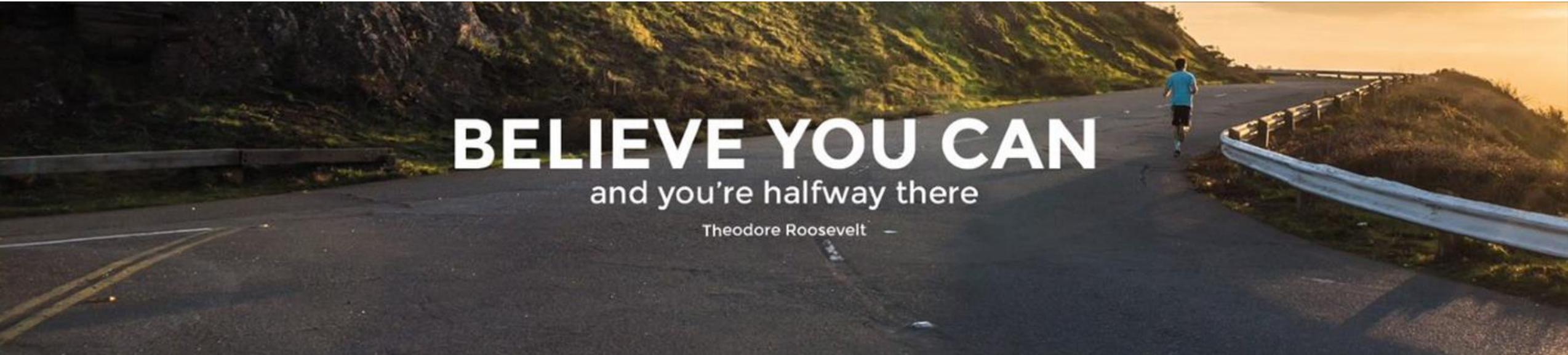


EB Education Revision Guide



How to work with Factors and Multiples

Factors

The factors of a number are all the numbers that divide into it, without leaving a remainder.

There is a method to make sure that you can find all the factors of a number.

1. Start with 1 x the number, then 2 x listing them in pairs.
2. If the numbers don't divide exactly cross them out.
3. Keep going until you get a repeated number, then you can stop.

How to find them all.

Find all the factors of 36.

$$1 \times 36$$

$$2 \times 18$$

$$3 \times 12$$

$$4 \times 9$$

$$\cancel{5 \times \underline{\quad}} \quad (\text{not a factor})$$

$$6 \times 6$$

$$\cancel{7 \times \underline{\quad}} \quad (\text{not a factor})$$

$$\cancel{8 \times \underline{\quad}} \quad (\text{not a factor})$$

$$9 \times 4 \quad \text{This number is repeated – so stop.}$$

The factors of 36 are:
1, 2, 3, 4, 6, 9, 12, 18, 36

Prime Factors (Prime Factor Tree)

Prime Numbers

A prime number is a number that has exactly two factors, itself and 1.

The number 1 is not a prime number as it only has one factor.

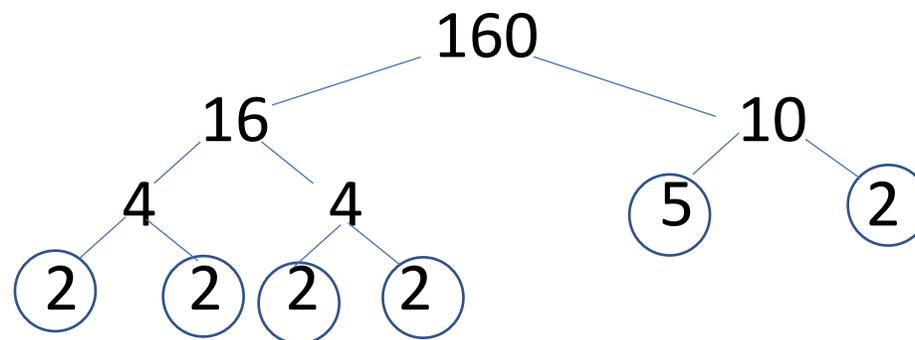
Some prime numbers: 2, 3, 5, 7, 11, 13, 17, 19,...

You can find prime factors by using a factor tree. This is called prime factorisation or prime factor decomposition.

1. Write the number at the top.
2. Split the number into factors (you can pick any factor pair of the number; you will end up with the same answer)
3. When you get to a prime number, circle it.
4. Keep going until you are left with only prime numbers.
5. Write out all the prime numbers you are left with, in order. If you have more than one of the same prime factor – you can write them as powers.

How to find Prime Factors

Express 160 as a product of prime factors.



$$160 = 2 \times 2 \times 2 \times 2 \times 2 \times 5$$
$$= 2^5 \times 5$$

Multiples

Multiples

Multiples are numbers that appear in the times table of the number.

You just need to write out the times table of a number to find all of its multiples.

For example, multiples of 4 are:

4, 8, 12, 16, 20, 24, 28, 32, 36..... and so on.

You might be asked to list multiples of numbers, or when provided with some numbers, asked to say which of them are multiples of a particular number.



Which of these numbers are:

a) Multiples of 4

8, 12, 16, 36, 40

b) Multiples of 6

12, 36, 66

Mixed questions

Example 1

1	3	12	8	16	20	13	2	15
24	17	19	6	36	7	18	30	4

Which of the numbers above are:

a) Multiples of 3

3, 6, 12, 15, 18, 24, 30, 36

a) Factors of 24

1, 2, 3, 4, 6, 8, 12, 24

a) Prime numbers

2, 3, 7, 13, 17, 19

Example 2

1	8	18	12	16	13	20	2	48
17	24	19	36	6	18	64	4	31

Which of the numbers above are:

a) Multiples of 6

6, 12, 18, 24, 36, 48

a) Factors of 32

1, 2, 4, 8, 16

a) Prime numbers

2, 13, 17, 19, 31

Your turn:

1. Use the list of numbers below.

2 5 7 8 9 12

Write down a number from the list which is:

- a) a multiple of 6
- b) a factor of 15
- c) a square number

2. Use the list of numbers below.

3 8 11 25 33 41

Write down a number from the list which is:

- a) an even number
- b) a square number
- c) a multiple of 11

3. Look at the numbers below.

18 9 6 12 81 42 3 30 11

Write down a number from the list which is:

- a) a multiple of 4
- b) a factor of 21
- c) a prime number



Your turn:

4. Look at this list of numbers.

5 6 12 20 25 26 28 33

Using this list write down:

- a) a square number
- b) a multiple of 7
- c) two factors of 40
- d) two numbers with a sum of 59

5. Nigel says “the number 6 is cube number because $2^3 = 6$ ”.

Is Nigel correct, and explain why.

6. Look at this list of numbers.

2 5 8 10 13 14 16 18

Using this list write down:

- a) an odd number
- b) a multiple of 6
- c) a square number

7. Daisy says 8 is a prime number. Is Daisy correct and explain why.

Your turn:

8. Express 525 as a product of its prime factors.

9. Express the following numbers as products of their prime factors.

a) 60

b) 96

Answers:

1. Use the list of numbers below.

2 5 7 8 9 12

Write down a number from the list which is:

- a) a multiple of 6 **12**
- b) a factor of 15 **5**
- c) a square number **9**

2. Use the list of numbers below.

3 8 11 25 33 41

Write down a number from the list which is:

- a) an even number **8**
- b) a square number **25**
- c) a multiple of 11 **11, 33**

3. Look at the numbers below.

18 9 6 12 81 42 3 30 11

Write down a number from the list which is:

- a) a multiple of 4 **12**
- b) a factor of 21 **3**
- c) a prime number **3, 11**

Answers:

4. Look at this list of numbers.

5 6 12 20 25 26 28 33

Using this list write down:

- a) a square number 25
- b) a multiple of 7 28
- c) two factors of 40 5 20
- d) two numbers with a sum of 59 26 33

5. Nigel says “the number 6 is cube number because $2^3 = 6$ ”.

Is Nigel correct, and explain why.

No, because $2 \times 2 \times 2 = 8$

6. Look at this list of numbers.

2 5 8 10 13 14 16 18

Using this list write down:

- a) an odd number 5 13
- b) a multiple of 6 18
- c) a square number 16

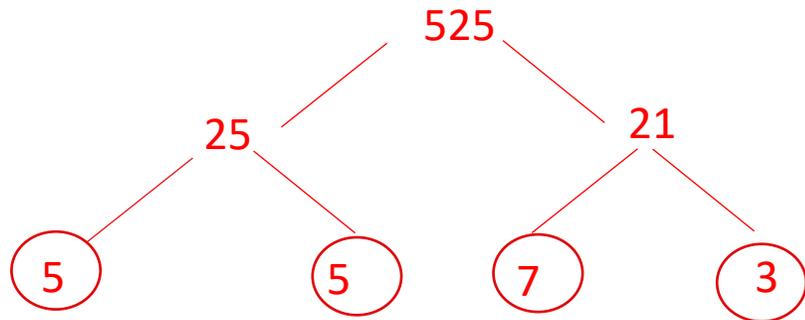
7. Daisy says 8 is a prime number.

Is Daisy correct and explain why.

No because 8 is divisible by 1, 2, 4 and 8 and prime numbers are only divisible by themselves and 1



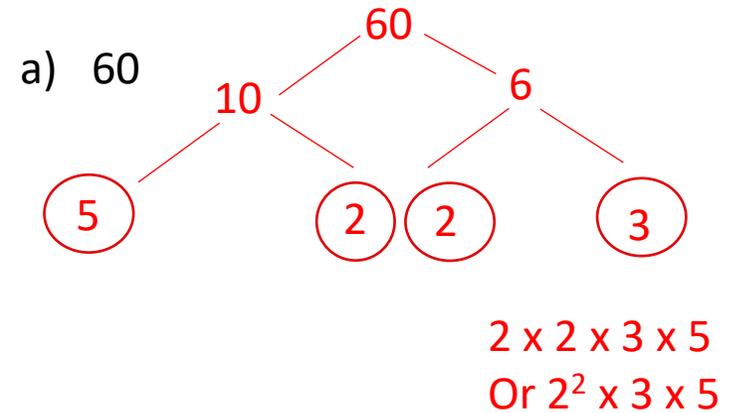
8. Express 525 as a product of its prime factors.



$$3 \times 5 \times 5 \times 7$$
$$\text{Or } 3 \times 5^2 \times 7$$

Your turn:

9. Express the following numbers as products of their prime factors.



a) 96

$$2 \times 2 \times 2 \times 2 \times 2 \times 3$$
$$\text{Or } 2^5 \times 3$$

For more help and resources, or
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