \cdot 5$ | $8 \cdot 6$ |
| $7 \cdot 3$ | $9 \cdot 5$ | $4 \cdot 3$ or $6 \cdot 2$ | $5 \cdot 3$ |
| $10 \cdot 7$ | $7 \cdot 5$ | $4 \cdot 4$ or $8 \cdot 2$ | $10 \cdot 6$ |
| $9 \cdot 3$ | $10 \cdot 8$ | $9 \cdot 8$ | $9 \cdot 8$ |
| $7 \cdot 7$ | $9 \cdot 9$ | $7 \cdot 2$ | $8 \cdot 7$ |
| $8 \cdot 6$ | $10 \cdot 9$ | $6 \cdot 6$ or $9 \cdot 4$ | $7 \cdot 4$ |
| $8 \cdot 4$ | $5 \cdot 3$ | $10 \cdot 9$ | $9 \cdot 9$ |

Remember that multiplication is commutative – **order** doesn't matter!

[Key 7]

| | | | |
|---------------------|---------------------|---------------------|---------------------|
| 5 | $5 \cdot 2$ | 2 | 3 |
| $2 \cdot 2 \cdot 2$ | $2 \cdot 2$ | $2 \cdot 2$ | $3 \cdot 3$ |
| $5 \cdot 2$ | 3 | $3 \cdot 3$ | $2 \cdot 2$ |
| $2 \cdot 2$ | 2 | 3 | 5 |
| $3 \cdot 3$ | $2 \cdot 2 \cdot 2$ | 7 | $3 \cdot 2$ |
| 2 | $3 \cdot 2$ | $3 \cdot 2$ | $2 \cdot 2 \cdot 2$ |
| 3 | 5 | 5 | $2 \cdot 2$ |
| 7 | $5 \cdot 2$ | 2 | 2 |
| $3 \cdot 2$ | 5 | $2 \cdot 2 \cdot 2$ | 7 |
| 7 | $2 \cdot 2 \cdot 2$ | $5 \cdot 2$ | $5 \cdot 2$ |
| $3 \cdot 3$ | $3 \cdot 2$ | 7 | $3 \cdot 3$ |

Factor Facts Drills

Use one drill each day as a warm-up before completing the assignments for the next 3 sections of the workbook.

| [Key 3] | [Key 4] | [Key 5] | [Key 6] |
|-----------------|-----------------|-----------------|-----------------|
| 7 • 7 | 8 • 8 | 10 • 9 | 7 • 2 |
| 9 • 8 | 10 • 7 | 10 • 6 | 8 • 4 |
| 8 • 6 | 9 • 8 | 10 • 5 | 5 • 5 |
| 9 • 5 | 4 • 3 or 6 • 2 | 9 • 4 | 8 • 7 |
| 5 • 5 | 8 • 5 or 10 • 4 | 7 • 7 | 10 • 9 |
| 7 • 2 | 5 • 3 | 5 • 4 or 10 • 2 | 7 • 3 |
| 8 • 7 | 9 • 5 | 4 • 3 or 6 • 2 | 9 • 5 |
| 5 • 3 | 8 • 6 | 10 • 8 | 6 • 3 or 8 • 2 |
| 9 • 3 | 7 • 6 | 4 • 4 or 8 • 2 | 5 • 4 or 10 • 2 |
| 10 • 6 | 6 • 4 or 8 • 3 | 9 • 7 | 7 • 4 |
| 9 • 9 | 8 • 7 | 10 • 7 | 6 • 4 or 8 • 3 |
| 10 • 10 | 10 • 6 | 8 • 5 or 10 • 4 | 10 • 6 |
| 8 • 8 | 8 • 4 | 7 • 5 | 9 • 6 |
| 8 • 5 or 10 • 4 | 6 • 3 or 9 • 2 | 5 • 3 | 9 • 8 |
| 6 • 4 or 8 • 3 | 6 • 5 or 10 • 3 | 9 • 8 | 8 • 6 |
| 8 • 7 | 7 • 7 | 9 • 3 | 10 • 7 |
| 4 • 4 or 8 • 2 | 5 • 5 | 7 • 4 | 7 • 5 |
| 8 • 4 | 9 • 3 | 6 • 6 or 9 • 4 | 6 • 3 or 9 • 2 |
| 5 • 4 or 10 • 2 | 10 • 8 | 8 • 4 | 8 • 5 or 10 • 4 |
| 6 • 6 or 9 • 4 | 10 • 9 | 7 • 2 | 6 • 6 or 9 • 4 |
| 9 • 7 | 7 • 2 | 9 • 5 | 8 • 8 |
| 7 • 6 | 7 • 4 | 8 • 6 | 7 • 6 |
| 4 • 3 or 6 • 2 | 6 • 3 or 8 • 2 | 6 • 4 or 8 • 3 | 5 • 3 |
| 6 • 3 or 8 • 2 | 10 • 5 | 6 • 3 or 9 • 2 | 9 • 7 |
| 7 • 7 | 5 • 4 or 10 • 2 | 8 • 8 | 9 • 9 |

Remember that multiplication is commutative – **order** doesn't matter!

[Key 8]

$3 \cdot 2 \cdot 5$

$3 \cdot 2 \cdot 3 \cdot 2$

$3 \cdot 3 \cdot 2$

$2 \cdot 2 \cdot 2 \cdot 7$

$7 \cdot 3$

$7 \cdot 5$

$2 \cdot 2 \cdot 2 \cdot 3 \cdot 2$

$5 \cdot 5$

$2 \cdot 2 \cdot 2 \cdot 5$

$3 \cdot 2 \cdot 2 \cdot 2$

$3 \cdot 3 \cdot 7$

$7 \cdot 3 \cdot 2$

$2 \cdot 2 \cdot 2 \cdot 2$

$3 \cdot 3 \cdot 3 \cdot 3$

$3 \cdot 3 \cdot 3 \cdot 2$

$3 \cdot 3 \cdot 5$

$5 \cdot 2 \cdot 7$

$5 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$5 \cdot 3$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$2 \cdot 2 \cdot 3$

$7 \cdot 2$

$5 \cdot 2 \cdot 5$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$5 \cdot 2 \cdot 3 \cdot 2$

$5 \cdot 2 \cdot 3 \cdot 3$

$5 \cdot 2 \cdot 5 \cdot 2$

$3 \cdot 3 \cdot 2 \cdot 2 \cdot 2$

$5 \cdot 2 \cdot 2$

$7 \cdot 7$

$7 \cdot 2 \cdot 2$

$3 \cdot 3 \cdot 3$

$3 \cdot 2 \cdot 2 \cdot 2$

Use factor ladders to find the prime factorization of each of these numbers. Write the prime factorization on the line and check your work. Remember that multiplication is commutative so the **order** of your answers will not matter.

$43 \cdot 3$

$37 \cdot 2$

$127 \cdot 1$

$13 \cdot 11$

$19 \cdot 7$

$7 \cdot 3 \cdot 2 \cdot 2$

$7 \cdot 7 \cdot 3$

$3 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$59 \cdot 2$

$43 \cdot 2$

$19 \cdot 3 \cdot 3$

$83 \cdot 3$

$29 \cdot 2$

$17 \cdot 3$

$61 \cdot 2$

$41 \cdot 2 \cdot 2$

$13 \cdot 3 \cdot 2 \cdot 2$

$7 \cdot 2 \cdot 2 \cdot 2$

$17 \cdot 3 \cdot 2$

$7 \cdot 3 \cdot 3 \cdot 2$

$17 \cdot 2$

$23 \cdot 3$

$19 \cdot 2 \cdot 2 \cdot 2$

$11 \cdot 3 \cdot 2 \cdot 2$

$3 \cdot 3 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$5 \cdot 3 \cdot 3 \cdot 2 \cdot 2$

$19 \cdot 2$

$37 \cdot 2 \cdot 2$

$53 \cdot 3$

$7 \cdot 3 \cdot 2 \cdot 2 \cdot 2$

$13 \cdot 2$

$59 \cdot 3$

$43 \cdot 2 \cdot 2$

$17 \cdot 5 \cdot 2$

$31 \cdot 3$

$23 \cdot 2$

[Key 12]

Easy Factor Drills

Use one drill each day as a warm-up before completing the assignments for the next 3 sections of the workbook.

[Key 9]

5 • 3
7 • 5
3 • 3 • 3 • 2
2 • 2 • 2 • 2
3 • 2 • 3 • 2
7 • 7
2 • 2 • 3
3 • 2 • 2 • 2
3 • 3 • 3 • 3
2 • 2 • 2 • 2 • 2
3 • 3 • 2 • 2 • 2
3 • 3 • 5
5 • 2 • 5 • 2
3 • 3 • 3
5 • 2 • 2
5 • 2 • 3 • 2
7 • 3 • 2
3 • 2 • 5
7 • 2 • 2
5 • 2 • 7
7 • 2
5 • 2 • 5
2 • 2 • 2 • 3 • 2
2 • 2 • 2 • 7
7 • 3

[Key 10]

2 • 2 • 2 • 5
5 • 2 • 2 • 2 • 2
3 • 2 • 2 • 2
7 • 2
3 • 3 • 3 • 3
2 • 2 • 3
3 • 2 • 5
7 • 2 • 2
7 • 3 • 2
5 • 2 • 3 • 2
3 • 3 • 3
2 • 2 • 2 • 2 • 2 • 2
5 • 2 • 5 • 2
5 • 5
5 • 3
7 • 3
5 • 2 • 3 • 3
5 • 2 • 5
2 • 2 • 2 • 2
5 • 2 • 2
5 • 2 • 7
3 • 3 • 2 • 2 • 2
3 • 3 • 5
3 • 2 • 3 • 2
2 • 2 • 2 • 3 • 2

[Key 11]

5 • 2 • 5 • 2
5 • 5
7 • 5
3 • 2 • 3 • 2
3 • 3 • 3 • 3
5 • 2 • 2 • 2 • 2
7 • 3
2 • 2 • 2 • 7
5 • 2 • 7
2 • 2 • 2 • 2 • 2 • 2
3 • 2 • 2 • 2
3 • 3 • 3
3 • 2 • 5
5 • 2 • 5
2 • 2 • 2 • 2
5 • 2 • 3 • 2
7 • 2 • 2
7 • 7
7 • 2
5 • 2 • 3 • 3
5 • 3
3 • 3 • 5
5 • 2 • 2
2 • 2 • 3
7 • 3 • 2

Find the Prime Factorization of each of the numbers below. You should use exponents to make writing and checking your work easier.

Drill A

$3 \cdot 2^3$

5^2

2^5

$5 \cdot 2^3$

$7 \cdot 3 \cdot 2$

$17 \cdot 3$

$13 \cdot 3 \cdot 2$

$5 \cdot 2^4$

3^4

$41 \cdot 2$

$7 \cdot 3 \cdot 2^2$

$5 \cdot 3^2 \cdot 2$

$91 \cdot 1$

$47 \cdot 2$

$7 \cdot 5 \cdot 3 \cdot 2$

$5^3 \cdot 2^2$

Drill B

$17 \cdot 1$

$3^2 \cdot 2$

$5 \cdot 2^2$

$7 \cdot 3$

$11 \cdot 2^2$

7^2

$52 \cdot 2$

$29 \cdot 2$

$7 \cdot 3^2$

$3^2 \cdot 2^3$

$29 \cdot 3$

$19 \cdot 5$

$7^2 \cdot 2$

$11 \cdot 5 \cdot 2^2$

$5^2 \cdot 3^2$

$5^2 \cdot 2^4$

Drill C

2^3

$3 \cdot 2^2$

24

$11 \cdot 2$

$5 \cdot 3 \cdot 2$

$17 \cdot 2$

$5 \cdot 3^3$

$3 \cdot 2^4$

2^6

$11 \cdot 3 \cdot 2$

$19 \cdot 2^2$

$11 \cdot 2^3$

$5^2 \cdot 2^2$

$17 \cdot 3 \cdot 2$

$7 \cdot 5^2 \cdot 2$

$79 \cdot 3 \cdot 2$