

# Reasoning and Problem Solving

## Step 9: Common Factors

### National Curriculum Objectives:

Mathematics Year 6: (6C5) [Identify common factors, common multiples and prime numbers](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Explain which number is the odd one out when investigating common factors using knowledge of the 2, 3, 4, 5 and 10 times tables.

**Expected** Explain which number is the odd one out when investigating common factors using knowledge of times tables up to 12.

**Greater Depth** Explain which number is the odd one out when investigating common factors beyond 12 using knowledge of known times tables facts.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Find the pair of numbers with the most common factors up to a given number. Includes common factors using knowledge of the 2, 3, 4, 5 and 10 times tables.

**Expected** Find the pair of numbers with the most common factors up to a given number. Includes using knowledge of times tables up to 12.

**Greater Depth** Find the pair of numbers with the most common factors up to a given number.

Questions 3, 6 and 9 (Reasoning)

**Developing** Prove the solution to a word problem by finding common factors using knowledge of the 2, 3, 4, 5 and 10 times tables.

**Expected** Prove the solution to a word problem by finding common factors using knowledge of times tables up to 12.

**Greater Depth** Prove the solution to a word problem by finding common factors beyond 12 using knowledge of known times tables facts.

More [Year 6 Four Operations](#) resources.

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## Common Factors

1a. Investigate common factors to find the odd one out.



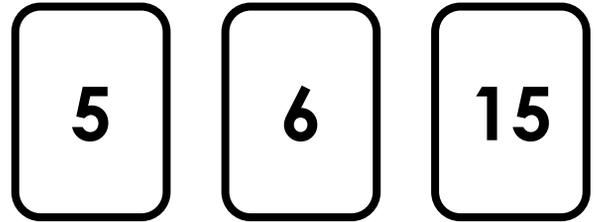
Explain your reasoning.



R

## Common Factors

1b. Investigate common factors to find the odd one out.



Explain your reasoning.



R

2a. Which pair of numbers have the most common factors?

25                      4  
12                      24



PS

2b. Which pair of numbers have the most common factors?

8                      20  
10                      6



PS

3a. A baker is packing 15 cupcakes and 20 chocolate cakes.

The same number of cakes must be packed into each box.

What is the largest number of cakes that can go into each box?

Prove it.



R

3b. Oak class has 24 children and Sycamore class has 20.

The children in both classes need to work in equal groups for a school project.

What is the largest number of children that could work in each group?

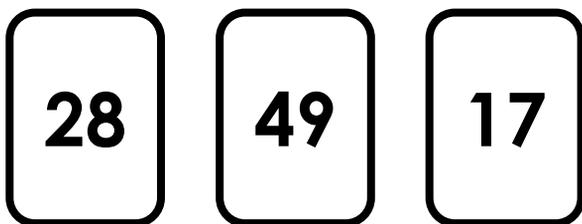
Prove it.



R

## Common Factors

4a. Investigate common factors to find the odd one out.



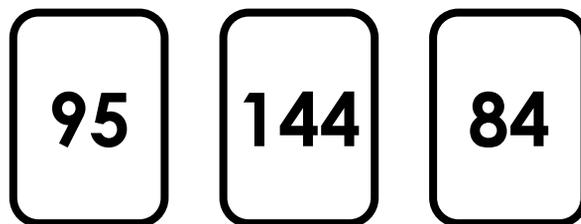
Explain your reasoning.



R

## Common Factors

4b. Investigate common factors to find the odd one out.



Explain your reasoning.



R

5a. Which pair of numbers have the most common factors?

24                      25  
50                      36



PS

5b. Which pair of numbers have the most common factors?

48                      21  
56                      12



PS

6a. A company is packing 48 gold watches and 60 silver watches.

The same number of watches must be packed into each box.

What is the largest number of watches that can go into each box?

Prove it.



R

6b. A gardener is planting 27 daffodil bulbs and 36 tulip bulbs.

The gardener needs equal rows of each flower.

What is the largest number of bulbs he can plant in each row?

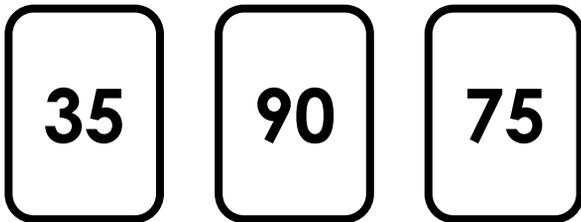
Prove it.



R

## Common Factors

7a. Investigate common factors to find the odd one out.



Explain your reasoning.



R

## Common Factors

7b. Investigate common factors to find the odd one out.



Explain your reasoning.



R

8a. Which pair of numbers has the most common factors?

105      148

144      210

Find a third number that shares their factors.



PS

8b. Which pair of numbers has the most common factors?

94      75

250      126

Find a third number that shares their factors.



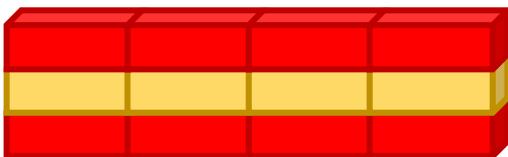
PS

9a. A builder has 125 yellow bricks and 75 red bricks.

She wants to build a wall and each row needs an equal number of bricks.

What is the largest number of bricks she can use in each row?

Prove it.



R

9b. A museum is creating a display of 96 Ancient Egyptian coins and 112 Iron Age coins.

Each row needs an equal number of coins.

What is the largest number of coins they can place in each row?

Prove it.



R

## Reasoning and Problem Solving Common Factors

### Developing

- 1a. 11 is the odd one out because it does not share the common factor 2 with 10 and 12.
- 2a. 12 and 24 have the most common factors – 1, 2, 3, 4, 6 and 12.
- 3a. 5 is the largest number of cakes which could be packed into each box because it is the biggest common factor of 15 and 20. There would be 3 boxes of cupcakes and 4 boxes of chocolate cake.

### Expected

- 4a. 17 is the odd one out because it does not share the common factor 7 with 28 and 49.
- 5a. 24 and 36 have the most common factors – 1, 2, 3, 4, 6 and 12.
- 6a. 12 is the largest number of watches which could be packed into each box because it is the biggest common factor of 48 and 60. There would be 4 boxes of gold watches and 5 boxes of silver watches.

### Greater Depth

- 7a. 35 is the odd one out because it does not share the common factors 3 and 15 with 90 and 75.
- 8a. 105 and 210 have the most common factors – 1, 3, 5, 7, 15, 21, 35, 105. Various answers, for example: 315 shares their factors.
- 9a. 25 is the largest number of bricks which could be on each row because it is the biggest common factor of 125 and 75. There would be 5 rows of yellow bricks and 3 rows of red.

## Reasoning and Problem Solving Common Factors

### Developing

- 1b. 5 is the odd one out because it does not share the common factor 3 with 6 and 15.
- 6 is the odd one out because it does not share the common factor of 5 with 5 have and 15.
- 2b. 20 and 10 have the most common factors – 1, 2, 5 and 10.
- 3b. 4 is the largest number of children which could work in each group because it is the biggest common factor of 24 and 20. There would be 6 groups in Oak class and 5 groups in Sycamore class.

### Expected

- 4b. 95 is the odd one out because it does not share the common factors 2, 3, 4, 6 and 12 with 144 and 84.
- 5b. 48 and 12 have the most common factors – 1, 2, 3, 4, 6 and 12.
- 6b. 9 is the largest number of bulbs he can plant in each row because it is the biggest common factor of 27 and 36. There would be 3 rows of daffodils and 4 rows of tulips.

### Greater Depth

- 7b. 125 is the odd one out because it does not share the common factor 13 with 104 and 143.
- 8b. 75 and 250 have the most common factors – 1, 5 and 25. Various answers, for example: 125 shares their factors.
- 9b. 16 is the largest number of coins which could be on each row because it is the biggest common factor of 96 and 112. There would be 6 rows of Ancient Egyptian coins and 7 rows of Iron Age coins.