

# Reasoning and Problem Solving

## Step 6: Cube Numbers

### National Curriculum Objectives:

Mathematics Year 5: (5C5d) [Recognise and use square numbers and cube numbers, and the notation for squared \(2\) and cubed \(3\)](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Find and explain the odd one out. Includes the first 5 cube numbers.

**Expected** Find and explain the odd one out. Includes the first 12 cube numbers.

**Greater Depth** Find and explain the odd one out. Includes the first 12 cube numbers and applying knowledge of square numbers.

Questions 2, 5 and 8 (Reasoning)

**Developing** Prove if a given number is a cube number. Includes the first 5 cube numbers.

**Expected** Prove if a given number is a cube number. Includes the first 12 cube numbers.

**Greater Depth** Prove if the answer to a given calculation is a cube number. Includes the first 12 cube numbers and applying knowledge of square numbers.

Questions 3, 6 and 9 (Problem Solving)

**Developing** Solve a word problem using knowledge and understanding of cube numbers. Includes the first 5 cube numbers.

**Expected** Solve a word problem using knowledge and understanding of cube numbers. Includes the first 12 cube numbers.

**Greater Depth** Solve a word problem using knowledge and understanding of cube and square numbers. Includes the first 12 cube numbers and square numbers.

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## Cube Numbers

1a. Circle the odd one out.

$$3^3 + 23$$

$$4^3 - 14$$

$$2^3 + 32$$

Explain your reasoning.



R

## Cube Numbers

1b. Circle the odd one out.

$$5^3 - 25$$

$$1^3 + 90$$

$$4^3 + 36$$

Explain your reasoning.



R

2a. Mo says,



The number  
125 is a cube  
number.

Is he correct? Prove it.



R

2b. Bella says,



The number  
27 is a cube  
number.

Is she correct? Prove it.



R

3a. Solve the word problem below.

I am thinking of a number.

If I cube my number, then add 7, I get  
another cube number.

What number am I thinking of?



PS

3b. Solve the word problem below.

I am thinking of a number.

If I cube my number, then take away 37, I  
get another cube number.

What number am I thinking of?



PS

## Cube Numbers

## Cube Numbers

4a. Circle the odd one out.

$$7^3 + 157$$

$$10^3 - 350$$

$$9^3 - 229$$

Explain your reasoning.



R

4b. Circle the odd one out.

$$11^3 + 210$$

$$9^3 - 384$$

$$6^3 + 129$$

Explain your reasoning.



R

5a. Ivan says,



The number  
1,728 is a  
cube number.

Is he correct? Prove it.



R

5b. Kayleigh says,



The number  
733 is a cube  
number.

Is she correct? Prove it.



R

6a. Solve the word problem below.

I am thinking of a number.

If I cube my number, then add 271, I get  
another cube number.

What number am I thinking of?



PS

6b. Solve the word problem below.

I am thinking of a number.

If I cube my number, then take away 169,  
I get another cube number.

What number am I thinking of?



PS

## Cube Numbers

7a. Circle the odd one out.

$$11^3 - 3^2$$

$$6^3 - 12^2$$

$$2^3 + 8^2$$

Explain your reasoning.



R

## Cube Numbers

7b. Circle the odd one out.

$$10^3 + 712$$

$$12^3 - 4^2$$

$$9^3 + 9^2$$

Explain your reasoning.



R

8a. Danny says,



The answer to  
 $12^3 - 12^2$  is a  
cube number.

Is he correct? Prove it.



R

8b. Kiran says,



The answer to  
 $8^3 + 11^2$  is a  
cube number.

Is she correct? Prove it.



R

9a. Solve the word problem below.

I am thinking of a number.

If I cube my number, then add the square number, I get the answer 810.

What number am I thinking of?



PS

9b. Solve the word problem below.

I am thinking of a number.

If I cube my number, then take away the square number, I get the answer 1,210.

What number am I thinking of?



PS

## Reasoning and Problem Solving Cube Numbers

### Developing

1a.  $2^3 + 32$  is the odd one out because the answer is 40. The answer to the other calculations is 50.

2a. Mo is correct because when the number 5 is multiplied by itself and then by itself again, the product is 125.

3a. 1

### Expected

4a.  $10^3 - 350$  is the odd one out because the answer is 650. The answer to the other calculations is 500.

5a. Ivan is correct because when the number 12 is multiplied by itself and then by itself again, the product is 1,728.

6a. 9

### Greater Depth

7a.  $11^3 - 3^2$  is the odd one out because the answer is 1,322. The answer to the other calculations is 72.

8a. Danny is not correct because  $12^3 - 12^2 = 1,584$  and no whole number can be multiplied by itself and then by itself again to reach the product 1,584. The cube number of 11 is 1,331 and the cube number of 12 is 1,728.

9a. 9

## Reasoning and Problem Solving Cube Numbers

### Developing

1b.  $1^3 + 90$  is the odd one out because the answer is 91. The answer to the other calculations is 100.

2b. Bella is correct because when the number 3 is multiplied by itself and then by itself again, the product is 27.

3b. 4

### Expected

4b.  $11^3 + 210$  is the odd one out because the answer is 1,541. The answer to the other calculations is 345.

5b. Kayleigh is not correct because no whole number can be multiplied by itself and then by itself again to reach the product 733. The cube number of 9 is 729 and the cube number of 10 is 1,000.

6b. 8

### Greater Depth

7b.  $9^3 + 9^2$  is the odd one out because the answer is 810. The answer to the other calculations is 1,712.

8b. Kiran is not correct because  $8^3 + 11^2 = 633$  and no whole number can be multiplied by itself and then by itself again to reach the product 633. The cube number of 8 is 512 and the cube number of 9 is 729.

9b. 11