Number and Algebra: Patterns and Algebra: Follow the Rules

Australian Curriculum
This lesson plan could be used to support the teaching and learning of the following Content Descriptions from the Australian Curriculum and Victorian Curriculum.

Y6: Number and Algebra: Patterns and Algebra
Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)

Child-Friendly Aim:	**Success Criteria:**	**Resources:**
I can order and compare numbers up to 10 000 000.	I can create sequences using a given rule. I can identify terms that will appear in a sequence with a given rule.	**Lesson Pack** Large dice
	Key/New Words: Sequence, order, pattern, increase, decrease, term, rule.	**Preparation:** Differentiated **Following the Rules Activity Sheet** - per child **Extra Challenge Activity Sheet** - as required

Prior Learning: It will be helpful if children have covered sequences of numbers up to 1 000 000.

Learning Sequence

	Beat the Teacher: The aim of this game is for the class to beat you by making a smaller decimal number than you do. Take turns to roll the dice and record the digit it shows on the place value grid on the **Lesson Presentation**. Choose which column to place the digits in, always aiming to make the smallest number. On the next slide, you can choose the criteria for the next game, such as the number nearest to 550.125, or the biggest number.	
Whole Class	**Following Rules:** Remind children how we can use the rule of a sequence to extend it and find missing terms. Click to display the sequence on the **Lesson Presentation** and describe the rule. Can children use the rule to find the missing terms? Reveal the answers on the **Lesson Presentation**.	
Whole Class	**Identifying Terms:** Show the sequence of numbers and shapes on the **Lesson Presentation** and describe the rule. Can children identify the missing term? Choose a child to click on the term they think is correct. If they are right, it will move to fill the space in the sequence. If they are incorrect, it will stay still. Show children the next sequence on the next slide. Describe the rule. Can children identify the term closest to 3500? Click to reveal the answer and discuss why this term is closest. Show children the next sequence and rule on the **Lesson Presentation**. Can children identify two terms that add to make 230? Click to reveal the answer and discuss how they found their answer.	
	Following the Rules Activity: Children complete the differentiated **Following the Rules Activity Sheet** by following the rules for each sequence to find the target number. Can children create their own sequences following the given rules? ★ Follow the rules to add the missing terms to the sequences, and identify the mystery target number. ★★ Follow the rules to create the sequences, ensuring they all share the same given target number. ★★★ Follow the rules to create the sequences, ensuring they all share the same mystery target number. Use clues to find the target number. An **Extra Challenge Activity Sheet** is provided as an extension activity if required.	
	Steps to Success: Children talk in pairs about the lesson. Children develop a set of short instructions to tell someone else how to extend sequences and identify missing terms.	

Masterit

Investigateit: Use this _____ to explore and investigate the Fibonacci sequence of numbers.

Playit: Use these _____ to play a game. In pairs, each child chooses a starting number card and a rule card. Give each pair a challenge, such as 'who will find a term closest to 350?' or 'who will find the smallest term?' They should find the next three terms of their sequences and see which partner wins the challenge.

Mathematics

Number and Algebra

Regent Studies | www.regentstudies.com

Follow the Rules

Aim

- I can order and compare numbers up to 10 000 000.

Success Criteria

- I can create sequences using a given rule.
- I can identify terms that will appear in a sequence with a given rule.

Beat the Teacher

The aim of this game is to create the **smallest number**. We will take turns to roll the dice, and decide where to place the digits shown on the dice in the grid below.

I will go first, then I will choose someone from our class to have a turn.

Think carefully about where to place the digits to create the smallest number.

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

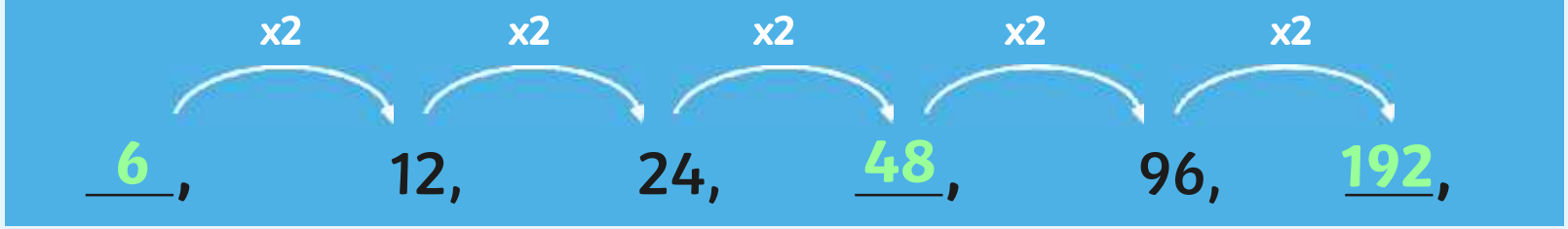
Beat the Teacher

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

Following Rules

A number sequence is a set of numbers that follow a particular pattern or rule. If you know what the rule is, you can use it to extend a sequence or identify missing terms.

Look at this sequence:



The rule of this sequence is double one term to find the next term.

Can you find the three missing terms?

How did you do? Could you use the rule to find the missing terms and extend the sequence?

Today, we are going to follow sequence rules to identify missing terms and extend number patterns.

Identifying Terms

This is a sequence of numbers and shapes.
The rule to find the next number in the sequence is add seven.

177 184 191 198 212 219 226

Can you identify the correct missing term?

205 207 205 207 207 205

Identifying Terms

The numbers in this sequence decrease by 100 each time.

4356, 4256, 4156

It continues in this way.

Can you identify the term in the sequence that is closest to 3500?

Continue the sequence by subtracting 100 from each term.

4256, 4156, 4056, 3956, 3856, 3756, 3656, 3556, 3456

The term closest to 3500 is 3456.

Did you identify it?

Identifying Terms

This sequence follows the rule 'add 25'.

15, 40, 65

It continues in this way.

Can you identify two terms in the sequence that have a sum of 230?

Continue the sequence by adding 25 each time.

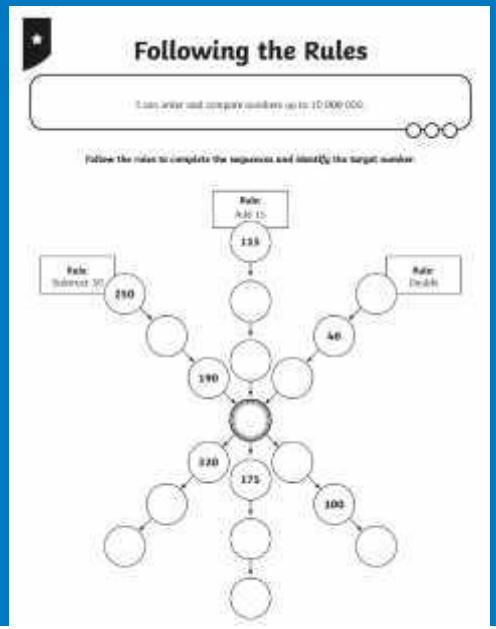
15, 40, 65, 90, 115, 140

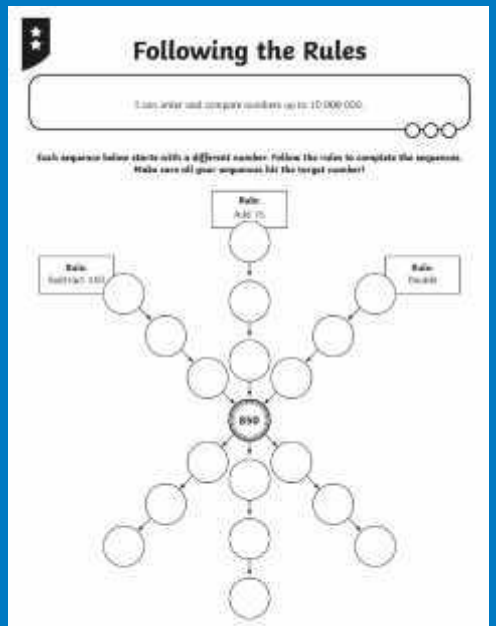
Look for two terms with a sum of 230?

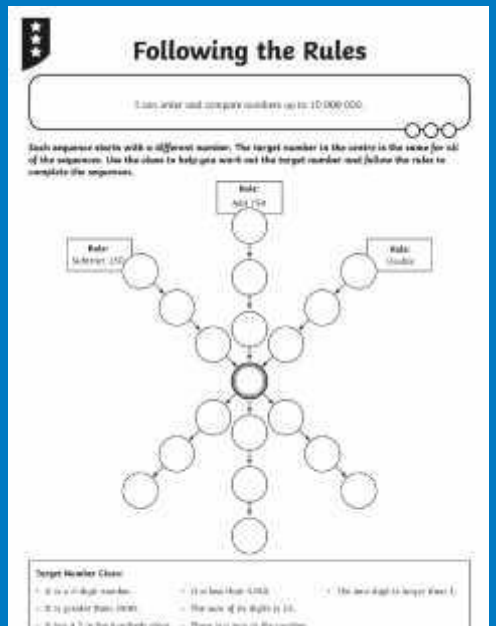
The sum of 90 and 140 is 230.

Following the Rules Activity

Follow the rules for each sequence to find the target number on your Activity Sheet.







Steps to Success

Talk to your partner about how to extend a sequence and find missing terms.

Can you develop a set of instructions to tell someone how to extend sequences?

Try to include at least four steps in your instructions.

- **First...**
- **Once you have done that...**
- **After that...**
- **Now you are ready to...**

Aim

- I can order and compare numbers up to 10 000 000.

Success Criteria

- I can create sequences using a given rule.
- I can identify terms that will appear in a sequence with a given rule.

Follow the Rules Extra Challenge

I can order and compare numbers up to 10 000 000.

We can use a formula to generate a sequence. For example, let's look at the formula **3n + 2**.

'3n' means multiply by 3. So for the first term, we would do 3 x 1. For the second term, we would do 3 x 2, for the third term 3 x 3, and so on. However, we can't forget the + 2 part of the formula. So for the first term, once we have done 3 x 1, we need to add 2 to the answer. This gives us **(3 x 1) + 2 = 5**. The first term is 5. For the second term, we do **(3 x 2) + 2**, which gives us 8. We can continue using this formula to find the next five terms of this sequence:

(3 x 3) + 2 = 11 **(3 x 4) + 2 = 14** **(3 x 5) + 2 = 17** **(3 x 6) + 2 = 20** **(3 x 7) + 2 = 23**

So the first seven terms of this sequence are **5, 8, 11, 14, 17, 20, 23**.

Can you use these formulas to find the first 10 terms of each sequence?	
7n – 2	
11n + 4	
10n + 5	
3n – 4	
15n + 12	

Follow the Rules Extra Challenge – Answers

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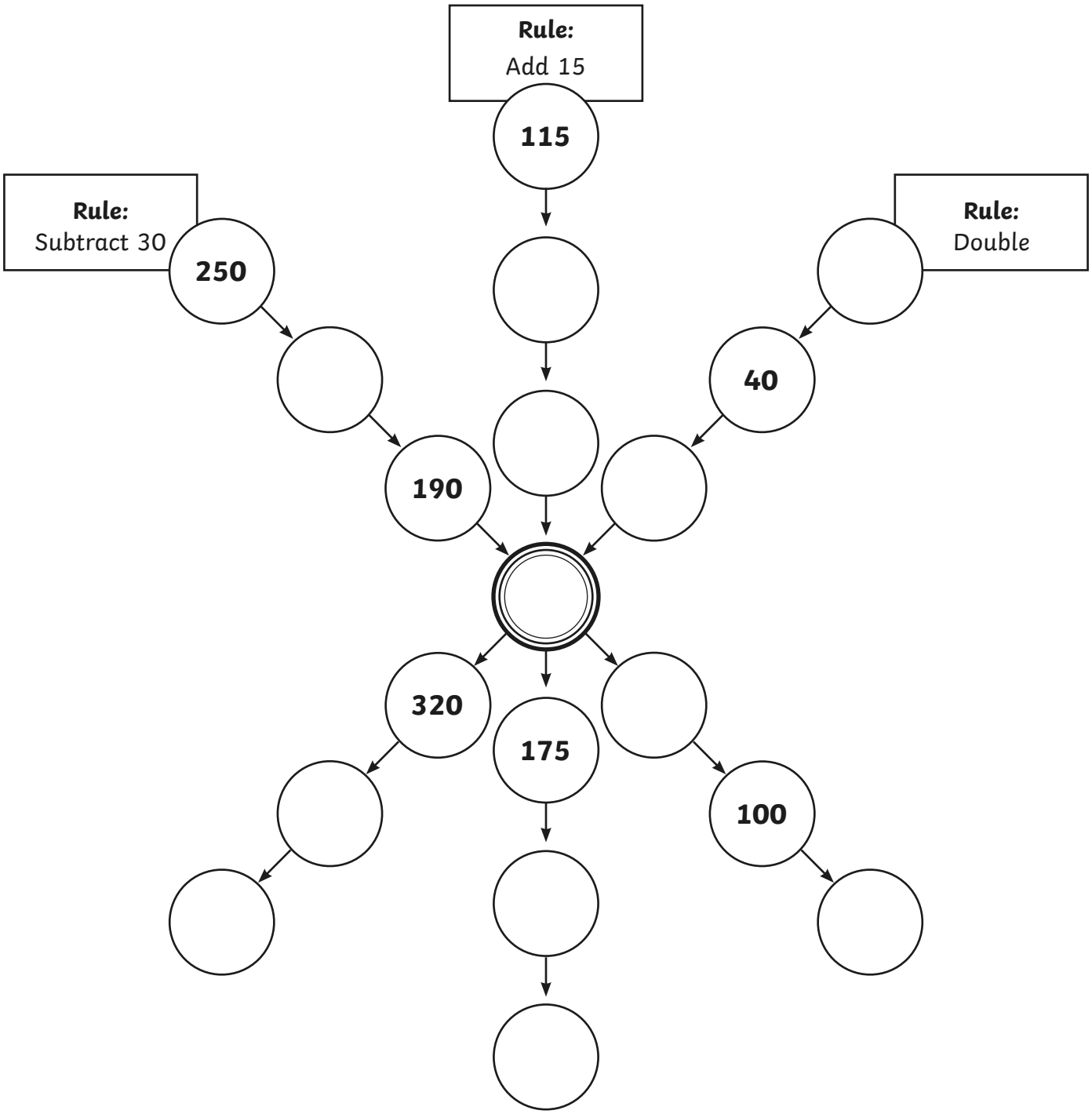
Can you use these formulas to find the first 10 terms of each sequence?	
7n – 2	**5, 12, 19, 26, 33, 40, 47, 54, 61, 68**
11n + 4	**15, 26, 37, 48, 59, 70, 81, 92, 103, 114**
10n + 5	**15, 25, 35, 45, 55, 65, 75, 85, 95, 105**
3n – 4	**–1, 2, 5, 8, 11, 14, 17, 20, 23, 26**
15n + 12	**27, 42, 57, 72, 87, 102, 117, 132, 147, 162**

Following the Rules

I can order and compare numbers up to 10 000 000.

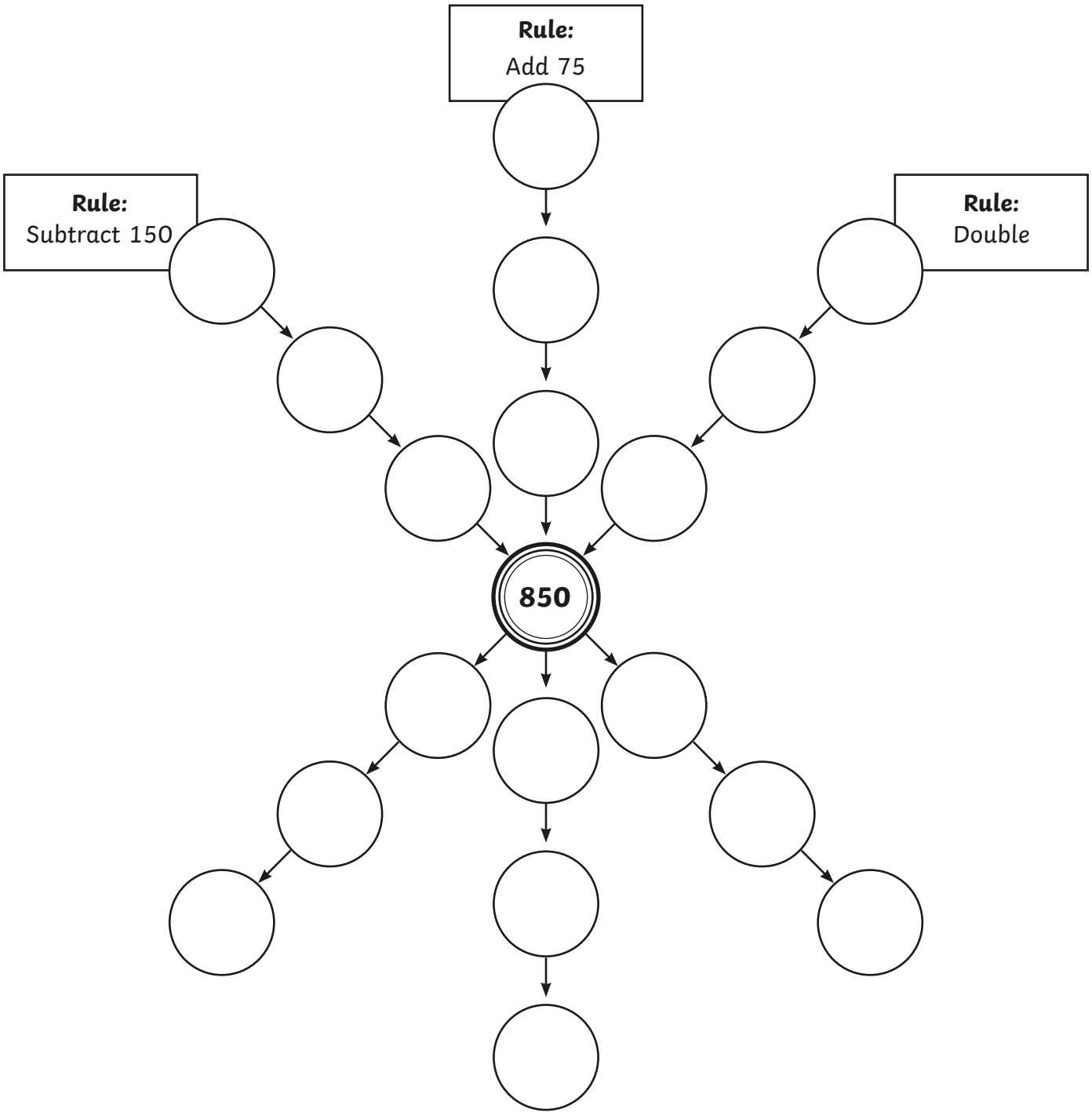
Follow the rules to complete the sequences and identify the target number.



Following the Rules

I can order and compare numbers up to 10 000 000.

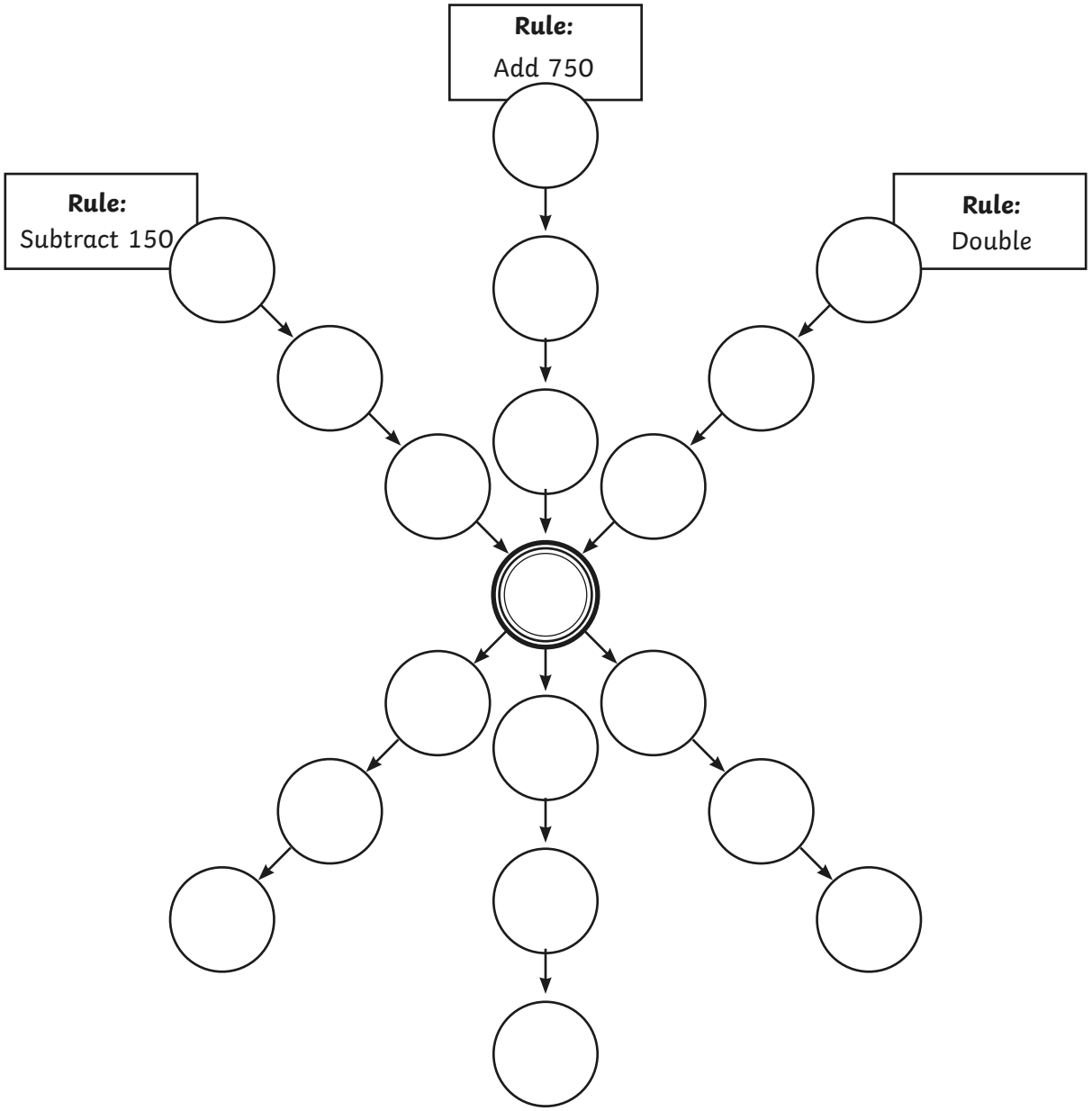
Each sequence below starts with a different number. Follow the rules to complete the sequences. Make sure all your sequences hit the target number!



Following the Rules

I can order and compare numbers up to 10 000 000.

Each sequence starts with a different number. The target number in the centre is the same for all of the sequences. Use the clues to help you work out the target number and follow the rules to complete the sequences.



Target Number Clues:

- It is a 4-digit number.
- It is greater than 3500.
- It has a 7 in the hundreds place.
- It is less than 4350.
- The sum of its digits is 15.
- There is a zero in the number.
- The tens digit is larger than 1.

Following the Rules – Answers

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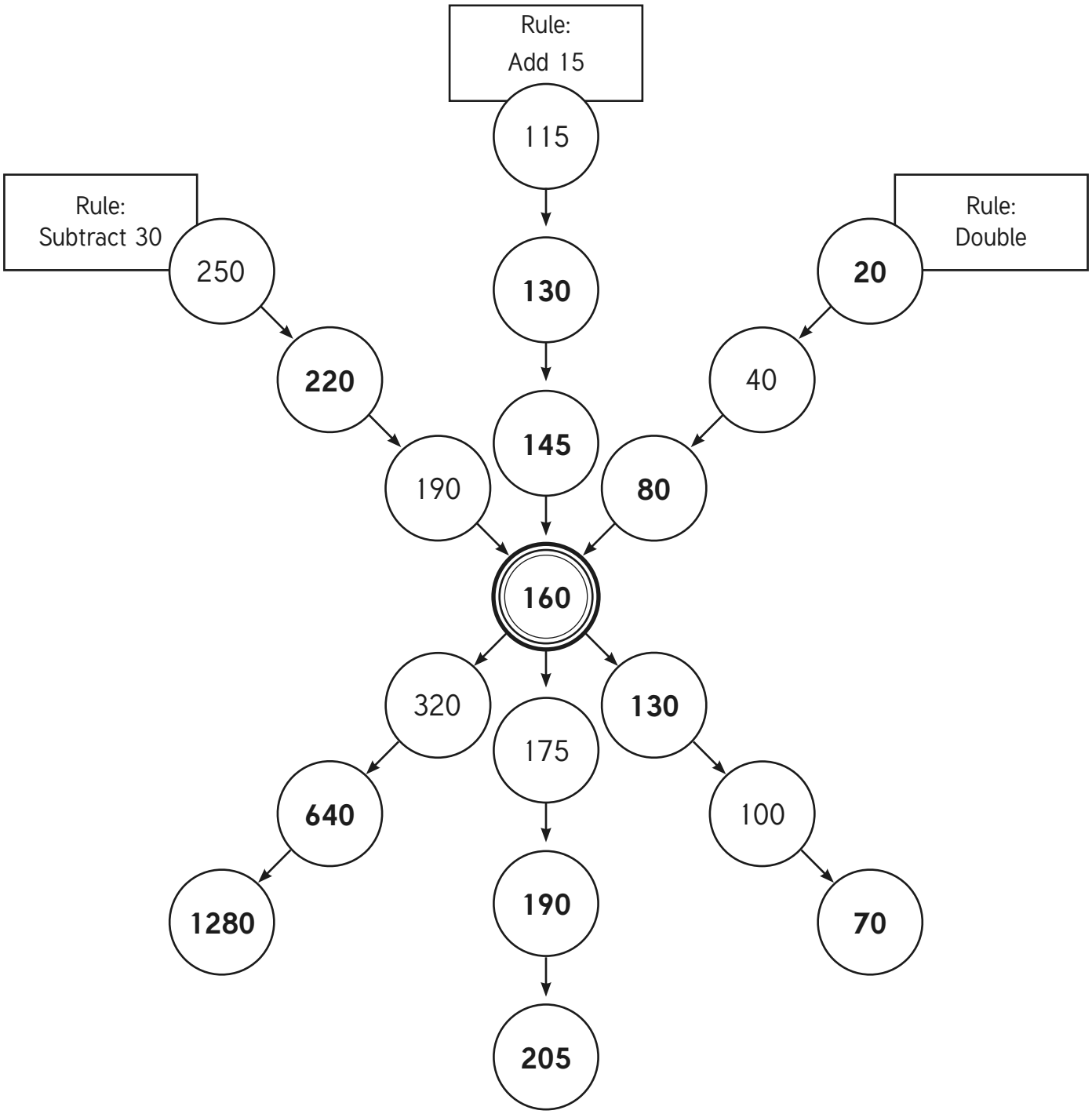

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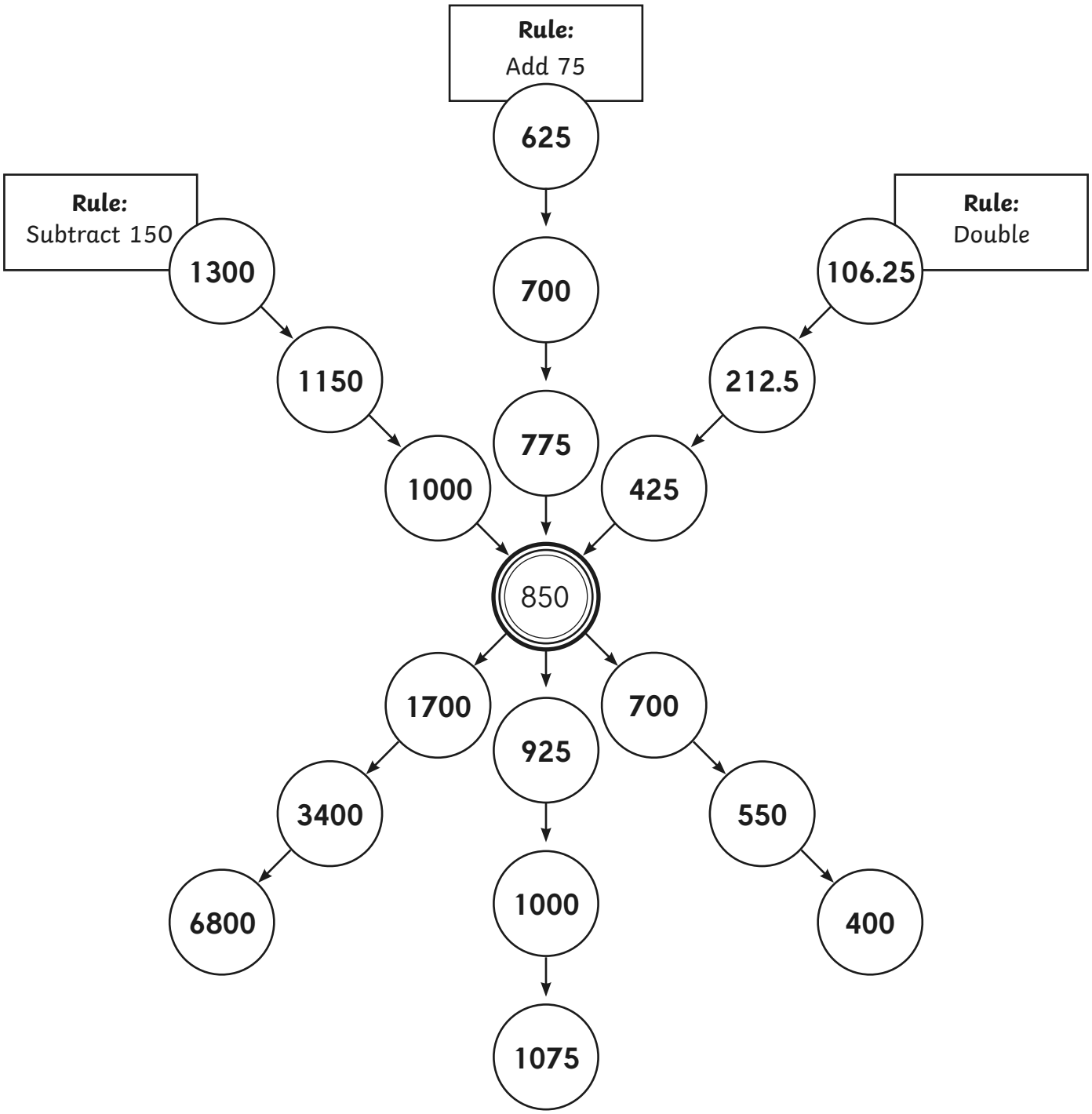

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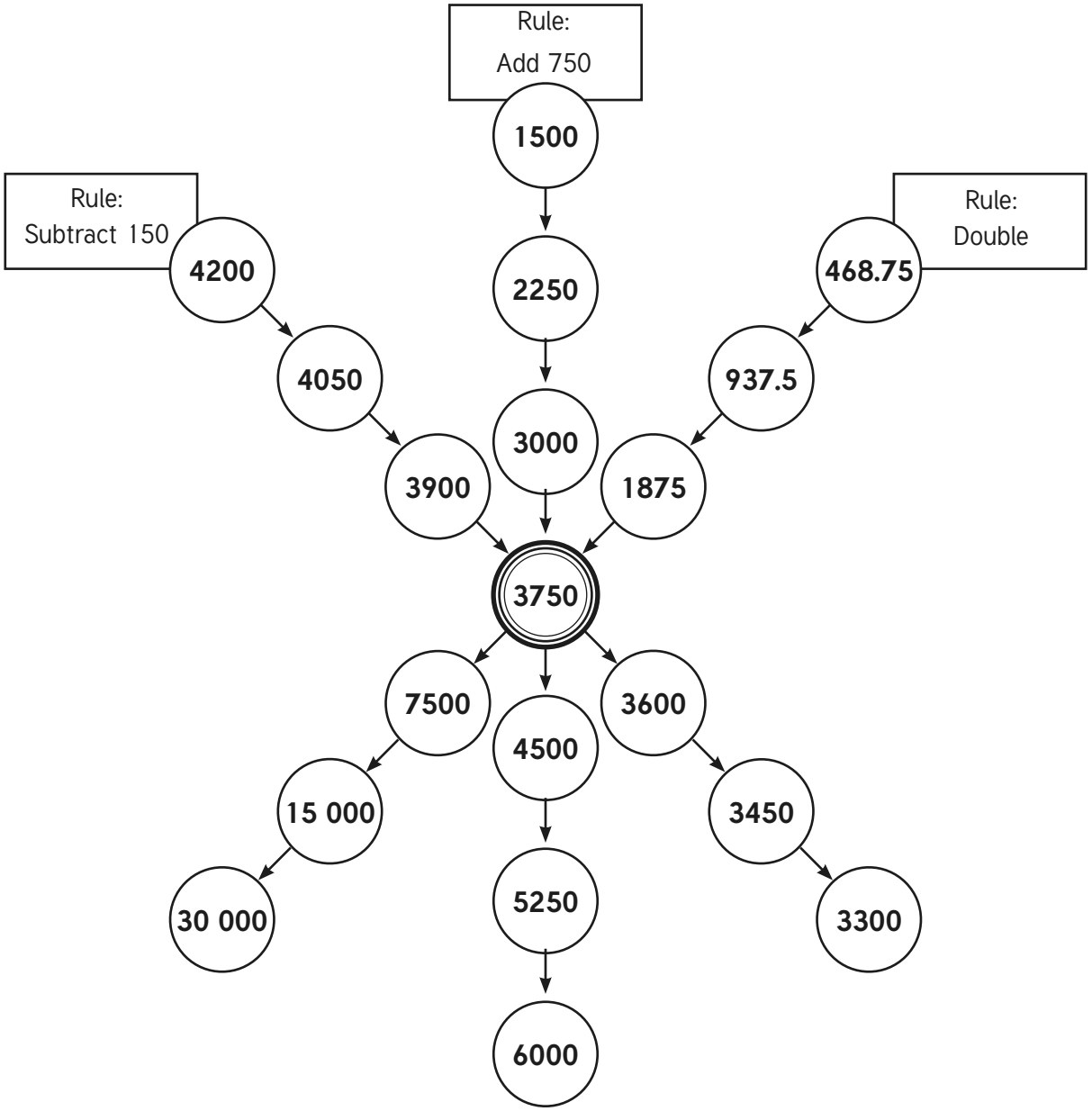

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