

Reasoning and Problem Solving

Step 12: Square and 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 \(3\)](#)

Mathematics Year 5: (5C8a) [Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Sort the square and cube numbers into the Venn diagram. Includes square numbers up to 12^2 and cube numbers up to 5^3 . All questions to include the index and the corresponding multiplication, i.e. $4^3 = 4 \times 4 \times 4$.

Expected Sort the square and cube numbers into the Venn diagram. Includes square numbers up to 12^2 and cube numbers up to 12^3 .

Greater Depth Sort the square and cube numbers into the Venn diagram. Includes square numbers up to 12^2 and cube numbers up to 12^3 . Questions presented using square and cube numbers within a calculation involving all four operations. Also using knowledge of square and cubed numbers to calculate the square and cube root.

Questions 2, 5 and 8 (Reasoning)

Developing Match the square and cube number cards and explain which is the odd one out. Includes numbers as outlined in Question 1.

Expected Match the square and cube number cards and explain which is the odd one out. Includes numbers as outlined in Question 4.

Greater Depth Match the square and cube number cards and explain which is the odd one out. Includes square numbers up to 12^2 and cube numbers up to 12^3 . Questions presented using square and cube numbers within a calculation involving all four operations.

Questions 3, 6 and 9 (Problem Solving)

Developing Use the number cards to complete the statements comparing square and cube numbers. Includes numbers as outlined in Question 1.

Expected Use the number cards to complete the statements comparing square and cube numbers. Includes numbers as outlined in Question 4.

Greater Depth Use the number cards to complete the statements comparing square and cube numbers. Includes numbers as outlined in Question 7.

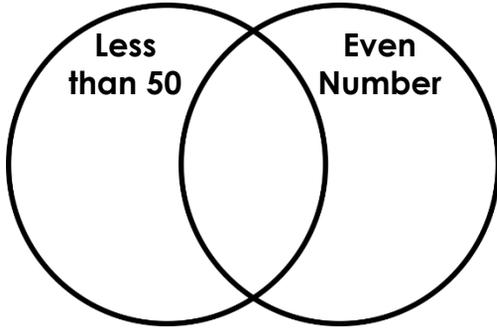
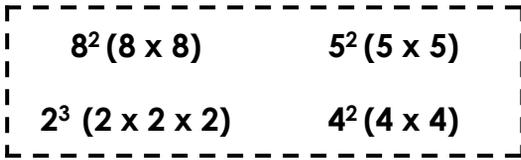
More [Year 6 Four Operations](#) resources.

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Square and Cube Numbers

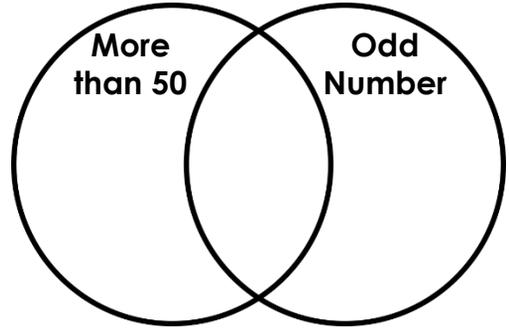
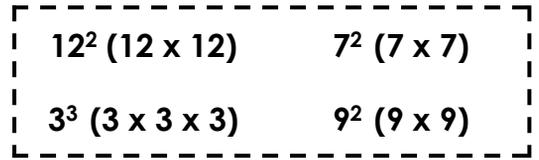
Square and Cube Numbers

1a. Sort the square and cube numbers into the Venn diagram.



PS

1b. Sort the square and cube numbers into the Venn diagram.



PS

2a. Match the square and cube numbers to the correct cards.

| | | |
|-----|----------------------|----|
| 64 | 6^2 (6 x 6) | 50 |
| 100 | 10^2 (10 x 10) | 36 |
| | 4^3 (4 x 4 x 4) | |

Which is the odd one out? Convince me.



R

2b. Match the square and cube numbers to the correct cards.

| | | |
|----|----------------------|-----|
| 8 | 5^3 (5 x 5 x 5) | 125 |
| 10 | 8^2 (8 x 8) | 64 |
| | 2^3 (2 x 2 x 2) | |

Which is the odd one out? Convince me.



R

3a. Use the cards to complete the statements below. Find 3 possibilities.

| | | |
|----------------------|------------------|----------------------|
| 2^3 (2 x 2 x 2) | 7^2 (7 x 7) | 5^3 (5 x 5 x 5) |
|----------------------|------------------|----------------------|



PS

3b. Use the cards to complete the statements below. Find 3 possibilities.

| | | |
|----------------------|---------------------|----------------------|
| 4^3 (4 x 4 x 4) | 10^2 (10 x 10) | 3^3 (3 x 3 x 3) |
|----------------------|---------------------|----------------------|

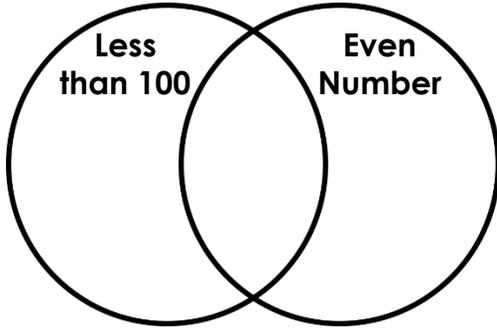
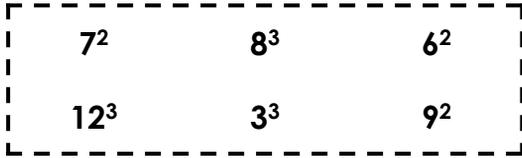


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Square and Cube Numbers

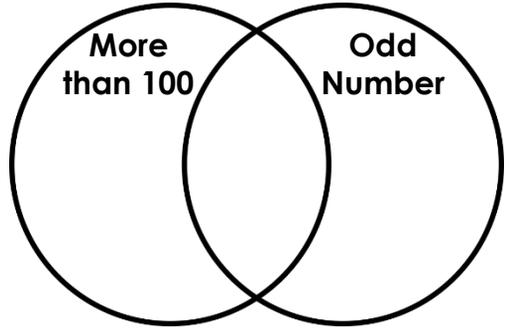
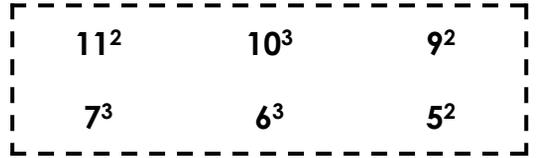
Square and Cube Numbers

4a. Sort the square and cube numbers into the Venn diagram.



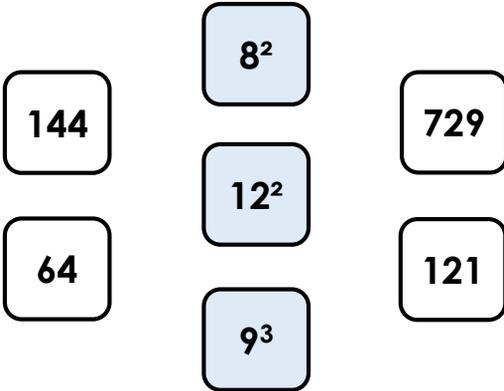
PS

4b. Sort the square and cube numbers into the Venn diagram.



PS

5a. Match the square and cube numbers to the correct cards.

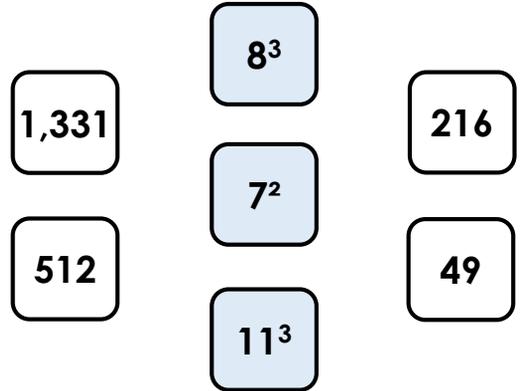


Which is the odd one out? Convince me.



R

5b. Match the square and cube numbers to the correct cards.



Which is the odd one out? Convince me.



R

6a. Use the cards to complete the statements below. Find 3 possibilities.



PS

6b. Use the cards to complete the statements below. Find 3 possibilities.



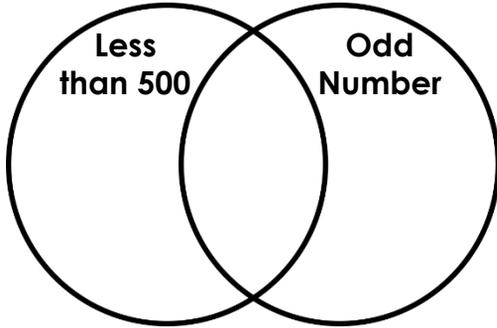
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Square and Cube Numbers

Square and Cube Numbers

7a. Sort the square and cube numbers into the Venn diagram.

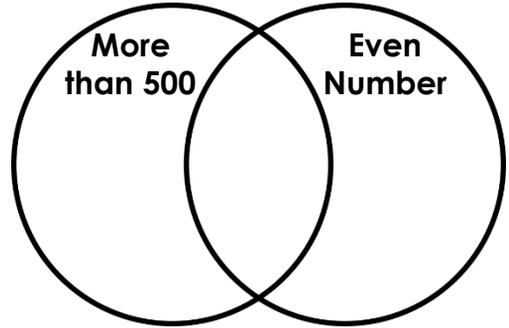
| | |
|------------------|----------------|
| cube root of 343 | $8^2 + 10^3$ |
| $12^3 - 9^2$ | $4^2 \times 2$ |



PS

7b. Sort the square and cube numbers into the Venn diagram.

| | |
|--------------|--------------------|
| $11^3 + 3^2$ | square root of 144 |
| $10^3 - 9^3$ | $9^3 + 4^2$ |



PS

8a. Match the square and cube numbers to the correct cards.

| | | |
|-----|----------------|-------|
| 98 | $500 - 6^3$ | 1,340 |
| 284 | $11^3 + 9$ | 275 |
| | $7^2 \times 2$ | |

Which is the odd one out? Convince me.



R

8b. Match the square and cube numbers to the correct cards.

| | | |
|-------|-----------------|----|
| 407 | 10×5^3 | 8 |
| 1,250 | $4^3 + 7^3$ | 16 |
| | $8^2 \div 2^3$ | |

Which is the odd one out? Convince me.



R

9a. Use the cards to complete the statements below. Find 3 possibilities.

| | | |
|--------------------|------------------|------------|
| square root of 144 | $10^3 \div 10^2$ | $8^3 + 50$ |
|--------------------|------------------|------------|



PS

9b. Use the cards to complete the statements below. Find 3 possibilities.

| | | |
|------------------|------------|-------------|
| cube root of 512 | $7^2 + 51$ | $300 - 6^3$ |
|------------------|------------|-------------|

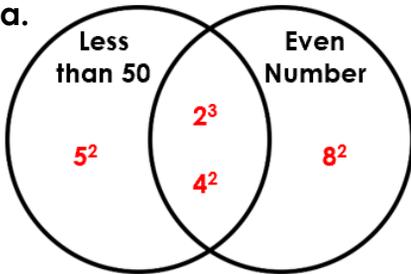


PS

Reasoning and Problem Solving Square and Cube Numbers

Developing

1a.

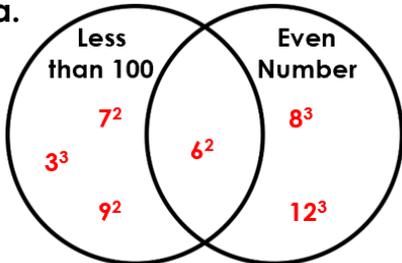


2a. 50 is the odd one out because it does not have a matching square or cube card. $6^2 (6 \times 6) = 36$, $10^2 (10 \times 10) = 100$, $4^3 (4 \times 4 \times 4) = 64$

3a. $2^3 (2 \times 2 \times 2) < 7^2 (7 \times 7)$, $2^3 (2 \times 2 \times 2) < 5^3 (5 \times 5 \times 5)$, $7^2 (7 \times 7) < 5^3 (5 \times 5 \times 5)$

Expected

4a.

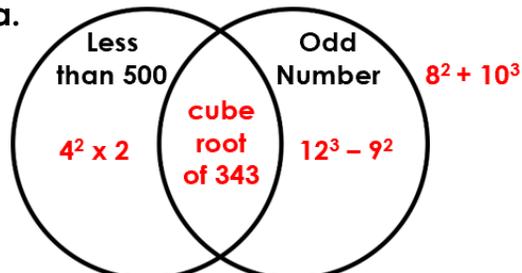


5a. 121 is the odd one out because it does not have a matching square or cube card. $8^2 = 64$, $12^2 = 144$ and $9^3 = 729$

6a. Various answers, for example: $4^2 < 125$, $7^3 > 100$; $125 < 7^3$, $11^3 > 100$; $4^2 < 100$, $11^3 > 7^3$

Greater Depth

7a.



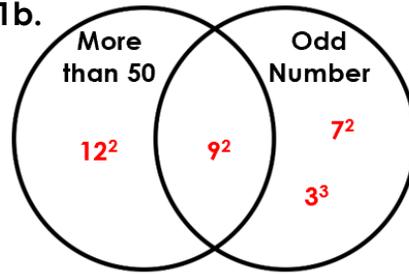
8a. 275 is the odd one out because it does not have a matching square or cube card. $500 - 6^3 = 284$, $11^2 + 69 = 1,340$ and $7^2 \times 2 = 98$

9a. $10^3 \div 10^2 < \text{square root of } 144$, $10^3 \div 10^2 < 8^3 + 50$, $\text{square root of } 144 < 8^3 + 50$

Reasoning and Problem Solving Square and Cube Numbers

Developing

1b.

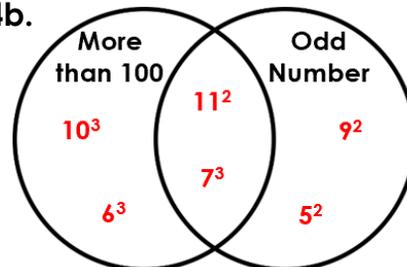


2b. 10 is the odd one out because it does not have a matching square or cube card. $5^3 (5 \times 5 \times 5) = 125$, $8^2 (8 \times 8) = 64$, $2^3 (2 \times 2 \times 2) = 8$

3b. $10^2 (10 \times 10) > 4^3 (4 \times 4 \times 4)$, $10^2 (10 \times 10) > 3^3 (3 \times 3 \times 3)$, $4^3 (4 \times 4 \times 4) > 3^3 (3 \times 3 \times 3)$

Expected

4b.

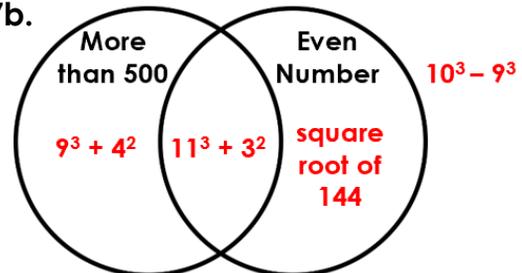


5b. 216 is the odd one out because it does not have a matching square or cube card. $8^3 = 512$, $7^2 = 49$, $11^3 = 1,331$

6b. Various answers, for example: $500 < 9^3$, $5^3 < 200$; $500 > 12^2$, $5^3 < 9^3$; $200 > 5^3$, $125 < 9^3$

Greater Depth

7b.



8b. 16 is the odd one out because it does not have a matching square or cube card. $10 \times 5^3 = 1,250$, $4^3 + 7^3 = 407$, $8^2 \div 2^3 = 8$

9b. $7^2 + 51 > 300 - 6^3$, $7^2 + 51 > \text{cube root of } 512$, $300 - 6^3 > \text{cube root of } 512$