Reasoning and Problem Solving
Step 11: Division using Factors

National Curriculum Objectives:

Mathematics Year 6: (6C5) Identify common factors, common multiples and prime numbers
Mathematics Year 6: (6C8) Solve problems involving addition, subtraction, multiplication and division

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Using knowledge of 2, 5 and 10 times table, explain if two factors can be used to solve a 3-digit number divided by a 2-digit number.
Expected Using knowledge of table facts to 12 x12, explain if two factors can be used to solve a 4-digit number divided by a 2-digit number.
Greater Depth Using knowledge of table facts to 12 x12 and beyond, explain if two factors can be used to solve a 5-digit number divided by a 2-digit number. Using numerals and words.

Questions 2, 5 and 8 (Problem Solving)
Developing Using knowledge of the 2, 5 and 10 times table, find two different factors to divide 3-digits by 2-digits.
Expected Using knowledge of table facts to 12 x12, find three different factors to divide 4-digits by 2-digits.
Greater Depth Using knowledge of table facts to 12 x 12 and beyond, find three different factors to divide 5-digits by 2-digits.

Questions 3, 6 and 9 (Problem Solving)
Developing Using knowledge of the 2, 5 and 10 times table, explain if three statements are always, sometimes or never true.
Expected Using knowledge of table facts to 12 x12, explain if three statements are always, sometimes or never true.
Greater Depth Using knowledge of table facts to 12 x 12 and beyond, explain if four statements are always, sometimes or never true.

More Year 5 and Year 6 Multiplication and Division resources.

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Reasoning and Problem Solving – Division using Factors

1a. True or false?

I can use the factors 3 and 5 when dividing seven hundred and thirty five by thirty five.

Is she correct? Explain why.

D

6 R

1b. True or false?

I can use the factors 8 and 2 when dividing six hundred and seventy two by sixteen.

Is he correct? Explain why.

D

6 R

2a. Find two different factor pairs that can be used to find the answer.

960 ÷ 20

What is the answer to the calculation?

D

6 PS

2b. Find two different factor pairs that can be used to find the answer.

720 ÷ 40

What is the answer to the calculation?

D

6 PS

3a. Are these statements always, sometimes or never true? Explain.

Factor pairs are numbers less than 10

3-digit numbers can be divided by two

Fourteen has an odd number of factor pairs.

D

6 PS

3b. Are these statements always, sometimes or never true? Explain.

3-digit numbers can be divided by ten

odd numbers always have factors

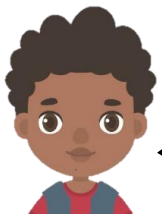
Doubling one factor pair will give you another factor pair

D

6 PS

Reasoning and Problem Solving – Division using Factors

4a. True or false?



I can use the factors 8 and 3 when dividing three thousand, three hundred and sixty by thirty two.

Is he correct? Explain why.

E

6 R

4b. True or false?

I can use the factors 9 and 5 when dividing one thousand, one hundred and seventy by forty five.

Is she correct? Explain why.

E

6 R

5a. Find three different factor pairs that can be used to find the answer.

8,424 ÷ 24

What is the answer to the calculation?

E

6 PS

5b. Find three different factor pairs that can be used to find the answer.

1,044 ÷ 36

What is the answer to the calculation?

E

6 PS

6a. Are these statements always, sometimes or never true? Explain.

Odd numbers do not have factors

4-digit numbers can be divided by ten

Thirty-six has an even number of factors.

E

6 PS

6b. Are these statements always, sometimes or never true? Explain.

Forty-eight has an odd number of factors.

All numbers have at least two factor pairs.

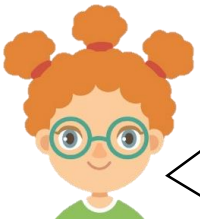
Even numbers always have factors

E

6 PS

Reasoning and Problem Solving – Division using Factors

7a. True or false?



I can use the factors 21 and 4 when dividing sixteen thousand, four hundred and fifty by twenty-five.

Is she correct? Explain why.

GD

6 R

7b. True or false?

I can use the factors 24 and 3 when dividing thirty thousand, two hundred and forty by seventy-two.

Is he correct? Explain why.

GD

6 R

8a. Find three different factor pairs that can be used to find the answer.

25,728 ÷ 64

What is the answer to the calculation?

GD

6 PS

8b. Find three different factor pairs that can be used to find the answer.

45,660 ÷ 60

What is the answer to the calculation?

GD

6 PS

9a. Are these statements always, sometimes or never true? Explain.

To find a factor pair you double one number and half the other

Any number can have a factor pair

Odd numbers do not have factor pairs

GD

6 PS

9b. Are these statements always, sometimes or never true? Explain.

5-digit numbers can be divided by two

Factor pairs must be made up of one odd and one even number

Even numbers always have factors

GD

6 PS

Reasoning and Problem Solving – Division using Factors

Developing

1a. False because 3 and 5 are not factors of thirty five. She could use 7 and 5 because they are factors of 35.
1b. True because 8 and 2 are factors of 16.
2a. 10 and 2; 4 and 5; the answer is 48
2b. 10 and 4; 8 and 5; the answer is 18
3a. Factor pairs are numbers less than 10; sometimes true because some factor pairs use numbers less than 10 but other factor pairs, such as 12 and 2, one number is above 10.
3-digit numbers can be divided by two; sometimes true. If the number is even.
Fourteen has an odd number of factor pairs; always true because the only factors are 2 and 7.
3b. 3-digit numbers can be divided by 10; sometimes true. If the number ends in zero
Odd numbers always have factors; never true as a number ending in 13 is odd but does not have a factor pair.
Doubling one factor pair will give you another factor pair; never trues because you would be dividing by a greater number. In some factor pairs you double one of the numbers and half the other.

Expected

4a. False because 8 and 3 are not factors of 32. He could use 8 and 4 because they are factors of 32.
4b. True because 9 and 5 are factors of 45.
5a. 12 and 2; 6 and 4; 8 and 3; the answer is 351
5b. 12 and 3; 9 and 4; 3 and 12; 4 and 9; the answer is 29
6a. Odd numbers do not have factors; sometimes true because 15 is an odd number and has the factors 3 and 5
4-digit numbers can be divided by 10; sometimes true, if the number ends in zero.
Thirty-six has an even number of factors; never true because the factors are 6 and 6; 9 and 4 and 12 and 3.
6b. Forty-eight has an odd number of factors; never true because the factors are 12 and 4; 8 and 6
All numbers have at least two factor pairs – never true because not all numbers have factor pairs.
Even numbers always have factors; always true because even numbers can be divided by 2.

Reasoning and Problem Solving – Division using Factors

Greater Depth

7a. False because 21 and 4 are not factors of 25. She could use 5 and 5 because they are factors of 25.

7b. True because 24 and 3 are factors of 72

8a. 32 and 2; 16 and 4; 8 and 8; the answer is 402

8b. 30 and 2; 20 and 3; 15 and 4; 10 and 6; the answer is 761

9a. To find a factor pair you double one number and half the other; sometimes true because it doesn't work for all factor pairs. This process works when dividing by 32 because you have factor pairs 2 and 16 and 4 and 8 but when dividing by 12 the factor pairs are 2 and 6 and 3 and 4.

All numbers have a factor pair; never true as some numbers such as 5, 11 and 13 do not have a factor pair.

Odd numbers do not have factor pairs; sometimes true because fifteen is odd and has factor pairs but 13 is odd and has no factor pairs.

9b. 5-digit numbers can be divided by two; sometimes true if the number is even.

Factor pairs must be made up of one odd and one even number; sometimes true as some factor pairs such as 2 and 5 are odd and even but other factor pairs such as 2 and 8 are both even.

Even numbers always have factors; always true because even numbers can always be divided by multiples of 2.