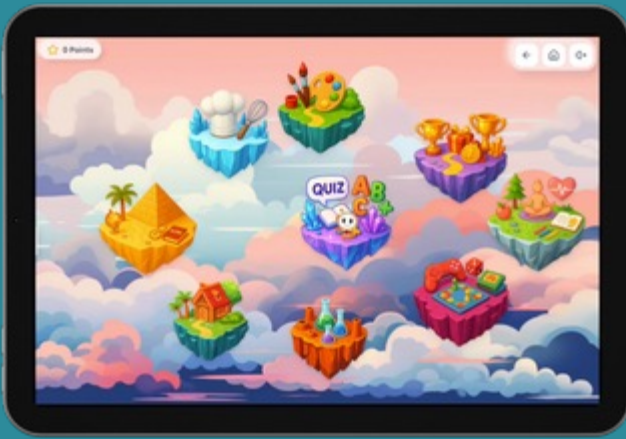


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Number Patterns - Year 3

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NUMBER PATTERN DETECTIVE

TOOLKIT



A number pattern is a sequence that follows the same rule each step.

INCREASING

14 → 19 → 24 → 29

+5 +5 +5

Rule: add 5

The numbers get larger.

DECREASING

82 → 75 → 68 → 61

-7 -7 -7

Rule: subtract 7

The numbers get smaller.

PATTERN WORDS

1

term: one number in the pattern

...

sequence: the ordered list of terms

⚙️

rule: what changes each time



CHECK IT: Apply the same rule from every term to the next.

HOW TO CRACK THE RULE

1 COMPARE

Look at two neighbouring terms.



2 CALCULATE

Find the difference.



$$35 - 29 = 6$$

3 NAME THE RULE

Say add ____
or subtract ____.

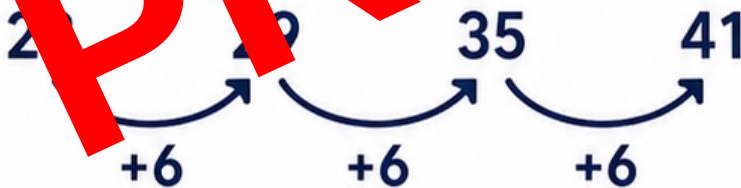


4 CHECK EVERY STEP

The same rule must
work all the way.



NUMBER LINE CHECK



Rule: add 6

INPUT-OUTPUT CHECK

IN	12	25	41
OUT	20	33	49

Rule: add 8



EXPLAIN IT

This pattern is increasing by 6
because 6 is added each time.

NUMBER PATTERN DETECTIVE



1. Compare two neighbouring terms.

2. Find the difference.

3. Name the rule: add ___ or subtract ___.

4. Check the same rule every time.



INCREASING

= numbers get larger



DECREASING

= numbers get smaller

Example:

18, 23, 28, 33
+5 +5 +5

Rule: add 5

Explain: It is increasing by 5.



CUT HERE

NUMBER PATTERN DETECTIVE



1. Compare two neighbouring terms.

2. Find the difference.

3. Name the rule: add ___ or subtract ___.

4. Check the same rule every time.



INCREASING

= numbers get larger



DECREASING

= numbers get smaller

Example:

18, 23, 28, 33
+5 +5 +5

Rule: add 5

Explain: It is increasing by 5.



PATTERN PATH

Race from START to FINISH by solving number-pattern challenges.



PATTERN PATH

Race from START to FINISH by solving number-pattern challenges.



HOW TO PLAY

1. Roll the die and move.
2. Draw a challenge card.
3. Correct answer: stay on the space.
4. Not yet: move back one space.

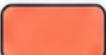


- ## HOW TO PLAY
1. Roll the die and move.
 2. Draw a challenge card.
 3. Correct answer: stay on the space.
 4. Not yet: move back one space.
- 



SPECIAL SPACES

	RULE BONUS: move ahead 1
	CREATE ONE: make a pattern
	EXPLAIN IT: tell how you know

- ## SPECIAL SPACES
- | | |
|---|--------------------------------------|
|  | RULE BONUS: move ahead 1 |
|  | CREATE ONE: make a pattern |
|  | EXPLAIN IT: tell how you know |

PATTERN PATH CHALLENGE CARDS

Find the missing term and name the rule.

CARD 1

12, 17, 22, 27, ____

Missing term: ____ Rule: ____

CARD 2

68, 62, 56, 50, ____

Missing term: ____ Rule: ____

CARD 3

21, 28, 35, ____, 49

Missing term: ____ Rule: ____

CARD 4

96, 86, ____, 66, 56

Missing term: ____ Rule: ____

CARD 5

9, 13, 17, 21, ____

Missing term: ____ Rule: ____

CARD 6

75, 72, 69, ____, 63

Missing term: ____ Rule: ____

CARD 7

34, ____, 46, 52, 58

Missing term: ____ Rule: ____

CARD 8

100, 91, 82, ____, 64

Missing term: ____ Rule: ____

CARD 9

5, 15, 25, ____, 45

Missing term: ____ Rule: ____

CARD 10

83, 78, ____, 68, 63

Missing term: ____ Rule: ____

CARD 11

18, 26, 34, 42, ____

Missing term: ____ Rule: ____

CARD 12

57, 50, 43, ____, 29

Missing term: ____ Rule: ____

PATTERN PATH RECORDING SHEET

Name: _____

Date: _____



Record six challenges. Show the missing term, rule and one quick check.



Round	Card	Sequence	Missing term	Rule	Quick check
1					
2					
3					
4					
5					
6					

PREVIEW

REFLECTION

One rule I solved quickly was _____ because _____.

One rule I need to practise is _____.

PATTERN PATH TEACHER KEY

Completed sequences and rules

CARD 1



12, 17, 22, 27, 32

Rule: add 5

CARD 2



68, 62, 56, 50, 44

Rule: subtract 6

CARD 3



21, 28, 35, 42, 49

Rule: add 7

CARD 4



96, 86, 76, 66, 56

Rule: subtract 10

CARD 5



9, 13, 17, 21, 25

Rule: add 4

CARD 6



75, 72, 69, 66, 63

Rule: subtract 3

CARD 7



34, 40, 46, 52, 58

Rule: add 6

CARD 8



100, 91, 82, 73, 64

Rule: subtract 9

CARD 9



5, 15, 25, 35, 45

Rule: add 10

CARD 10



83, 78, 73, 68, 63

Rule: subtract 5

CARD 11



18, 26, 34, 42, 50

Rule: add 8

CARD 12



57, 50, 43, 36, 29

Rule: subtract 7



GUESS MY RULE

Create a pattern. Hide the rule. Challenge a partner.



HOW TO PLAY

1. The Maker chooses a starting number and rule.
2. The Maker writes the first four terms but hides the rule.
3. The Detective names the rule and the next two terms.
4. Check together, then swap roles.

PATTERN MAKER

Starting number: _____

My secret rule: add _____ or subtract _____

First four terms:

_____, _____, _____, _____

PATTERN DETECTIVE

I think the rule is: _____

Next two terms:

_____, _____

My evidence:

CHECK TOGETHER

Did the same rule work every time?

YES

/

NOT YET

GUESS MY RULE CARDS

Draw a card. Create the pattern. Hide your rule.

CARD 1

Start at 8. Add a number from 2 to 9.

$$8 +$$

CARD 2

Start at 70. Subtract a number from 2 to 9.

$$70 -$$

CARD 3

Start at a two-digit number. Add 10.

$$10$$

CARD 4

Start between 80 and 100. Subtract 10.

$$90 -$$

CARD 5

Roll twice for a two-digit start. Add your first roll.

$$\text{dice} +$$

CARD 6

Roll twice for a two-digit start. Subtract your second roll.

$$\text{dice} -$$

CARD 7

Choose an odd start. Add an even number.

$$5 + 4$$

CARD 8

Choose an even start. Subtract an odd number.

$$12 - 7$$

CARD 9

Make an increasing pattern that passes 50.



CARD 10

Make a decreasing pattern that ends below 20.



CARD 11

Create a tricky missing-term pattern.

$$6 \quad ? \quad 18$$

CARD 12

Create one false term. Can your partner spot it?



FIND THE RULE & MISSING TERMS

PAGE 1 • SUPPORT AND CORE

Name: _____

Date: _____



For each pattern: circle increasing or decreasing, write the rule, then fill the two missing terms.



1

14, 18, 22, __, __

increasing / decreasing

Rule: add / subtract _____

2

63, 58, 53, __, __

increasing / decreasing

Rule: add / subtract _____

3

7, 17, 27, __, __

increasing / decreasing

Rule: add / subtract _____

4

82, 65, 78, __, __

increasing / decreasing

Rule: add / subtract _____

5

31, 37, 43, __, __

increasing / decreasing

Rule: add / subtract _____

6

76, 68, 60, __, __

increasing / decreasing

Rule: add / subtract _____



DETECTIVE TIP: Compare the first two terms.

FIND THE RULE & MISSING TERMS

PAGE 1 • SUPPORT AND CORE

Name: **ANSWERS** _____

Date: _____



For each pattern: circle increasing or decreasing, write the rule, then fill the two missing terms.



1

14, 18, 22, 26, 30

increasing / decreasing

Rule: add / subtract 4

2

63, 58, 53, 48, 43

increasing / decreasing

Rule: add / subtract _____

3

7, 17, 27, 37, 47

increasing / decreasing

Rule: add / subtract 10

4

52, 65, 78, 71, 64

increasing / decreasing

Rule: add / subtract 7

5

31, 37, 43, 49, 55

increasing / decreasing

Rule: add / subtract 6

6

76, 68, 60, 52, 44

increasing / decreasing

Rule: add / subtract 8



DETECTIVE TIP: Compare the first two terms.

FIND THE RULE & MISSING TERMS

PAGE 2 • MIXED CLUES

Name: _____

Date: _____



Find all missing terms and write the rule. Use neighbouring terms as clues.



1

____, 26, 32, 38, ____

Rule: _____

Show one check: _____

2

95, ____, 81, 74, ____

Rule: _____

Show one check: _____

3

13, 22, ____, 41, ____

Rule: _____

Show one check: _____

4

____, 64, 56, ____, 40

Rule: _____

Show one check: _____

5

47, ____, 57, ____, 67

Rule: _____

Show one check: _____

6

120, 110, ____, ____, 80

Rule: _____

Show one check: _____



DETECTIVE TIP: A blank can be at the start, middle or end.

FIND THE RULE & MISSING TERMS

PAGE 2 • MIXED CLUES

Name: ANSWERS

Date: _____



Find all missing terms and write the rule. Use neighbouring terms as clues.



1

20, 26, 32, 38, 44

Rule: add 6

Show one check: $26 + 6 = 32$

2

95, 88, 81, 74, 67

Rule: subtract 7

Show one check: $95 - 7 = 88$

3

13, 22, 31, 41, 49

Rule: add 9

Show one check: $22 + 9 = 31$

4

72, 64, 56, 48, 40

Rule: subtract 8

Show one check: $64 - 8 = 56$

5

47, 52, 57, 62, 67

Rule: add 5

Show one check: $47 + 5 = 52$

6

120, 110, 100, 90, 80

Rule: subtract 10

Show one check: $110 - 10 = 100$



DETECTIVE TIP: A blank can be at the start, middle or end.

NUMBER LINES & HUNDRED CHART PATTERNS

PAGE 1 • NUMBER-LINE JUMPS

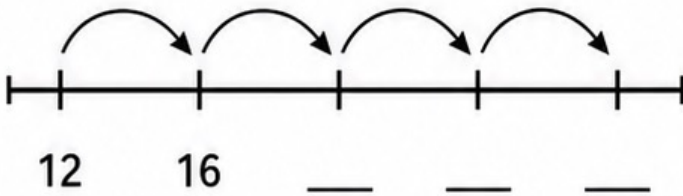
Name: _____

Date: _____

Use the labelled jump to complete each number line. Write the missing terms.

1

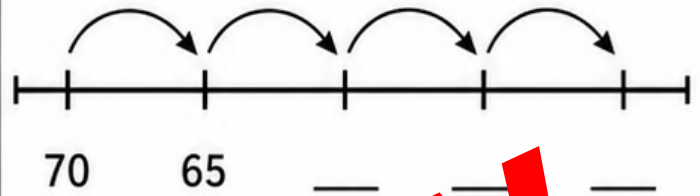
JUMP: +4



increasing / decreasing

2

JUMP: -5



increasing / decreasing

3

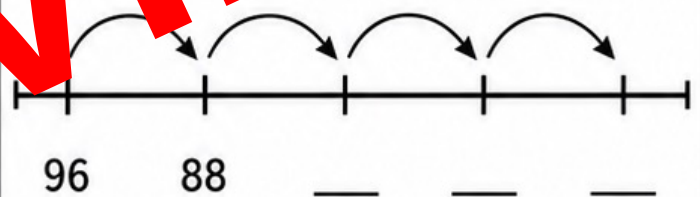
JUMP: +10



increasing / decreasing

4

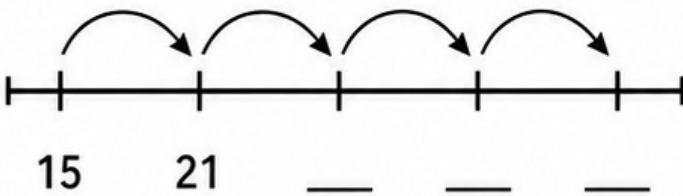
JUMP: -8



increasing / decreasing

5

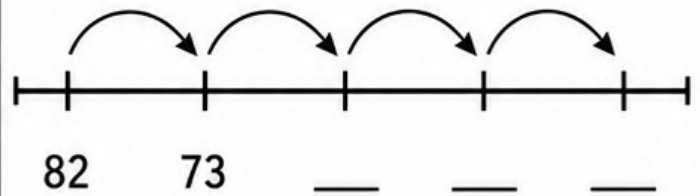
JUMP: +6



increasing / decreasing

6

JUMP: -9



increasing / decreasing

TIP: Every jump has the same size and direction.

NUMBER LINES & HUNDRED CHART PATTERNS

PAGE 1 • NUMBER-LINE JUMPS

Name: **ANSWERS**

Date: _____

Use the labelled jump to complete each number line. Write the missing terms.

1 JUMP: +4 increasing / decreasing	2 JUMP: -5 increasing / decreasing
3 JUMP: +10 increasing / decreasing	4 JUMP: -8 increasing / decreasing
5 JUMP: +6 increasing / decreasing	6 JUMP: -9 increasing / decreasing

TIP: Every jump has the same size and direction.

NUMBER LINES & HUNDRED CHART PATTERNS

PAGE 2 • HUNDRED-CHART MOVES

Name: _____

Date: _____

HUNDRED-CHART KEY			
			
right = +1	left = -1	down = +10	up = -10

Fill the four blank squares around each centre number.

1

	46	

2

	73	

3

	21	

	58	

5. Start at 24. Move down three times.

24, _____, _____, _____

Rule: _____

6. Start at 86. Move up three times.

86, _____, _____, _____

Rule: _____

EXPLAIN: Moving down a hundred chart changes the number by _____ each time.

NUMBER LINES & HUNDRED CHART PATTERNS

PAGE 2 • HUNDRED-CHART MOVES

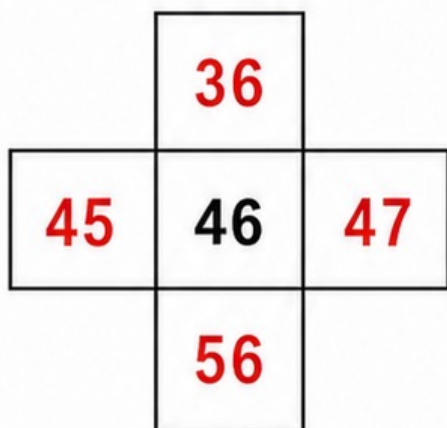
Name: **ANSWERS**

Date: _____

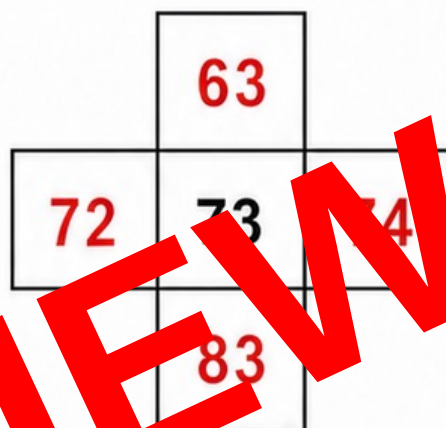
HUNDRED-CHART KEY			
			
right = +1	left = -1	down = +10	up = -10

Fill the four blank squares around each centre number.

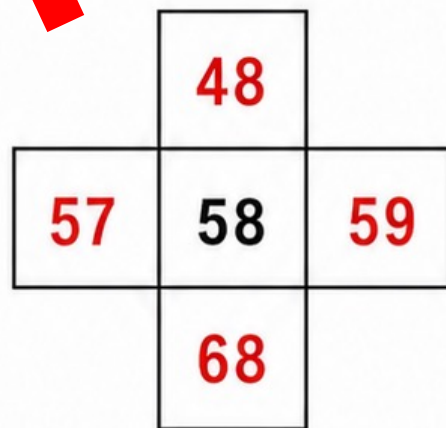
1



2



3



5. Start at 24. Move down three times.

24, 34, 44, 54

Rule: add 10

6. Start at 86. Move up three times.

86, 76, 66, 56

Rule: subtract 10

EXPLAIN: Moving down a hundred chart changes the number by 10 each time.

INPUT-OUTPUT PATTERN MACHINES

PAGE 1 • FIND THE RULE

Name: _____

Date: _____



Compare each input with its output. Write the machine rule.

1

INPUT	OUTPUT
4	11
9	16
15	22
22	29

Machine rule: add / subtract _____

Check: _____

2

INPUT	OUTPUT
18	1
27	22
35	3
42	41

Machine rule: add / subtract _____

Check: _____

3

INPUT	OUTPUT
12	22
25	35
40	50
63	73

Machine rule: add / subtract _____

Check: _____

4

INPUT	OUTPUT
96	88
82	74
71	63
59	51

Machine rule: add / subtract _____

Check: _____



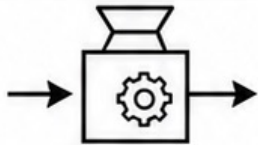
TIP: The same operation must work for every row.

INPUT-OUTPUT PATTERN MACHINES

PAGE 1 • FIND THE RULE

Name: **ANSWERS**

Date: _____



Compare each input with its output. Write the machine rule.

1

INPUT	OUTPUT
4	11
9	16
15	22
22	29

Machine rule: add / subtract 7

Check: $4 + 7 = 11$

2

INPUT	OUTPUT
18	13
27	22
35	30
41	41

Machine rule: add / subtract 5

Check: $18 - 5 = 13$

3

INPUT	OUTPUT
12	22
25	35
40	50
63	73

Machine rule: add / subtract 10

Check: $12 + 10 = 22$

4

INPUT	OUTPUT
96	88
82	74
71	63
59	51

Machine rule: add / subtract 8

Check: $96 - 8 = 88$



TIP: The same operation must work for every row.

INPUT-OUTPUT PATTERN MACHINES

PAGE 2 • APPLY AND CREATE

Name: _____

Date: _____

Use each rule to complete the table. Then create and test your own machine.

1 Rule: add 6

INPUT	OUTPUT
14	—
29	—
43	—
58	—

2 Rule: subtract 9

INPUT	OUTPUT
91	—
74	—
59	—
48	—

3 WORK BACKWARDS

Rule: add 8

INPUT	OUTPUT
—	25
—	42
—	57
—	80

4 CREATE YOUR OWN

My rule: _____

INPUT	OUTPUT
—	—
—	—
—	—
—	—

CHECK: Does the same rule work for all four rows? YES / NOT YET

INPUT-OUTPUT PATTERN MACHINES

PAGE 2 • APPLY AND CREATE

Name: **ANSWERS**

Date: _____

Use each rule to complete the table. Then create and test your own machine.

1 Rule: add 6

INPUT	OUTPUT
14	20
29	35
43	49
58	64

2 Rule: subtract 9

INPUT	OUTPUT
91	82
74	65
59	50
48	39

3 WORK BACKWARDS

Rule: add 8

INPUT	OUTPUT
17	25
34	42
49	57
72	80

4 CREATE YOUR OWN

My rule: Sample: add 4

INPUT	OUTPUT
10	14
20	24
35	39
50	54

CHECK: Does the same rule work for all four rows? **YES** / NOT YET

DESCRIBE, CREATE & TEST PATTERNS

PAGE 1 • DESCRIBE AND JUSTIFY

Name: _____

Date: _____



For each pattern, write the direction and rule. Explain how the differences prove your rule.

1

11, 17, 23, 29, 35

Direction: _____

Rule: _____

Evidence: _____

2

84, 76, 68, 60, 52

Direction: _____

Rule: _____

Evidence: _____

3

25, 35, 45, 55, 65

Direction: _____

Rule: _____

Evidence: _____

97, 90, 83, 76, 69

Direction: _____

Rule: _____

Evidence: _____

5. Which pattern changes by the greatest amount?

Pattern _____ because _____.

6. Write the next two terms for Pattern 4.

_____, _____

EXPLAINING FRAME: The pattern is _____ by _____ because _____ is added or subtracted each time.

DESCRIBE, CREATE & TEST PATTERNS

PAGE 1 • DESCRIBE AND JUSTIFY

Name: ANSWERS

Date: _____



For each pattern, write the direction and rule. Explain how the differences prove your rule.

1

11, 17, 23, 29, 35

Direction: increasing

Rule: add 6

Evidence: The difference is 6 each time.

2

84, 76, 68, 60, 52

Direction: decreasing

Rule: subtract 8

Evidence: The difference is 8 each time.

3

25, 35, 45, 55, 65

Direction: increasing

Rule: add 10

Evidence: The difference is 10 each time.

97, 90, 83, 76, 69

Direction: decreasing

Rule: subtract 7

Evidence: The difference is 7 each time.

5. Which pattern changes by the greatest amount?

Pattern 3 because it changes by 10 each time.

6. Write the next two terms for Pattern 4.

62 , 55

EXPLAINING FRAME: The pattern is increasing by 6 because 6 is added or subtracted each time.

DESCRIBE, CREATE & TEST PATTERNS

PAGE 2 • CREATE AND TEST

Name: _____

Date: _____

1 DICE START

Roll twice. Use the first roll as tens and the second roll as ones.

Starting number: _____

My rule: add _____

First six terms:

_____, _____, _____,

_____, _____, _____

2 COUNTING DOWN

Choose a starting number from 40 to 99.
Subtract a number from 2 to 9.

Starting number: _____

My rule: subtract _____

First six terms:

_____, _____, _____,

_____, _____, _____

3 PATTERN BEE

Write a start in the bee.

Choose a number to subtract.

Fill the six honeycomb cells down the page.

Start: _____

Rule: add / subtract _____



4 PARTNER TEST

Create five terms. Hide your rule and one term. Ask a partner to solve it.

My pattern: _____, _____, _____, _____, _____

My hidden rule: _____

Partner's rule: _____

Missing term: _____

Did the same rule work every time? YES / NOT YET

DESCRIBE, CREATE & TEST PATTERNS

PAGE 2 • CREATE AND TEST

Name: ANSWERS

Date: _____

1 DICE START

Roll twice. Use the first roll as tens and the second roll as ones.

Starting number: 34

My rule: add 6

First six terms:

34 , 40 , 46 ,

52 , 58 , 64

2 COUNTING DOWN

Choose a starting number from 40 to 99.
Subtract a number from 2 to 9.

Starting number: 75

My rule: subtract 7

First six terms:

75 , 68 , 61 ,

54 , 47 , 40

Check: $40 + 7 = 47$

3 PATTERN BEE

Write a start in the bee.

Choose add or subtract.

Fill the hexagons with numbers.
cells down the page.

Start: 12

Rule: add / subtract 8



4 PARTNER TEST

Create five terms. Hide your rule and one term. Ask a partner to solve it.

My pattern: 18 , 23 , _____ , 33 , 38

My hidden rule: add 5

Partner's rule: add 5

Missing term: 28

Did the same rule work every time? ☒ YES / NOT YET

PATTERN PROBLEMS & REASONING

PAGE 1 • APPLY YOUR RULES

Name: _____

Date: _____



Solve each problem. Show a pattern, rule or explanation.

1



SEEDLING ROWS

Row 1 has 12 seedlings.
Each new row has 5 more.
Write the totals for the first six rows.

_____, _____, _____, _____, _____, _____

Rule: _____

2



READING MINUTES

Aria reads for 48 minutes on Monday,
then 6 fewer minutes each day.
Write Tuesday to Friday.

_____, _____, _____, _____

Rule: _____

3



GAME SCORE

A score is 25 in Round 1 and
increases by 8 each round.
What is the score in Round 5?

Pattern: _____, _____, _____, _____, _____

Round 5 score: _____

4



SPOT THE ERROR

Leo says 16, 22, 28, 35, 40
follows the rule add 6.

First wrong term: _____

It should be: _____

Explain: _____

5



USE THE CLUES

A pattern starts at 72 and
ends at 44 after four equal steps.

72, _____, _____, _____, 44

Rule: _____

6



REASON

Can a constant add rule make
a pattern decrease?

YES / NO

Explain: _____

PATTERN PROBLEMS & REASONING

PAGE 1 • APPLY YOUR RULES

Name: ANSWERS

Date: _____



Solve each problem. Show a pattern, rule or explanation.

1



SEEDLING ROWS

Row 1 has 12 seedlings.
Each new row has 5 more.
Write the totals for the first six rows.

12, 17, 22, 27, 32, 37

Rule: add 5

2



READING MINUTES

Aria reads for 48 minutes on Monday,
then 6 fewer minutes each day.
Write Tuesday to Friday.

42, 36, 30, 24

Rule: subtract 6

3



GAME SCORE

A score is 25 in Round 1 and increases by 8 each round.
What is the score in Round 5?

Pattern: 25, 33, 41, 49, 57

Round 5 score: 57



SPOT THE ERROR

Leo says 16, 22, 28, 35, 40
follows the rule add 6.

First wrong term: 35

It should be: 34

Explain: $28 + 6 = 34$

5



USE THE CLUES

A pattern starts at 72 and
ends at 44 after four equal steps.

72, 65, 58, 51, 44

Rule: subtract 7

6



REASON

Can a constant add rule make
a pattern decrease?

YES / **NO**

Explain: Adding a positive amount
makes the terms larger.

PATTERN PROBLEMS & REASONING

PAGE 2 • SOLVE THE CHALLENGE

Name: _____

Date: _____

Use the clues. Show your pattern, rule or explanation.

1 PATTERN CLUES

A pattern starts at 18 and adds 7 each time.

What are the 6th and 8th terms?

Pattern: 18, __, __, __, __, __, __, __.

6th term: ____ 8th term: ____

2 WORK BACKWARDS

The 5th term is 72. The rule is subtract 6.

Find the first term.

Pattern: __, __, __, __, 72

First term: ____

3 SAME OR DIFFERENT?

Pattern A: 14, 20, 26, 32, 38, 44

Pattern B: 15, 21, 27, 33, 39, 45

Same rule? YES / NO

Rule: ____

What is different? ____

4 REPAIR THE ERROR

100, 91, 82, 74, 64

The intended rule is subtract 9.

First wrong term: ____

It should be: ____

Explain: ____

5 MYSTERY PATTERN

The start is between 20 and 30.

The rule is add 8.

The 4th term is 49.

Start: ____

Pattern: __, __, __, 49

6 PREDICT AND EXPLAIN

16, 23, 30, 37, ...

What is the 10th term? ____

Rule: ____

Explain how you know: ____

PATTERN PROBLEMS & REASONING

PAGE 2 • SOLVE THE CHALLENGE

Name: ANSWERS

Date: _____

Use the clues. Show your pattern, rule or explanation.

1 PATTERN CLUES

A pattern starts at 18 and adds 7 each time.

What are the 6th and 8th terms?

Pattern: 18, 25, 32, 39, 46, 53, 60, 67.

6th term: 53 8th term: 67

2 WORK BACKWARDS

The 5th term is 72. The rule is subtract 6.

Find the first term.

Pattern: 96, 90, 84, 78, 72

First term: 96

3 SAME OR DIFFERENT?

Pattern A: 14, 20, 26, 32, 38, 44

Pattern B: 15, 21, 27, 33, 39, 45

Same rule? YES / NO

Rule: add 6

What is different? different starting numbers

4 REPAIR THE ERROR

100, 91, 82, 74, 64

The intended rule is subtract 9.

First wrong term: 74

It should be: 73

Explain: $82 - 9 = 73$

5 MYSTERY PATTERN

The start is between 20 and 30.

The rule is add 8.

The 4th term is 49.

Start: 25

Pattern: 25, 33, 41, 49

6 PREDICT AND EXPLAIN

16, 23, 30, 37, ...

What is the 10th term? 79

Rule: add 7

Explain how you know: I kept adding 7
until the 10th term.

NUMBER PATTERN DETECTIVE ASSESSMENT

PAGE 1 • RULES AND TERMS

Name: _____ Date: _____ Class: _____

Show what you know. Write rules clearly and show your thinking.

① FIND THE RULE

17, 23, 29, _____, _____

Direction: increase / decrease

Rule: _____

② MISSING TERMS

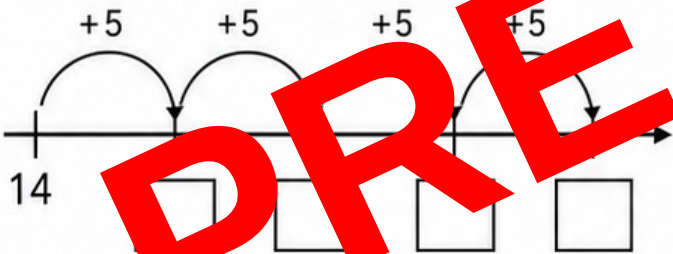
92, 84, _____, 68, _____

Direction: increase / decrease

Rule: _____

③ NUMBER LINE

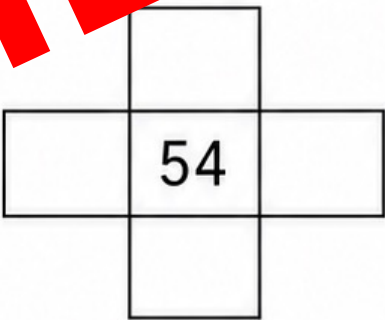
Show four jumps of +5 starting at 14.



Landing numbers: _____, _____, _____, _____

④ NUMBER CHARACTER CROSS

The centre number is 54.



Above: _____ Below: _____

Left: _____ Right: _____

⑤ INPUT-OUTPUT RULE

Input	Output
8	15
21	28
36	43

Rule: _____

⑥ EXPLAIN THE PATTERN

63, 57, 51, 45

Rule: _____

How do you know? _____

NUMBER PATTERN DETECTIVE ASSESSMENT

PAGE 1 • RULES AND TERMS

Name: ANSWERS Date: _____ Class: _____

Show what you know. Write rules clearly and show your thinking.

① FIND THE RULE

17, 23, 29, 35, 41

Direction: increase / decrease

Rule: add 6

② MISSING TERMS

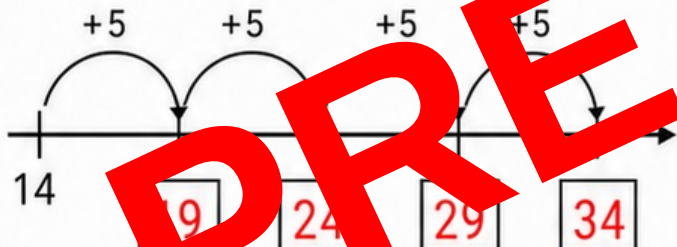
92, 84, 76, 68, 60

Direction: increase / decrease

Rule: subtract

③ NUMBER LINE

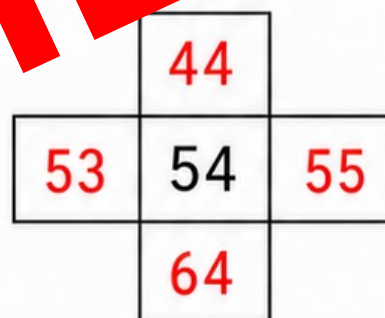
Show four jumps of +5 starting at 14.



Landing numbers: 19, 24, 29, 34

④ NUMBER CHARACTER CROSS

The centre number is 54.



Above: 44 Below: 64

Left: 53 Right: 55

⑤ INPUT-OUTPUT RULE

Input	Output
8	15
21	28
36	43

Rule: add 7

⑥ EXPLAIN THE PATTERN

63, 57, 51, 45

Rule: subtract 6

How do you know? Each term is 6 less.

NUMBER PATTERN DETECTIVE ASSESSMENT

PAGE 2 • APPLY AND EXPLAIN

Name: _____ Date: _____ Class: _____



Apply a constant rule. Check your terms and explain your thinking.

1 INPUT-OUTPUT



Rule: subtract 9

Input	Output
88	_____
74	_____
60	_____

How did you check? _____

2 FIND AND FIX



20, 28, 36, 45, 52

The intended rule is add 8.

First wrong term: _____

It should be: _____

Explain: _____

3 STICKER PATTERN



An album has 80 unused stickers.
Zara uses 7 stickers each day.

Write the number left at the start
and after four days.

Pattern: 80, __, __, __, __

Rule: _____

4 CHOOSE A PATTERN



Choose a start between 10 and 20.

Choose an add rule from 4 to 9.

Start: _____ Rule: add _____

Write six terms:

____, __, __, __, __, __

5 TEST YOUR PATTERN



Use your start and rule from Task 4.

Show one calculation that checks
your second term.

_____ + _____ = _____

Does your rule work for every term?

YES / NO

6 COMPARE PATTERNS



A: 11, 16, 21, 26

B: 31, 36, 41, 46

Do they use the same rule? YES / NO

Rule: _____

Explain what is different: _____

NUMBER PATTERN DETECTIVE ASSESSMENT

PAGE 2 • APPLY AND EXPLAIN

Name: ANSWERS Date: _____ Class: _____



Apply a constant rule. Check your terms and explain your thinking.

1 INPUT-OUTPUT



Rule: subtract 9

Input	Output
88	79
74	65
60	51

How did you check? $88 - 9 = 79$

2 FIND AND FIX



20, 28, 36, 45, 52

The intended rule is add 8.

First wrong term: 45

It should be: 44

Explain: $36 + 8 = 44$

3 STICKER PATTERN



An album has 80 unused stickers.
Zara uses 7 stickers each day.

Write the number left at the start
and after four days.

Pattern: 80, 73, 66, 59, 52

Rule: subtract 7

4 CHOOSE A PATTERN

Sample
answer



Choose a start between 10 and 20.

Choose an add rule from 4 to 9.

Start: 14 Rule: add 6

Write six terms:

14, 20, 26, 32, 38, 44

5 TEST YOUR PATTERN



Use your start and rule from Task 4.

Show one calculation that checks
your second term.

14 + 6 = 20

Does your rule work for every term?

YES / NO

6 COMPARE PATTERNS



A: 11, 16, 21, 26

B: 31, 36, 41, 46

Do they use the same rule? YES / NO

Rule: add 5

Explain what is different: different
starting numbers.

NUMBER PATTERNS - YEAR 3 RUBRIC

AC9M3N07 • Number patterns using a constant addition or subtraction rule

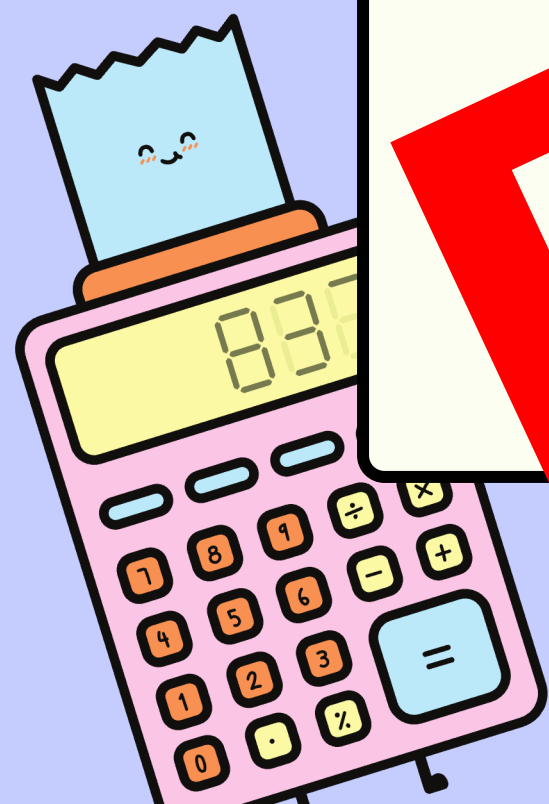
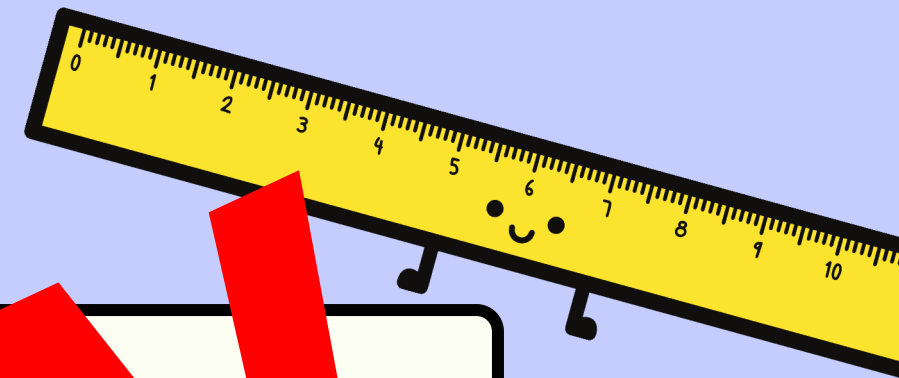
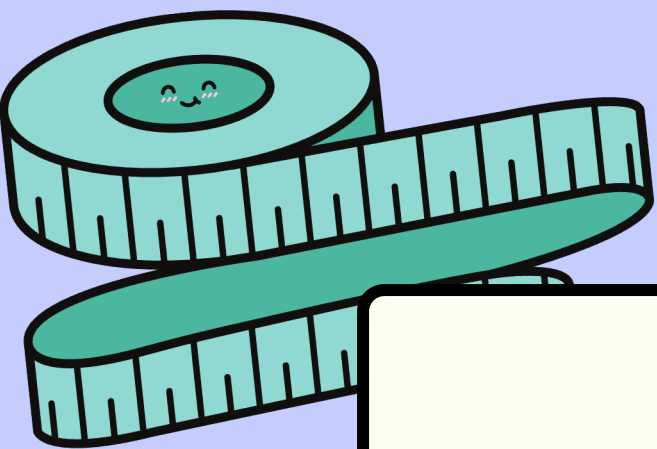
Student: _____ Date: _____ Teacher: _____

Circle or highlight the descriptor that best matches the student's current achievement.

CRITERIA	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
1. Identify direction and constant rule	Needs support to identify the change.	Identifies direction or a simple rule.	Identifies direction and a constant add or subtract rule.	Explains the rule accurately across representations.	Justifies the rule and compares patterns.
2. Continue and find missing terms	Fills a few terms with support.	Continues familiar patterns.	Continues patterns and finds missing terms accurately.	Works forwards and backwards, then checks.	Solves unfamiliar multi-step pattern problems.
3. Represent patterns	Uses models with support.	Reads one representation.	Uses number lines, input-output charts and input-output tables.	Connects representations and explains links.	Selects an efficient representation and generalises.
4. Create and test a pattern	Copies a given pattern.	Creates a pattern with prompts.	Creates a valid pattern using a constant rule.	Tests and corrects their own pattern.	Creates a constrained pattern and proves it works.
5. Explain reasoning	Gives an answer only.	Gives a partial explanation.	Names a pattern and describes their reasoning.	Uses calculations or examples to justify.	Communicates a clear generalisation.

Overall comment: _____

Next learning step: _____



Number Patterns

PREVIEW



Learning Intention

Learning intention: find, continue and extend number patterns.

Success criteria:

I can identify a constant add or subtract rule.

I can find missing terms and explain my check.



Key Vocabulary

term – one number in a pattern

sequence – the ordered list

rule – the constant change each step

increasing – terms get larger

decreasing – terms get smaller

input goes in; output comes out



What Is a Number Pattern?

A number pattern is a sequence with the same change each step.

Example: 1, 6, 11, 16, 21, 26, 31, 36

Differences: +5, +5, +5, +5, +5, +5

Rule: add 5



Increasing or Decreasing?

14, 19, 24, 29 → increasing by 5

32, 39, 46, 53, 61 → increasing by 7

Ask: Are the numbers getting larger or smaller?



Four Detective Steps

1 Compare eight pairs of numbers.

Calculate the difference.

3 Name the rule: add ___ or subtract ___.

4 Check that the same rule works every time.



Worked Example: Add 6

23, 29, 35, 41

$29 - 23 = 6$

$35 - 29 = 6$

$41 - 35 = 6$

The constant rule is add 6.



Worked Example: Subtract 7

82, 75, 68, 61

82 - 75 = 7

75 - 68 = 7

68 - 61 = 7

The constant rule is subtract 7.



Your Turn

31, 43, —, —

Is increasing or decreasing?

What is the constant rule?

How will you check?



Check Your Thinking

31, 37, 43, 49, 55

The terms are increasing.

Each difference is 6.

Rule: add 6

Check: $49 + 6 = 55$.



Missing Terms

____, 26, 32, 38, ____

Work backwards. $26 - 6 = 20$.

Work forwards. $38 + 6 = 44$.

Complete the sequence. 20, 26, 32, 38, 44

Rule: add 6



Number Lines Show Steps

Start at 14. Jump 5 four times.

$14 \rightarrow 19 \rightarrow 24 \rightarrow 29 \rightarrow 34$

Each jump shows the constant rule.

Rule: add 5



Input-Output Tables

Input 8 → Output 15

Input 21 → Output 28

Input 36 → Output 43

The same operation is used every time.

Machine rule: add 7



Try the Machine

Put subtract

Inputs: 2, 4, 60

Outputs: __, __, __

Which inverse operation could check one answer?



Machine Answer

PREVIEW

$$88 - 9 = 79$$

$$74 - 19 = 55$$

$$60 - 9 = 51$$

Inverse check: $79 + 9 = 88$



Create an Algorithm

- 1 Choose a start number.
- 2 Choose one add or subtract rule.
- 3 Only use the rule to create each new term.
- 4 Check every neighbouring pair.

Example: start 25, add 8 $\rightarrow$ 25, 33, 41, 49



Dice Challenge

Roll two dice to make a two-digit number. It starts at 10.

Choose to add or subtract 4-9.

Repeat the rule six times.

Keep a record of all seven terms.

Check every step.



Partner Pattern Challenge

Create a six-term pattern.

Use one middle term.

Start with a partner.

Find the missing term and rule.

Explain one difference as evidence.



Number Pattern Review

Can I identify increasing or decreasing?

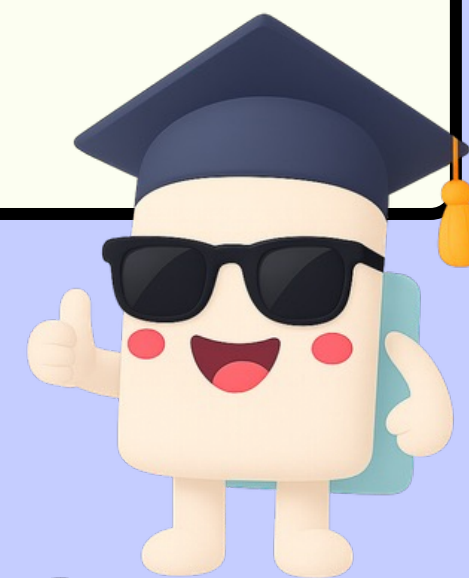
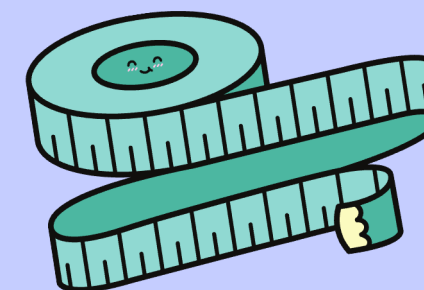
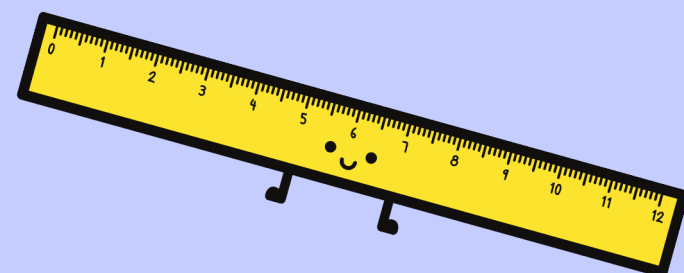
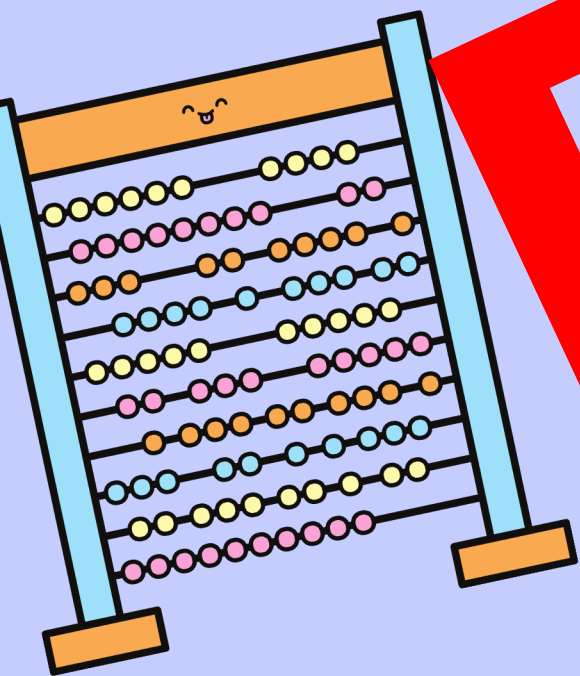
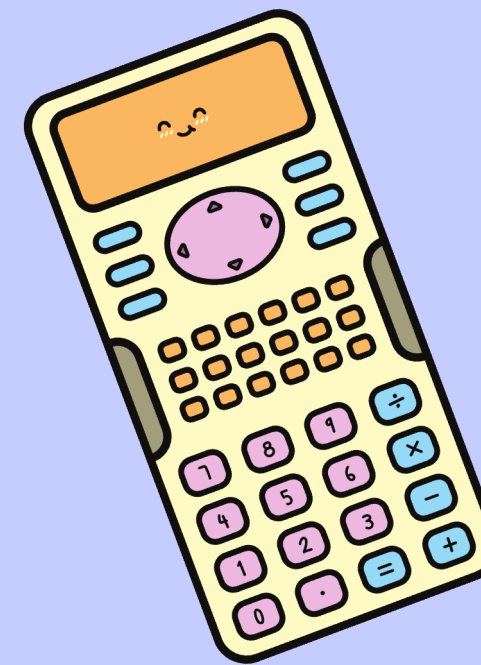
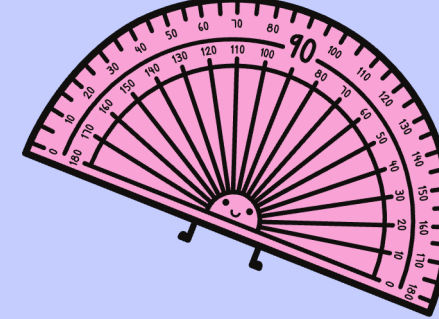
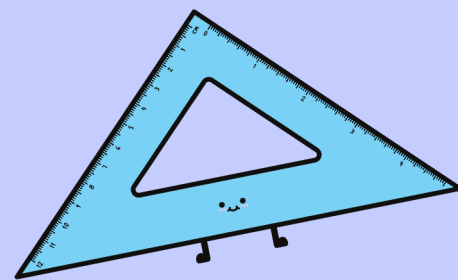
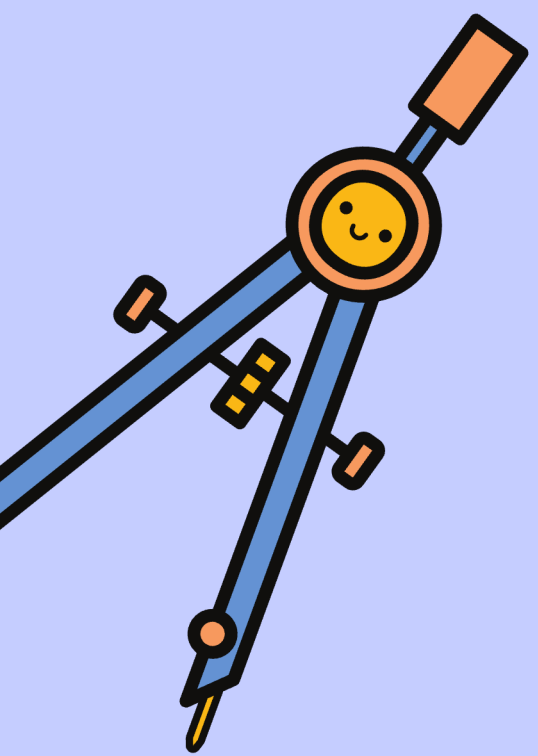
Can I state the constant rule?

Can I find missing terms?

Can I use a number line or input-output table?

Can I explain how I checked?





Well Done!

PREVIEW

Number Patterns Quiz

PREVIEW



Question 1

MULTIPLE CHOICE

What is the rule for 1, 19, 24, 29, 34?

A add 4 B add 5

C subtract 5 D add 10



Answer 1

B add 5

19 - 14 = 5

The difference is 5 every time.



Question 2

PREVIEW

TRUE OR FALSE

8, 24, 40, 56 decreases by 6 each time.

TRUE FALSE



Answer 2

PREVIEW

TRUE

$$90 - 84 = 6$$

$$84 - 78 = 6$$

$$78 - 72 = 6$$



Question 3

SHORT ANSWER

What are the next two terms?

31, 35, 39, 43, __, __

Write the rule.



Answer 3

PREVIEW

7 5.
Rule: add 4

Every number has a neighbouring difference is 4.



Question 4

MULTIPLE CHOICE

Which number is missing?

72, 64, __, 48, 40

A 54 B 56 C 60 D 64



Answer 4

PREVIEW

$64 - 8 = 56$

Rule: subtract 8

$$64 - 8 = 56$$



Question 5

SHORT ANSWER

state the constant rule.

7, 12, 17, 22, 27

How did you check?



Answer 5

Run and 5

$$12 - 7 = 5$$

The difference is 5 every time.



Question 6

MULTIPLE CHOICE

Which rule fits every input-output pair?

6 $\rightarrow$ 15 17 $\rightarrow$ 20 18 $\rightarrow$ 27

A add 7 B add 8 C add 9 D subtract 9



Answer 6

PREVIEW

$$- \text{add } 9$$

$$6 + 5 = 11$$

$$11 + 9 = 20$$

$$18 + 9 = 27$$



Question 7

PREVIEW

TRUE OR FALSE

4, 11, 3 follows the rule subtract 7.

TRUE FALSE



Answer 7

PREVIEW

LS
48, 41, 34, 27

The 6th term should be 27.



Question 8

PREVIEW

SHORT ANSWER

Starts at 18. Use the rule add 6.

Write the first five terms.



Answer 8

18, 24, 30, 36, 42

Each new term is 6 more.

PREVIEW



Question 9

MULTIPLE CHOICE

Which term is wrong for the rule add 5?

44, 49, 54, 60, 64

A 49 B 54 C 60 D 64



Answer q

PREVIEW

$c = 6$

it should be 59.

$$54 + 5 = 59$$



Question 10

SHORT ANSWER

Describe the pattern and give the next term.

100, 91, 82, 73, ____



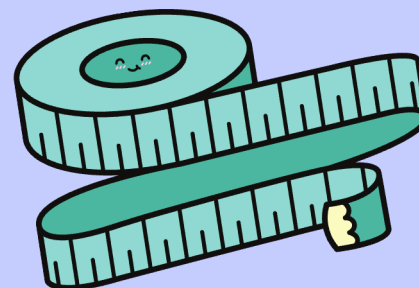
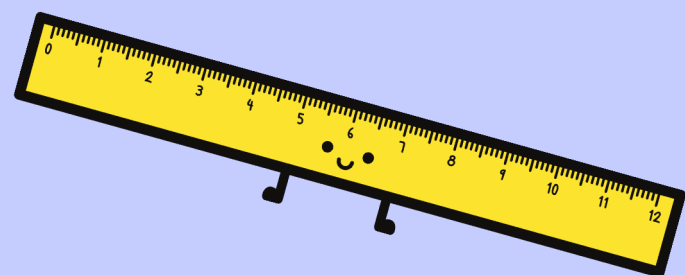
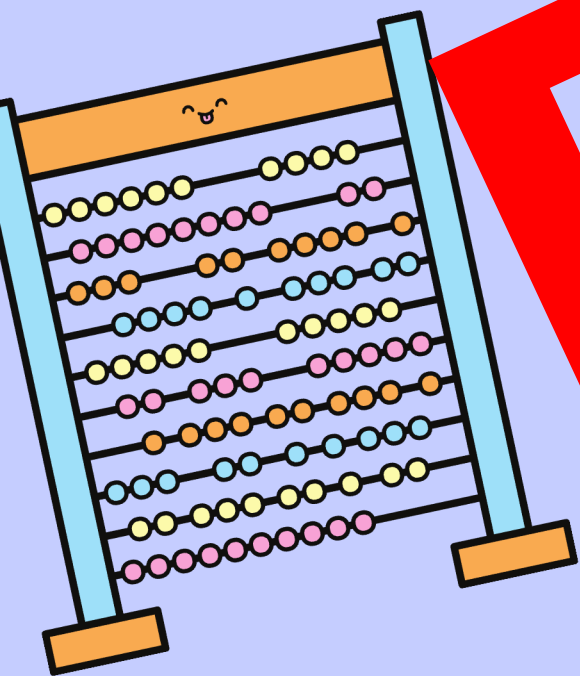
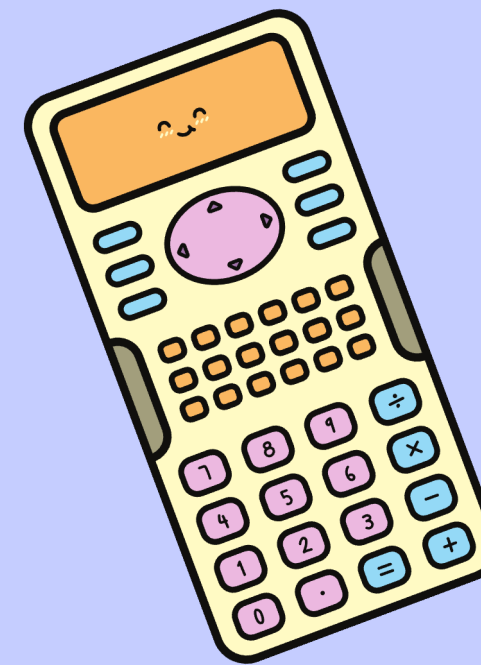
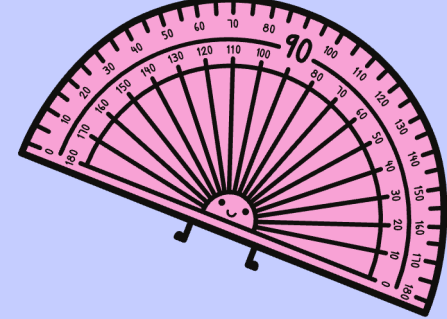
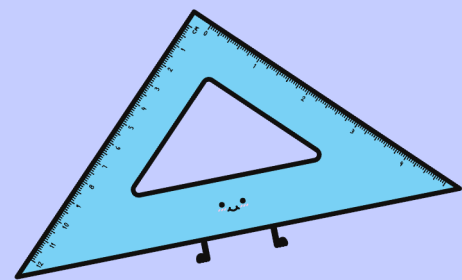
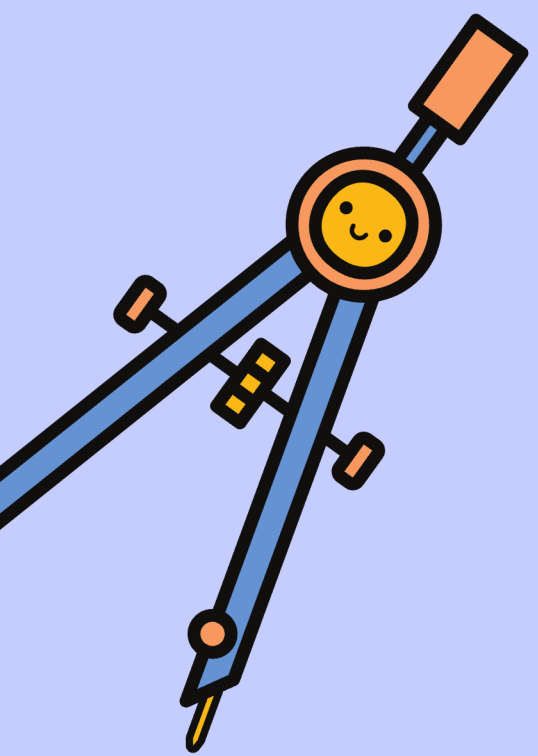
Answer 10

The pattern increases by 9.

Rule: subtract 9

Next term: 64





Well Done!

PREVIEW