Prime Factors

To find prime factors of 2-digit numbers.

Aneeka has completed some factor trees.
Can you help her by circling the prime factors?
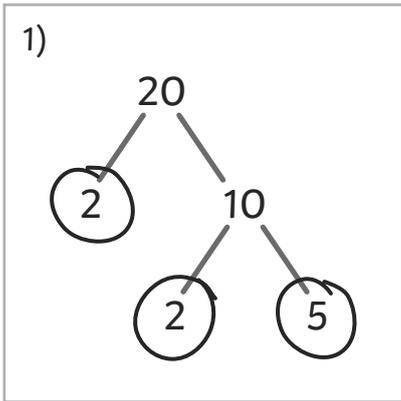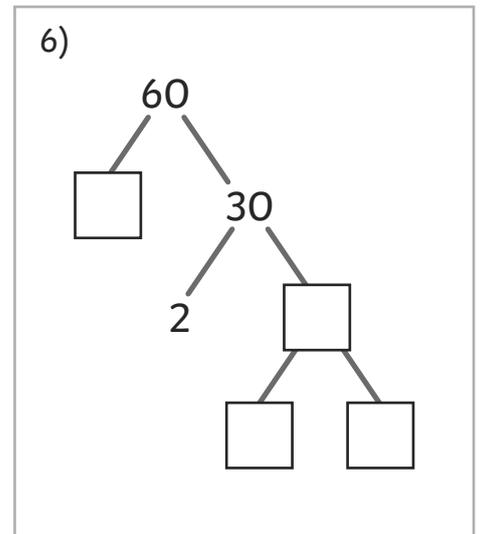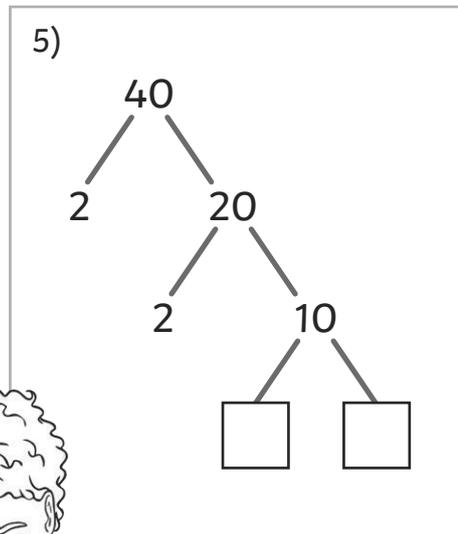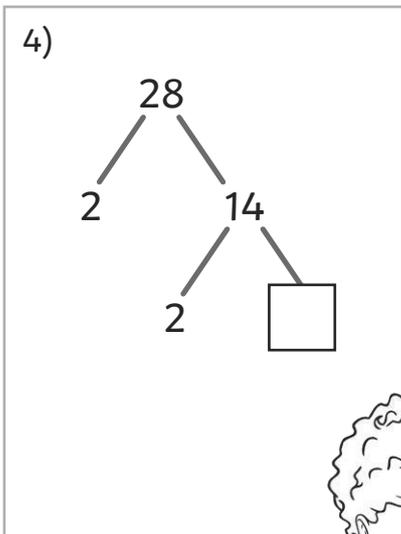The first one has been done for you.

1)
```
        20
       /   \
     (2)    10
           /   \
         (2)   (5)
```

2)
```
        32
       /   \
      2     15
           /   \
          3     5
```

3)
```
        44
       /   \
      2     22
           /   \
          2     11
```
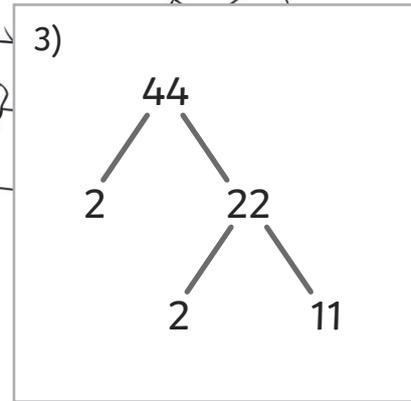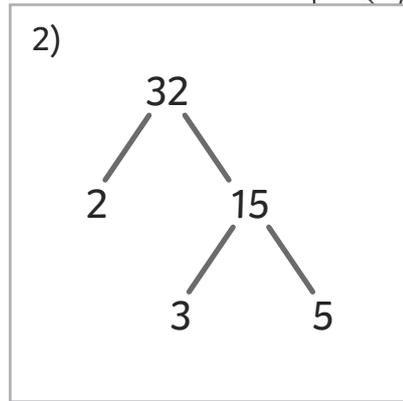
George has tried to complete some factor trees but he has become a little lost along the way.
Could you help him complete his factor trees? Don't forget to circle the prime factors!

4)
```
        28
       /   \
      2     14
           /   \
          2    [ ]
```

5)
```
        40
       /   \
      2     20
           /   \
          2     10
               /   \
             [ ]   [ ]
```

6)
```
        60
       /   \
     [ ]    30
           /   \
          2    [ ]
              /   \
            [ ]   [ ]
```

REGENT STUDIES
Focused education on life's walk!
www.regentstudies.com

Prime Factors

To find prime factors of 2-digit numbers.

Complete the factor trees and write the calculation to match.
Remember to circle the prime factors.

1) 28

2   14

2   ☐

☐ × ☐ × ☐ = ☐

2) 40

2   20

2   10

☐   ☐

☐ × ☐ × ☐ × ☐ = ☐

3) 60

☐   30

2   ☐

☐   ☐

☐ × ☐ × ☐ × ☐ = ☐

Create factor trees to find the prime factors of the following numbers: **48   56   82**
Don't forget to write the matching calculation and circle the prime factors!

4) 48

5) 56

6) 84

7) Claudia says that there is only one way to create a factor tree for 24.
Do you agree or disagree? Prove your answer.
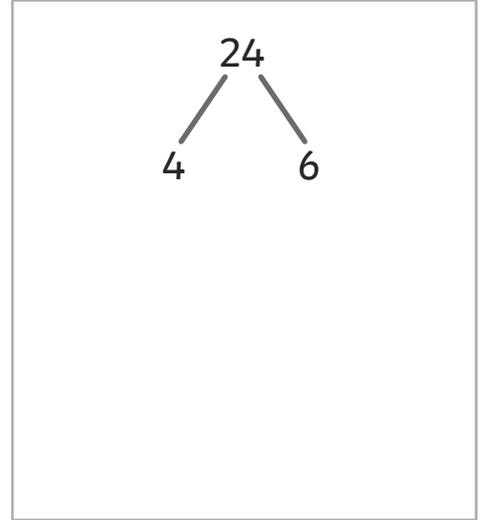
_____

_____

_____

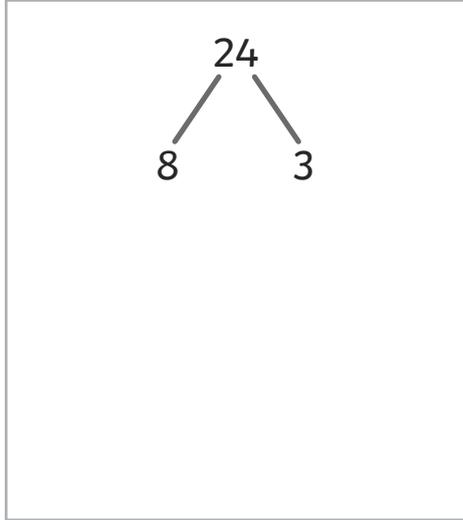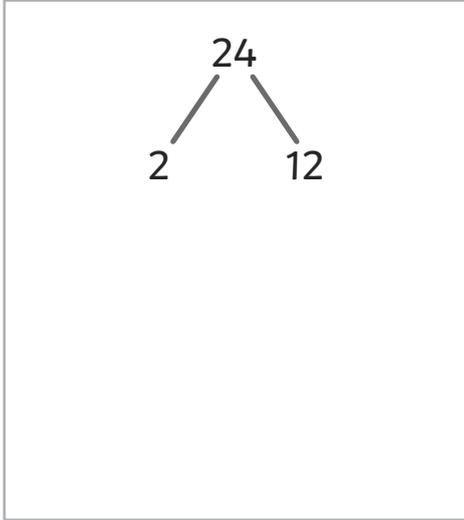# Prime Factors

To find prime factors of 2-digit numbers.

1) a) Complete the factor trees for the number 24.

```
      24                    24                    24
     /  \                  /  \                  /  \
    2    12               8    3                4    6
```

b) What is 24 as a product of its prime factors?

24 = ☐ × ☐ × ☐ × ☐

c) Isaac says that it is possible to complete one of these factor trees in two different ways. Is he correct? Prove it.

_____

_____

_____

_____

_____

_____

REGENT STUDIES
Focused education on life's walk!
www.regentstudies.com
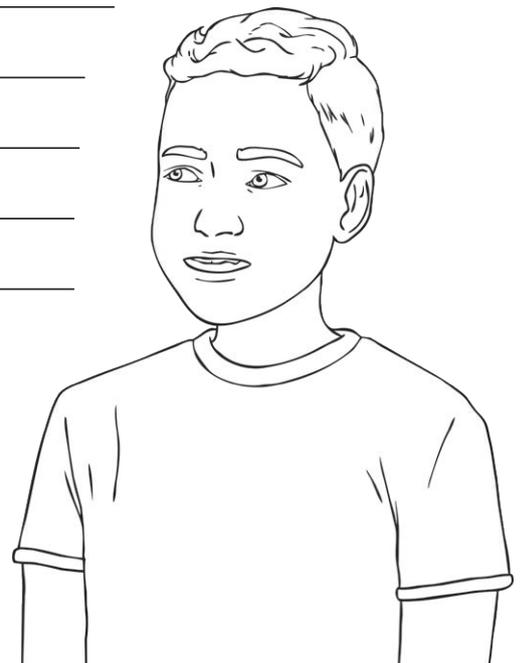
2) Which has more prime factors, 26 or 42? How could you prove it?

_____

_____

3) Abigail has completed a factor tree for the number 100.

```
            100
          /     \
        10       10
       /  \     /  \
      5    5   5    5
```

5 × 5 × 5 × 5 = 100

What mistake has she made?

_____

_____

_____

_____

REGENT STUDIES
Focused education on life's walk!
www.regentstudies.com

Prime Factors **Answers**

1)

```
        20
       /  \
     (2)   10
          /  \
        (2)  (5)
```

2)

```
        32
       /  \
     (2)   15
          /  \
        (3)  (5)
```
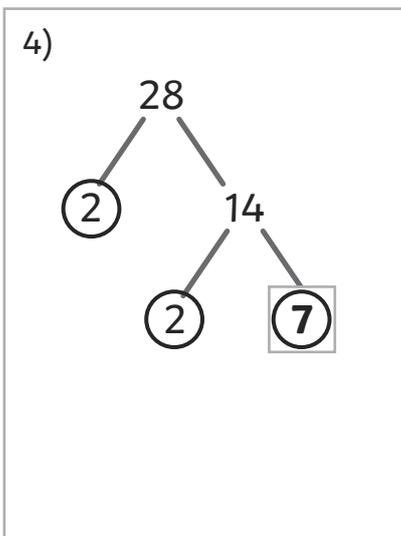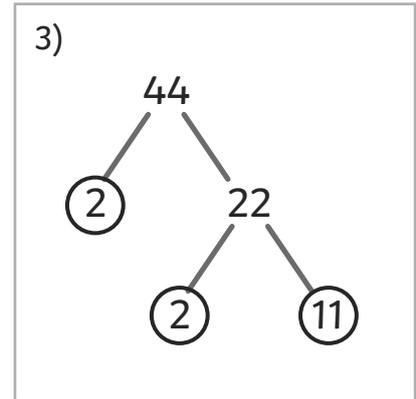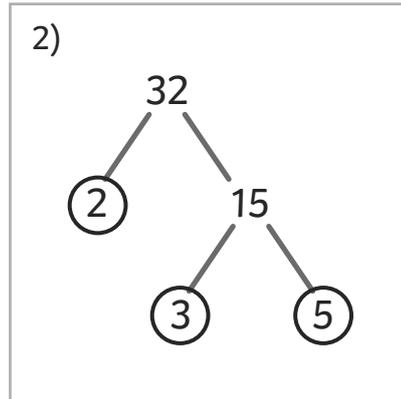
3)

```
        44
       /  \
     (2)   22
          /  \
        (2)  (11)
```

4)

```
        28
       /  \
     (2)   14
          /  \
        (2)  [7]
```

5)

```
        40
       /  \
     (2)   20
          /  \
        (2)   10
             /  \
           [2]  [5]
```

6)

```
        60
       /  \
     [2]   30
          /  \
        (2)  [15]
             /  \
           [3]  [5]
```

Prime Factors **Answers**

1)

28
├ ②
└ 14
  ├ ②
  └ ⑦

| 2 | × | 2 | × | 7 | = | 28 |

2)

40
├ ②
└ 20
  ├ ②
  └ 10
    ├ ②
    └ ⑤

| 2 | × | 2 | × | 2 | × | 5 | = | 40 |

3)

60
├ ②
└ 30
  ├ ②
  └ 15
    ├ ③
    └ ⑤

| 2 | × | 2 | × | 3 | × | 5 | = | 60 |

4)

48
├ ②
└ 24
  ├ ②
  └ 12
    ├ ②
    └ 6
      ├ ②
      └ ③

2 × 2 × 2 × 2 × 2 = 48

5)

56
├ ②
└ 28
  ├ ②
  └ 14
    ├ ②
    └ ⑦

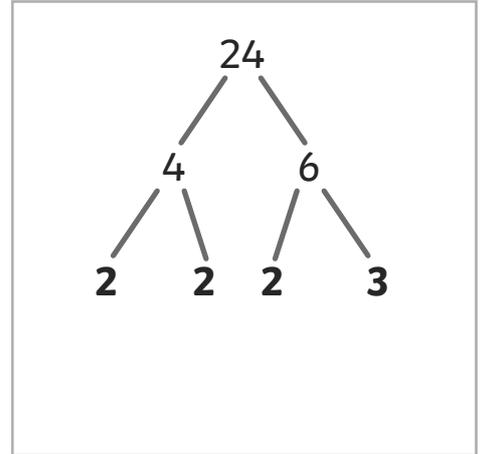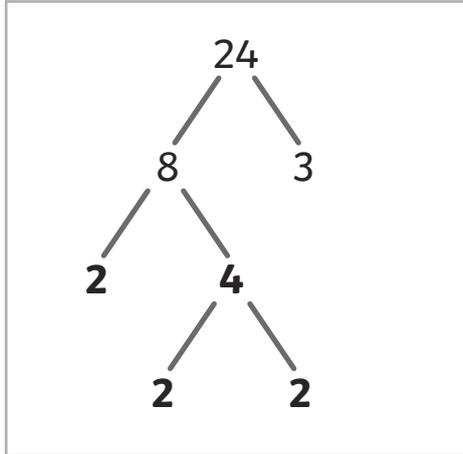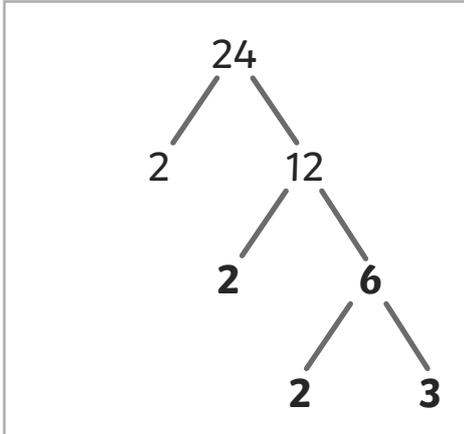**2 × 2 × 2 × 7 = 56**

6)

84
├ ②
└ 42
  ├ ②
  └ 21
    ├ ③
    └ ⑦

2 × 2 × 3 × 7 = 82

7) Claudia says that there is only one way to create a factor tree for 24.
Do you agree or disagree? Prove your answer.

There are three ways. Claudia's first branch could be: 2 and 12, 8 and 3, or 4 and 6.

Prime Factors **Answers**

1) a) Complete the factor trees for the number 24.

```
        24                      24                      24
       /  \                    /  \                    /  \
      2    12                 8    3                  4    6
          /  \               / \                     / \  / \
         2    6             2   4                    2  2  2  3
             / \               / \
            2   3             2   2
```

Also accept a branch from 12 with factors of 4 and 3, with a branch from 4 showing factors of 2 and 2.

b) What is 24 as a product of its prime factors?

24 = **2** × **2** × **2** × **3**

c) Isaac says that it is possible to complete one of these factor trees in two different ways. Is he correct? Prove it.
   There is more than one way of completing the first tree. You could either create a branch from 12 showing factors of 2 and 6, with a branch from 6 showing factors of 2 and 3; or you could create a branch from 12 showing factors of 4 and 3, with a branch from 4 showing factors of 2 and 2.

2) Which has more prime factors, 26 or 42? How could you prove it?
   26 only has 2 and 13 as its prime factors whereas 42 has 2, 3 and 7. Children may prove their answer by drawing a factor tree.

3) Abigail has completed a factor tree for the number 100. What mistake has she made?
   Abigail has made a mistake by thinking that 5 × 5 = 10. She probably got confused with adding and multiplying. She has completed her first branches correctly as 10 × 10 = 100. Abigail should have written 2 × 5 for both of her second branches.

```
        100
       /   \
      10    10
     / \    / \
    5   5  5   5
```

5 × 5 × 5 × 5 = 100