

Prime Numbers

A-PF 1

Instructions: Determine if the number given is a Prime Number. You can do this by testing for divisibility. (For the exercises on this page, you only need to try divisibility tests for 2,3,and 5.) Mark the correct box.

1 2 Prime
 NOT Prime

2 4 Prime
 NOT Prime

3 3 Prime
 NOT Prime

4 11 Prime
 NOT Prime

5 15 Prime
 NOT Prime

6 17 Prime
 NOT Prime

7 10 Prime
 NOT Prime

8 8 Prime
 NOT Prime

9 7 Prime
 NOT Prime

10 9 Prime
 NOT Prime

11 6 Prime
 NOT Prime

12 12 Prime
 NOT Prime

13 31 Prime
 NOT Prime

14 44 Prime
 NOT Prime

15 14 Prime
 NOT Prime

16 25 Prime
 NOT Prime

17 20 Prime
 NOT Prime

18 19 Prime
 NOT Prime

Composite Numbers

A-PF 2

Instructions: Multiply each set of Prime Factors to see what Composite Number they make.
(We recommend using a calculator for these exercises.)

1 $2 \times 2 = \underline{4}$

2 $3 \times 3 = \underline{\hspace{2cm}}$

3 $2 \times 3 = \underline{\hspace{2cm}}$

4 $2 \times 5 = \underline{\hspace{2cm}}$

5 $2 \times 2 \times 3 = \underline{\hspace{2cm}}$

6 $3 \times 5 = \underline{\hspace{2cm}}$

7 $2 \times 2 \times 2 = \underline{\hspace{2cm}}$

8 $5 \times 5 = \underline{\hspace{2cm}}$

9 $2 \times 3 \times 3 = \underline{\hspace{2cm}}$

10 $2 \times 3 \times 5 = \underline{\hspace{2cm}}$

11 $3 \times 3 \times 3 = \underline{\hspace{2cm}}$

12 $3 \times 3 \times 5 = \underline{\hspace{2cm}}$

13 $2 \times 2 \times 3 \times 3 = \underline{\hspace{2cm}}$

14 $2 \times 3 \times 5 \times 7 = \underline{\hspace{2cm}}$

15 $2 \times 3 \times 3 \times 3 = \underline{\hspace{2cm}}$

16 $2 \times 2 \times 2 \times 3 \times 7 = \underline{\hspace{2cm}}$

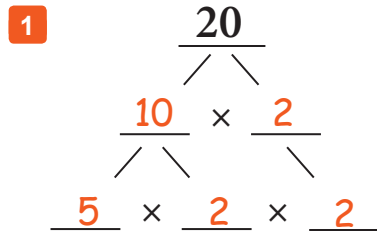
17 $2 \times 2 \times 3 \times 5 = \underline{\hspace{2cm}}$

18 $2 \times 2 \times 2 \times 5 \times 7 = \underline{\hspace{2cm}}$

Factoring to Primes

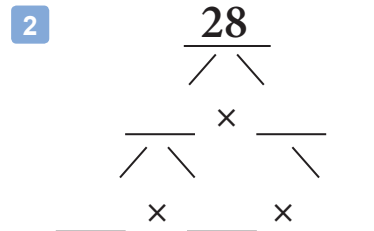
A-PF 3

Instructions: Factor each number down to its Prime Factorization. Use the 'factor tree' templates to help you.



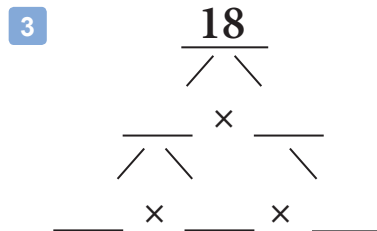
$$20 = \underline{5 \times 2 \times 2}$$

Prime Factorization



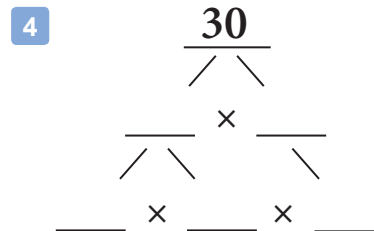
$$28 = \underline{\quad \times \quad \times \quad}$$

Prime Factorization



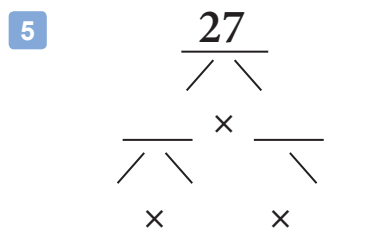
$$18 = \underline{\quad \times \quad \times \quad}$$

Prime Factorization



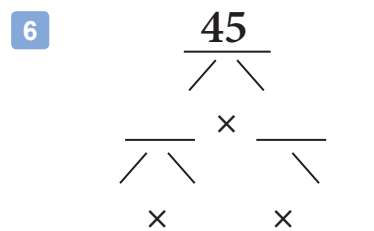
$$30 = \underline{\quad \times \quad \times \quad}$$

Prime Factorization



$$27 = \underline{\quad \times \quad \times \quad}$$

Prime Factorization



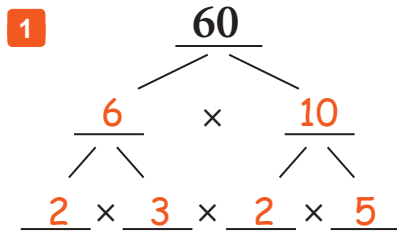
$$45 = \underline{\quad \times \quad \times \quad}$$

Prime Factorization

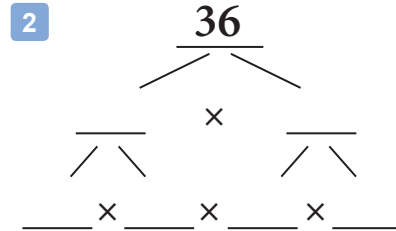
Factoring to Primes - Set 2

A-PF 4

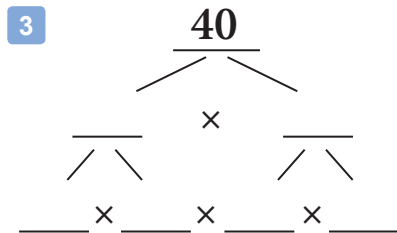
Instructions: Factor the number down to its Prime Factorization. Use the 'factor tree' templates to help you.



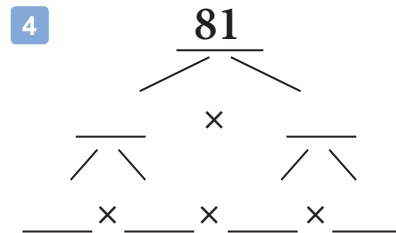
$$60 = \frac{2 \times 2 \times 3 \times 5}{\text{Prime Factorization}}$$



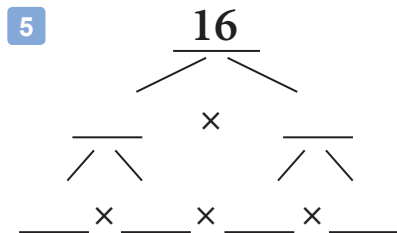
$$36 = \frac{\quad}{\text{Prime Factorization}}$$



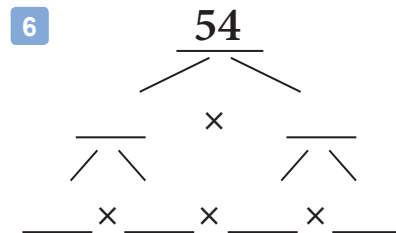
$$40 = \frac{\quad}{\text{Prime Factorization}}$$



$$81 = \frac{\quad}{\text{Prime Factorization}}$$



$$16 = \frac{\quad}{\text{Prime Factorization}}$$



$$54 = \frac{\quad}{\text{Prime Factorization}}$$

More Prime Factorization Practice

A-PF 5

Instructions: Factor each number down to its Prime Factorization. For each problem, make a 'factor tree' on some scratch paper to help you get the right answer.

1 $40 = \underline{2 \times 2 \times 2 \times 5}$
Prime Factorization

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

3 $32 = \underline{\hspace{2cm}}$
Prime Factorization

4 $72 = \underline{\hspace{2cm}}$
Prime Factorization

5 $100 = \underline{\hspace{2cm}}$
Prime Factorization

6 $150 = \underline{\hspace{2cm}}$
Prime Factorization

7 $175 = \underline{\hspace{2cm}}$
Prime Factorization

8 $66 = \underline{\hspace{2cm}}$
Prime Factorization

9 $270 = \underline{\hspace{2cm}}$
Prime Factorization

10 $102 = \underline{\hspace{2cm}}$
Prime Factorization

11 $160 = \underline{\hspace{2cm}}$
Prime Factorization

Prime Factorization and Exponent Notation

A-PF 6

Review: Exponents are used to show repeated multiplication. For example, if you want to multiply the number 2 together 3 times, you could write $2 \times 2 \times 2$, but you could also use Exponent Notation and just write 2^3 . The small '3' means multiply this number by itself 3 times. Here are a few examples so you can see the pattern.

$$3^2 = 3 \times 3$$

$$4^4 = 4 \times 4 \times 4 \times 4$$

$$5^3 = 5 \times 5 \times 5$$

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2$$

Instructions: Rewrite the Prime Factorization shown using Exponent Notation.

1 $2 \times 2 \times 2 \times 5 =$ $2^3 \times 5$

2 $2 \times 2 \times 3 \times 3 =$ _____

3 $2 \times 2 \times 2 \times 2 =$ _____

4 $2 \times 2 \times 5 \times 5 =$ _____

5 $2 \times 2 \times 3 \times 3 \times 7 =$ _____

6 $2 \times 2 \times 2 \times 2 \times 7 =$ _____

7 $2 \times 2 \times 2 \times 5 \times 5 =$ _____

8 $2 \times 2 \times 3 \times 5 \times 7 =$ _____

9 $2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 =$ _____

10 $2 \times 2 \times 2 \times 3 \times 3 \times 7 \times 7 =$ _____

11 $2 \times 3 \times 3 \times 3 \times 5 \times 7 \times 7 =$ _____

12 $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 =$ _____

Prime or Composite?

A-PF 7

Instructions: In this list of every whole number up to 100, circle any Prime Numbers that you know. Then, use the answer key and circle any Prime Numbers that you may have missed. All the numbers that are not circled are Composite Numbers! (NOTE: This is an advanced exercise and should be considered optional.)

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

Prime Factorization

1 Use a factor tree to find the prime factorization of 18.

2 Use a factor tree to find the prime factorization of 32.

3 Use a factor tree to find the prime factorization of 60.

4 Use a factor tree to find the prime factorization of 91.



5 Use a factor tree to find the prime factorization of 126.



6 Use a factor tree to find the prime factorization of 315.



Prime Numbers

A-PF 1

Instructions: Determine if the number given is a Prime Number. You can do this by testing for divisibility. (For the exercises on this page, you only need to try divisibility tests for 2,3,and 5.) Mark the correct box.

1 2 Prime
 NOT Prime

2 4 Prime
 NOT Prime

3 3 Prime
 NOT Prime

4 11 Prime
 NOT Prime

5 15 Prime
 NOT Prime

6 17 Prime
 NOT Prime

7 10 Prime
 NOT Prime

8 8 Prime
 NOT Prime

9 7 Prime
 NOT Prime

10 9 Prime
 NOT Prime

11 6 Prime
 NOT Prime

12 12 Prime
 NOT Prime

13 31 Prime
 NOT Prime

14 44 Prime
 NOT Prime

15 14 Prime
 NOT Prime

16 25 Prime
 NOT Prime

17 20 Prime
 NOT Prime

18 19 Prime
 NOT Prime

Composite Numbers

A-PF 2

Instructions: Multiply each set of Prime Factors to see what Composite Number they make.
(We recommend using a calculator for these exercises.)

1 $2 \times 2 = \underline{4}$

2 $3 \times 3 = \underline{9}$

3 $2 \times 3 = \underline{6}$

4 $2 \times 5 = \underline{10}$

5 $2 \times 2 \times 3 = \underline{12}$

6 $3 \times 5 = \underline{15}$

7 $2 \times 2 \times 2 = \underline{8}$

8 $5 \times 5 = \underline{25}$

9 $2 \times 3 \times 3 = \underline{18}$

10 $2 \times 3 \times 5 = \underline{30}$

11 $3 \times 3 \times 3 = \underline{27}$

12 $3 \times 3 \times 5 = \underline{45}$

13 $2 \times 2 \times 3 \times 3 = \underline{36}$

14 $2 \times 3 \times 5 \times 7 = \underline{210}$

15 $2 \times 3 \times 3 \times 3 = \underline{54}$

16 $2 \times 2 \times 2 \times 3 \times 7 = \underline{168}$

17 $2 \times 2 \times 3 \times 5 = \underline{60}$

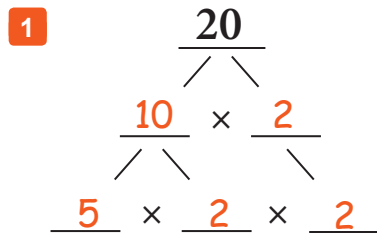
18 $2 \times 2 \times 2 \times 5 \times 7 = \underline{280}$

Factoring to Primes

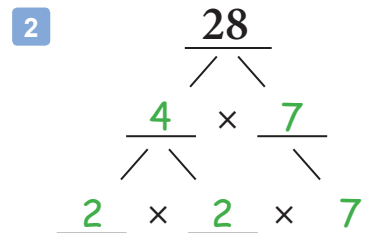
A-PF 3

Instructions: Factor each number down to its Prime Factorization. Use the 'factor tree' templates to help you.

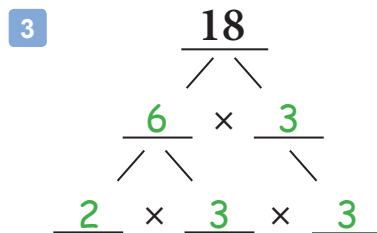
NOTE: Factor tree steps may vary, but the final 'prime factorization' should match this answer key.



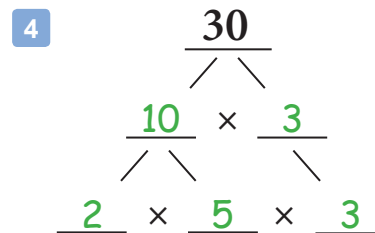
$$20 = \frac{5 \times 2 \times 2}{\text{Prime Factorization}}$$



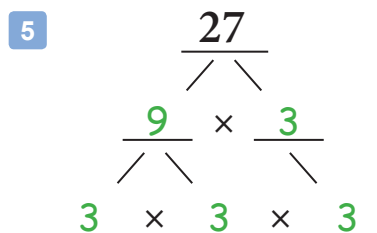
$$28 = \frac{2 \times 2 \times 7}{\text{Prime Factorization}}$$



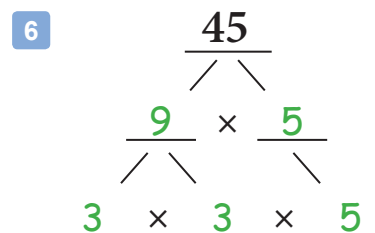
$$18 = \frac{2 \times 3 \times 3}{\text{Prime Factorization}}$$



$$30 = \frac{2 \times 5 \times 3}{\text{Prime Factorization}}$$



$$27 = \frac{3 \times 3 \times 3}{\text{Prime Factorization}}$$



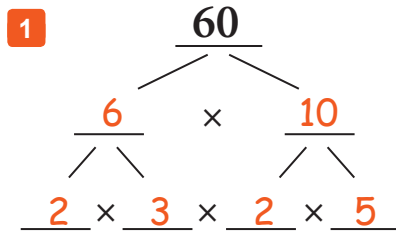
$$45 = \frac{3 \times 3 \times 5}{\text{Prime Factorization}}$$

Factoring to Primes - Set 2

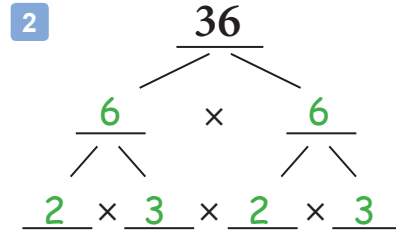
A-PF 4

Instructions: Factor the number down to its Prime Factorization. Use the 'factor tree' templates to help you.

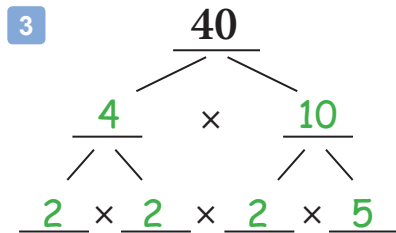
NOTE: Factor tree steps may vary, but the final 'prime factorization' should match this answer key.



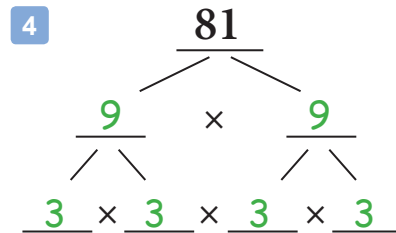
$$60 = \frac{2 \times 2 \times 3 \times 5}{\text{Prime Factorization}}$$



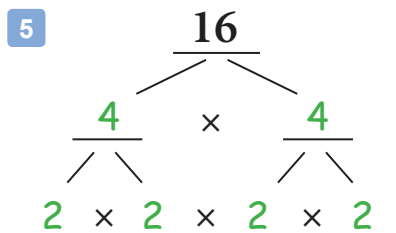
$$36 = \frac{2 \times 2 \times 3 \times 3}{\text{Prime Factorization}}$$



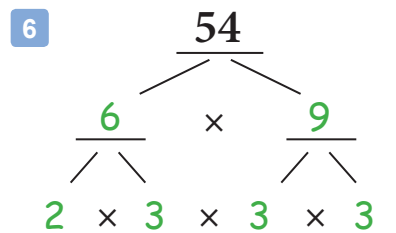
$$40 = \frac{2 \times 2 \times 2 \times 5}{\text{Prime Factorization}}$$



$$81 = \frac{3 \times 3 \times 3 \times 3}{\text{Prime Factorization}}$$



$$16 = \frac{2 \times 2 \times 2 \times 2}{\text{Prime Factorization}}$$



$$54 = \frac{2 \times 3 \times 3 \times 3}{\text{Prime Factorization}}$$

More Prime Factorization Practice

A-PF 5

Instructions: Factor each number down to its Prime Factorization. For each problem, make a 'factor tree' on some scratch paper to help you get the right answer.

$$\begin{array}{l} \mathbf{1} \quad 40 = \underline{2 \times 2 \times 2 \times 5} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{2} \quad 50 = \underline{2 \times 5 \times 5} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{3} \quad 32 = \underline{2 \times 2 \times 2 \times 2 \times 2} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{4} \quad 72 = \underline{2 \times 2 \times 2 \times 3 \times 3} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{5} \quad 100 = \underline{2 \times 2 \times 5 \times 5} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{6} \quad 150 = \underline{2 \times 3 \times 5 \times 5} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{7} \quad 175 = \underline{5 \times 5 \times 7} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{8} \quad 66 = \underline{2 \times 3 \times 11} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{9} \quad 270 = \underline{2 \times 3 \times 3 \times 3 \times 5} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{10} \quad 102 = \underline{2 \times 3 \times 17} \\ \text{Prime Factorization} \end{array}$$

$$\begin{array}{l} \mathbf{11} \quad 160 = \underline{2 \times 2 \times 2 \times 2 \times 2 \times 5} \\ \text{Prime Factorization} \end{array}$$

Prime Factorization and Exponent Notation

A-PF 6

Review: Exponents are used to show repeated multiplication. For example, if you want to multiply the number 2 together 3 times, you could write $2 \times 2 \times 2$, but you could also use Exponent Notation and just write 2^3 . The small '3' means multiply this number by itself 3 times. Here are a few examples so you can see the pattern.

$$3^2 = 3 \times 3$$

$$4^4 = 4 \times 4 \times 4 \times 4$$

$$5^3 = 5 \times 5 \times 5$$

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2$$

Instructions: Rewrite the Prime Factorization shown using Exponent Notation.

1 $2 \times 2 \times 2 \times 5 =$ $2^3 \times 5$

2 $2 \times 2 \times 3 \times 3 =$ $2^2 \times 3^2$

3 $2 \times 2 \times 2 \times 2 =$ 2^4

4 $2 \times 2 \times 5 \times 5 =$ $2^2 \times 5^2$

5 $2 \times 2 \times 3 \times 3 \times 7 =$ $2^2 \times 3^2 \times 7$

6 $2 \times 2 \times 2 \times 2 \times 7 =$ $2^4 \times 7$

7 $2 \times 2 \times 2 \times 5 \times 5 =$ $2^3 \times 5^2$

8 $2 \times 2 \times 3 \times 5 \times 7 =$ $2^2 \times 3 \times 5 \times 7$

9 $2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 =$ $2^3 \times 3^4$

10 $2 \times 2 \times 2 \times 3 \times 3 \times 7 \times 7 =$ $2^3 \times 3^2 \times 7^2$

11 $2 \times 3 \times 3 \times 3 \times 5 \times 7 \times 7 =$ $2 \times 3^3 \times 5 \times 7^2$

12 $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 =$ $2^6 \times 3$

Prime or Composite?

A-PF 7

Instructions: In this list of every whole number up to 100, circle any Prime Numbers that you know. Then, use the answer key and circle any Prime Numbers that you may have missed. All the numbers that are not circled are Composite Numbers! (NOTE: This is an advanced exercise and should be considered optional.)

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50
51	52	53	54	55
56	57	58	59	60
61	62	63	64	65
66	67	68	69	70
71	72	73	74	75
76	77	78	79	80
81	82	83	84	85
86	87	88	89	90
91	92	93	94	95
96	97	98	99	100

Prime Factorization

- 1** Use a factor tree to find the prime factorization of 18.

factor tree may vary

answer:

$$18 = 2 \times 3 \times 3$$

or $18 = 2 \times 3^2$

- 2** Use a factor tree to find the prime factorization of 32.

factor tree may vary

answer:

$$32 = 2 \times 2 \times 2 \times 2 \times 2$$

or $32 = 2^5$

- 3** Use a factor tree to find the prime factorization of 60.

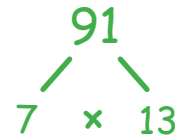
factor tree may vary

answer:

$$60 = 2 \times 2 \times 3 \times 5$$

or $60 = 2^2 \times 3 \times 5$

- 4** Use a factor tree to find the prime factorization of 91.



answer:

$$91 = 7 \times 13$$

- 5** Use a factor tree to find the prime factorization of 126.



factor tree may vary

answer:

$$126 = 2 \times 3 \times 3 \times 7$$

or $126 = 2 \times 3^2 \times 7$

- 6** Use a factor tree to find the prime factorization of 315.



factor tree may vary

answer:

$$315 = 3 \times 3 \times 5 \times 7$$

or $315 = 3^2 \times 5 \times 7$