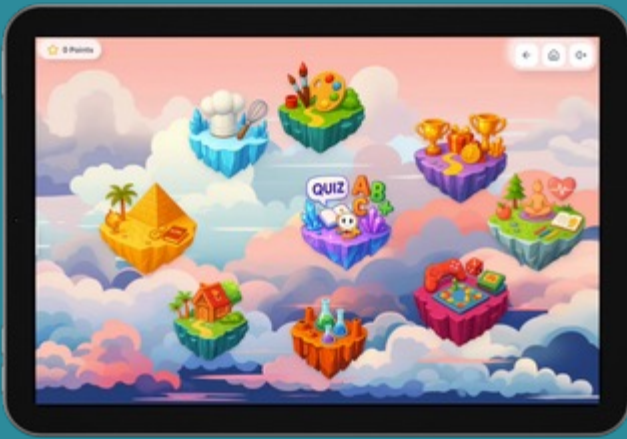


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Fraction and Decimal Pattern Paths - Year 6

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Teacher preparation and lesson 1

Learning target

Generate two finite rational-number paths from stated starts and signed quarter/half steps. Explain each move with a number line or trace. A short finite list alone does not fix one rule.

Before the week

Print the display, twelve card page panels, three practice sheets with paired keys, game kit, rehearsal pages, assessment and rubric. Prepare six labelled step cards: $+1/4$, $+0.25$, $+1/2$, $+0.5$, $-1/2$, -0.5 . Use pencils, counters or safe matchsticks as optional markers. No account or coding platform is needed.

Entry diagnostic · 5–8 min

Show 0.25, 0.5, 0.75 and 3, 2.5, 2 without answers. Ask each learner to name a possible next move and show it. Record who locates quarters, halves, who confuses the sign and who assumes the rule is unique. Reteach only the necessary prerequisite.

Lesson 1 · 45–60 min

Model the R1 upward path on a number line, then the downward path with arrows left. Use cards 1–3. Partners place starting values and generate a four-term path. Stop to contrast $+0.25$ with $+0.5$ from 0.5. Collect one oral or written explanation from every learner.

Decision before lesson 2

If a pupil places 3 then 2.5 to the right on a standard number line, reteach direction with physical step cards. Otherwise proceed to signed increments.

Lessons 2 and 3

Lesson 2 - 45–60 min

Retrieve one insecure diagnostic only. Model start 2.75 with -0.5 , making the leftward move explicit. Use cards 4–6 and guided sheet R3-1. Ask pupils to explain a changed condition: from 0.25, $+0.5$ has a different second term from $+0.25$. Mark using the adjacent differences, not just the final number.

Check

Ask each learner to show $0.5 + 1/4$ on a number line and explain why the next term is 0.75. Record a sign or equivalence misconception before moving on.

Lesson 3 - 45–60 min

Match $+1/4$ to $+0.25$ and $-1/2$ to -0.5 using cards 7–9. Demonstrate the complete game turn, including a mistaken match and constructive correction. Pupils complete core sheet R3-2 and then play Equivalent-Step Match. Observe the mathematical explanation on each turn.

Game key - cards 1–6

1: 0.75, 1 ($+0.25$); 2: 1.5, 1 (-0.5); 3: 1, 1.75 ($+0.25$); 4: 2.5, 2 (-0.5); 5: 0.75, 1.25 ($+0.5$); 6: 2.25, 1.75 (-0.5).

Game key - cards 7–12

7: 1.25, 1.5 ($+0.25$); 8: 2, 1.5 (-0.5); 9: 1, 1.25 ($+0.25$); 10: 2.75, 2.25 (-0.5); 11: 2, 2.5 ($+0.5$); 12: 1.75, 1.25 (-0.5).

Decision before lesson 4

If an equivalent match is correct without a reason, ask for a concrete pair of equal moves. Do not score a guess as understanding.

Lessons 4 and 5 · assessment

Lesson 4 · 45–60 min

Use card 10 to find the first broken term in a stated $+0.5$ path. Pupils complete transfer sheet R3-3 and both rehearsal tasks R5. Show how a finite prefix can fit a different explicitly stated rule. Give one correction tied to the adjacent difference, then ask for a fresh application.

Lesson 5 · 45–60 min

Retrieve the success criteria without displaying answers. Pupils independently complete assessment R6: two five-term paths, one $+0.25$ and one -0.5 , each with signed fraction/decimal step and evidence. Apply rubric R7 and record actual evidence plus a targeted next step.

Access and extension

Support with movable step cards, a partly filled graph and oral responses; keep the same mathematical demand. Core pupils complete both finite paths and explanations. Extension pupils compare a different explicitly stated rule and identify where paths diverge. Avoid unbounded trials.

Marking and next steps

For assessment A expect 0.75, 1, 1.25, 1.5, 1.75 and $+1/4 = +0.25$. For B expect 3.5, 3, 2.5, 2, 1.5 and $-1/2 = -0.5$. Require a replicable trace or standard number-line path and a reasoned adjacent-step explanation. A continued list alone is insufficient. Accept equivalent explanations and accessible response modes.

Next teaching decision

If the terms are correct but the reason is absent, rehearse checking differences. If the sign or direction is wrong, return to the physical number line. If the pupil states the rule and checks every move independently, move to a matched new case.



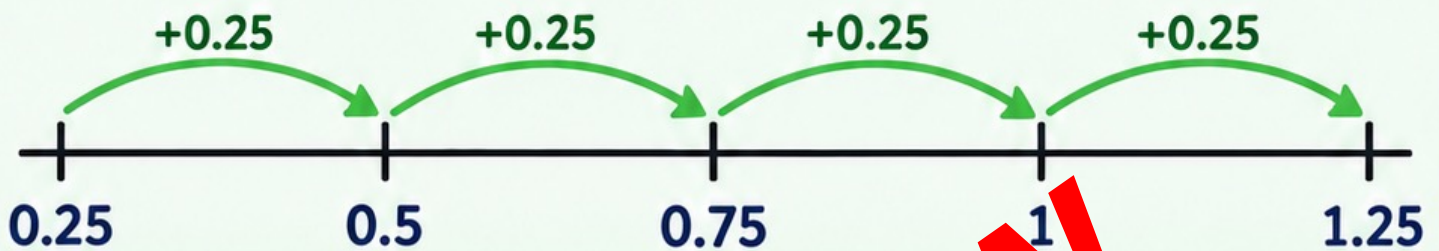
Fraction and Decimal Pattern Paths

Same steps
create a pattern!

State the start and signed step, then check each adjacent move.

Start: 0.25
Step: +0.25

One quarter = 0.25



Start: 3
Step: -0.5

One half = 0.5



**0.25 to 0.75 is +0.5,
not one +0.25 step.**



Remember:

1. State the start and signed step.
2. Check each adjacent move.
3. Look for the pattern.



Fraction and Decimal Path Cards 1–3

1. Add one quarter

Start 0.25. Add 0.25 four times.



Explain each move.

2. Subtract one half

Start 3. Subtract 0.5 four times.



Explain each move.

3. Your turn

Start 0.5. Add 0.25 three times.



Explain each move.

Fraction and Decimal Path Cards 4–6

4

Start 1.5. Add 0.25.

Four empty boxes connected by right-pointing arrows: → → →



Complete four terms. Explain the move.

5

Start 2.75. Subtract 0.5.

Four empty boxes connected by left-pointing arrows: ← ← ←



Complete four terms. Explain the move.

6

Start 0.25. Add 0.5.

Four empty boxes connected by right-pointing arrows: → → →



Complete four terms. Explain the move.

Compare direction and step size.

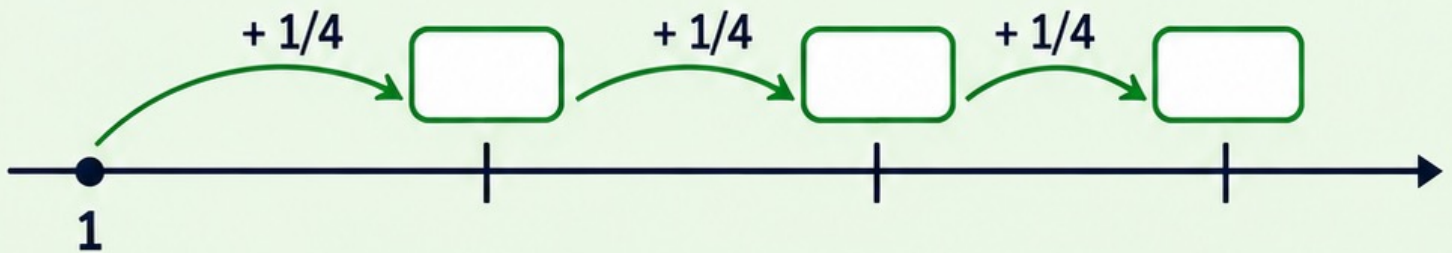


Equivalent-Step Cards 7-9

Same distance, different steps.

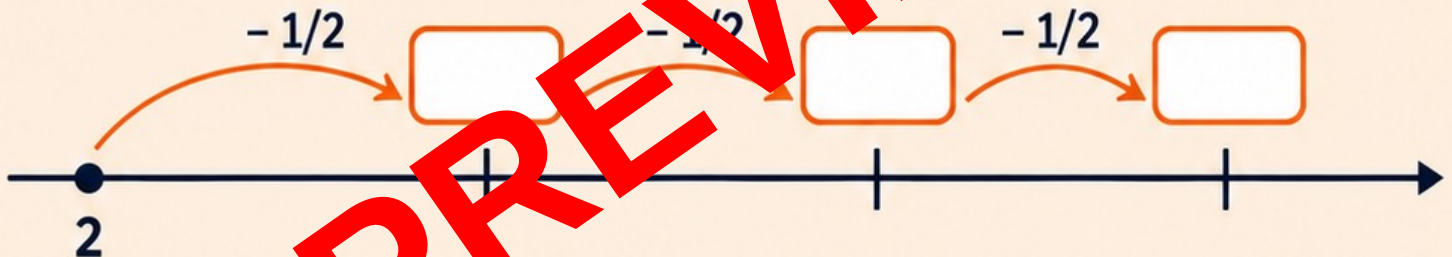
7

Start 1. Add $\frac{1}{4}$ each time. Write four terms.
Match the decimal step: _____.



8

Start 2. Subtract $\frac{1}{2}$ each time. Write four terms.
Match the decimal step: _____.



9

Contrast: From 1, adding 0.5 reaches 1.5.
Adding 0.25 reaches 1.25.
Explain why the paths differ: _____

Add 0.5



Add 0.25





Fraction and Decimal Path Cards 10–12

Investigate number patterns. Think, reason and explain.



10

Repair the path

Rule: start 1.5, add 0.5 each time.

Claimed: 1.5, 2, 2.25, 3.

Circle the first broken term. Write its correct value: _____.



11

Name the intended rule

0.25, 0.5, 0.75.

If the rule is $+0.25$, the next term is _____.

A short list alone does not prove a unique rule.

Same
numbers.
Different
rules?

12

Make your own path

Choose a start. Choose $+0.25$, -0.25 , $+0.5$ or -0.5 .

Write four terms and explain every move.



	→		→		→	
--	---	--	---	--	---	--

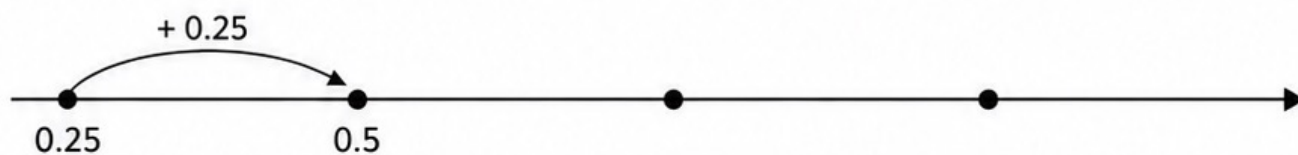
Rational-Step Sequence Repair 1: Guided

Look for
the pattern.
Explain your thinking.

Name: _____

1. **A.** Start 0.25. Add 0.25 each time.

0.25, 0.5, _____, _____.



Why? _____

2. **B.** Start 3. Subtract 0.5 each time.

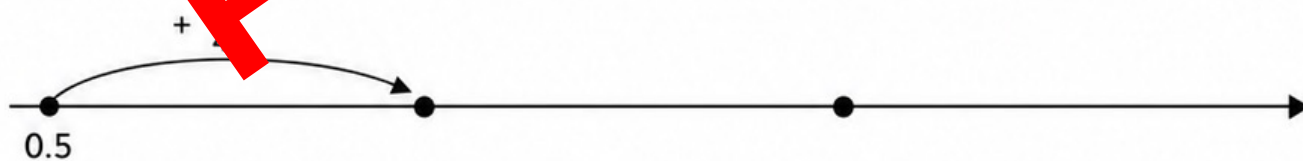
3, 2.5, _____, _____.



Why? _____

3. **C.** Start 0.5. Add $\frac{1}{4}$ each time.

0.5, _____, _____.



Why? _____

4. **D.** Start 2.5. Subtract $\frac{1}{2}$ each time.

2.5, _____, _____.



Why? _____

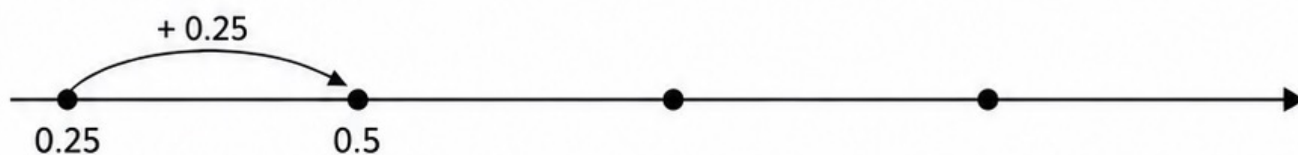
Rational-Step Sequence Repair 1: Guided

Look for
the pattern.
Explain your thinking.

Name: ANSWERS

1. A. Start 0.25. Add 0.25 each time.

0.25, 0.5, 0.75 ✓ 1 ✓



Why? Each move adds 0.25. ✓

2. B. Start 3. Subtract 0.5 each time.

3, 2.5, 2 ✓ 1.5 ✓



Why? Each move subtracts 0.5. ✓

3. C. Start 0.5. Add $\frac{1}{4}$ each time.

0.5, 0.75 ✓ 1 ✓



Why? One quarter is 0.25. ✓

4. D. Start 2.5. Subtract $\frac{1}{2}$ each time.

2.5, 2 ✓ 1.5 ✓

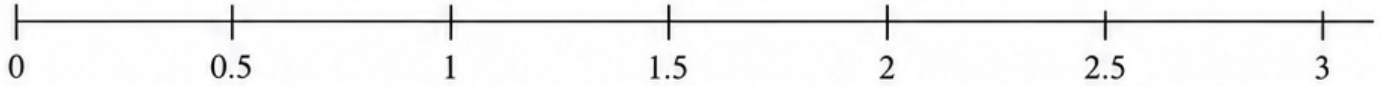


Why? One half is 0.5. ✓

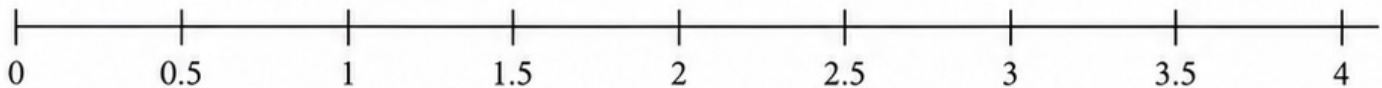
Rational-Step Sequence Repair 2: Core

Name: _____

1. Start 1.25. Add 0.25. Write the next two terms: _____, _____.



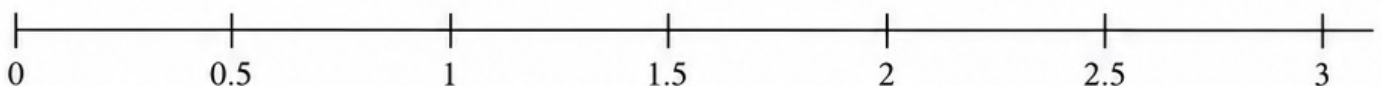
2. Start 2.75. Subtract 0.5. Write the next two terms: _____, _____.



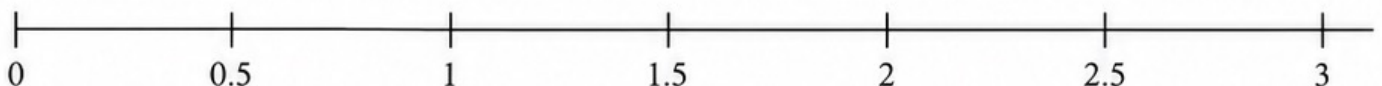
3. Is $+0.25$ the same step as $+1/4$? Explain: _____

4. Is -0.5 the same step as subtracting $1/2$? Explain: _____

5. Repair this $+0.25$ path: 1, 1.25, 1.75, 1.75. Write the corrected four terms: _____



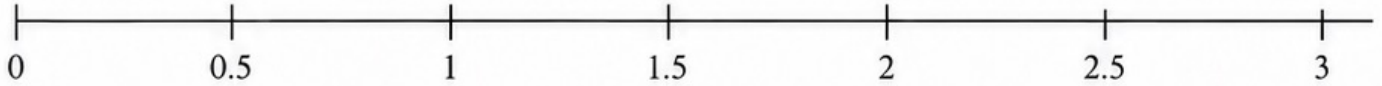
6. Does 2, 1.5, 1, 0.5 follow -0.5 ? Explain with differences: _____



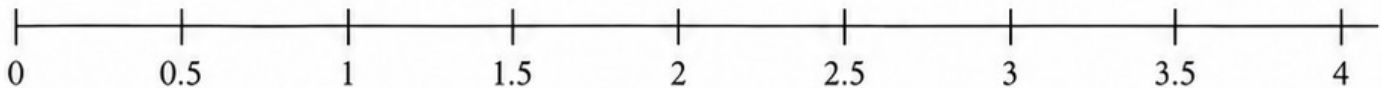
Rational-Step Sequence Repair 2: Core

Name: ANSWERS

1. Start 1.25. Add 0.25. Write the next two terms: 1.5, 1.75.



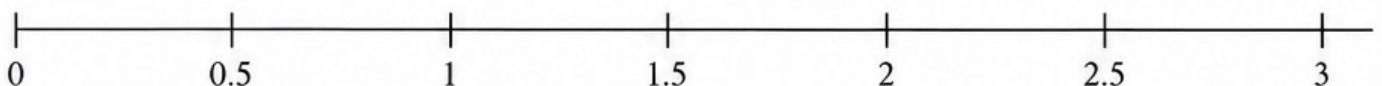
2. Start 2.75. Subtract 0.5. Write the next two terms: 2.25, 1.75.



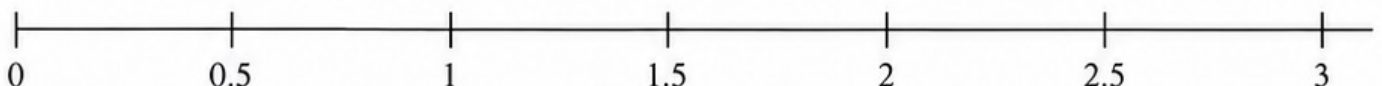
3. Is +0.25 the same step as $+1/4$? Explain: Yes. One quarter equals 0.25.

4. Is -0.5 the same step as subtracting $1/2$? Explain: Yes. Subtracting one half means -0.5 .

5. Repair this $+0.25$ path: 1, 1.25, 1.75, 1.75. Write the corrected four terms: 1, 1.25, 1.5, 1.75.



6. Does 2, 1.5, 1, 0.5 follow -0.5 ? Explain with differences: Yes. Each adjacent difference is -0.5 .



Rational-Step Sequence Repair 3: Transfer

Name: _____

Year 6 Maths

1. Start 1.75. Add 0.25 three times. Write four terms and show each move.
Explain how you checked.

Terms: _____ , _____ , _____ , _____

Show each move on the number line:

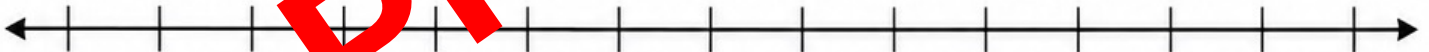


Explanation (how you checked):

2. Start 3.25. Subtract 0.5 three times. Write four terms and show each move.
Explain how you checked.

Terms: _____ , _____ , _____ , _____

Show each move on the number line:



Explanation (how you checked):

3. A pupil claims 0.5, 0.75, 1.25, 1.25 follows +0.25.
Circle the first wrong term. Repair all four terms and explain.

Repaired terms: _____ , _____ , _____ , _____

Explanation:

Rational-Step Sequence Repair 3: Transfer

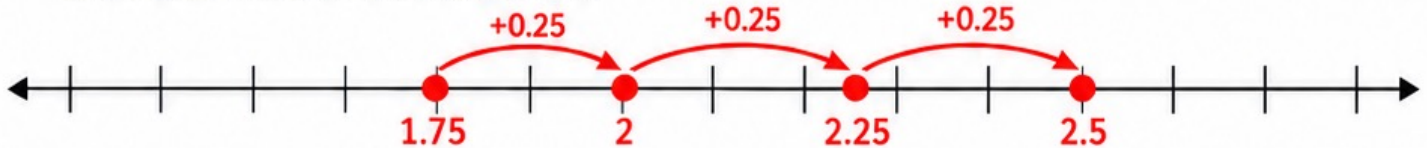
Name: **ANSWERS**

Year 6 Maths

1. Start 1.75. Add 0.25 three times. Write four terms and show each move. Explain how you checked.

Terms: **1.75** , **2** , **2.25** , **2.5**

Show each move on the number line:



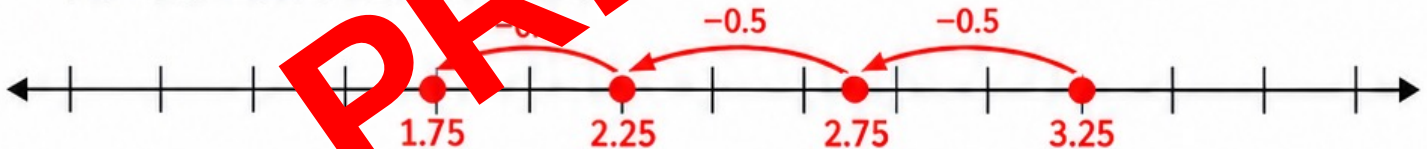
Explanation (how you checked):

Three adjacent moves are +0.25.

2. Start 3.25. Subtract 0.5 three times. Write four terms and show each move. Explain how you checked.

Terms: **3.25** , **2.75** , **2.25** , **1.75**

Show each move on the number line:



Explanation (how you checked):

Three adjacent moves are -0.5.

3. A pupil claims 0.5, 0.75, 1.25, 1.25 follows +0.25. Circle the first wrong term. Repair all four terms and explain.

Repaired terms: **0.5** , **0.75** , **1** , **1.25**

First wrong term: third 1.25.

Explanation:

Each adjacent move must be +0.25.

Equivalent-Step Match

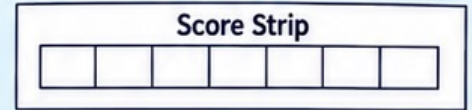
A Year 6 Maths Partner Game

Use equivalent fraction and decimal steps to build number paths.

**SAME
STEP
DIFFERENT
FORMS**

Setup:

Partners share 12 challenge cards, six step cards (+1/4, +0.25, +1/2, +0.5, -1/2, -0.5), pencils and a score strip.

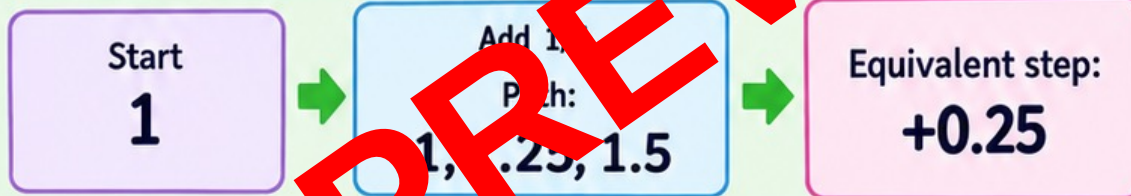


Each turn:

- 1 Draw one challenge card.
- 2 Choose the equivalent fraction or decimal step card.
- 3 Generate the next two terms.
- 4 Explain the move; partner checks with teacher key.

**SAME
CHANGE.
DIFFERENT
LOOK!**

Worked turn:



Both steps do the same thing!

Scoring:

One point only for correct terms AND explanation.
Switch roles.



Correct terms and explanation earn 1 point!

Finish:

Stop after 12 cards or 15 minutes.
Most points wins.



**THINK
CALCULATE
EXPLAIN
SCORE!**

Score strip (12 turns):

Turn	1	2	3	4	5	6	7	8	9	10	11	12
Partner A												
Partner B												

**Most
points
wins!**

Equivalent-Step Match: Challenge Cards 1–6

Say the equivalent decimal or fraction step and explain.

1

Start 0.5.

Add $\frac{1}{4}$.

Next 1

Next 2

2

Start 2.

Subtract $\frac{1}{2}$.

Next 1

Next 2

3

Start 1.25.

Add 0.25.

Next 1

Next 2

4

Start 3.

Subtract 0.5.

Next 1

Next 2

5

Start 0.25.

Add 0.5.

Next 1

Next 2

6

Start 2.75.

Subtract $\frac{1}{2}$.

Next 1

Next 2

PREVIEW

Equivalent-Step Match: Challenge Cards 7–12

Say the equivalent fraction or decimal step and explain.

7

Start: 1
Add 0.25.

Next 1

Next 2

8

Start: 2.5
Subtract 0.5.

Next 1

Next 2

9

Start: 0.75
Add $\frac{1}{4}$.

Next 1

Next 2

10

Start: 3.25
Subtract $\frac{1}{2}$.

Next 1

Next 2

11

Start: 1.5
Add 0.5.

Next 1

Next 2

12

Start: 2.25
Subtract 0.5.

Next 1

Next 2

PREVIEW

New Rational Sequence Explanation: Rehearsal 1

Year 6 Maths

Name: _____

Start 1.75. Add one quarter each time. Generate five terms.

Mark each term on the number line.

Explain why the third term has its value.

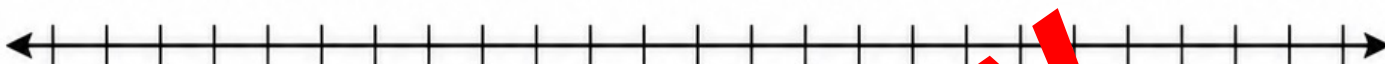
Term 1:

Term 2:

Term 3:

Term 4:

Term 5:



Explain why the third term has its value

PREVIEW

New Rational Sequence Explanation: Rehearsal 1

Year 6 Maths

Name: **ANSWERS**

Start 1.75. Add one quarter each time. Generate five terms.

Mark each term on the number line.

Explain why the third term has its value.

Term 1:

1.75

Term 2:

2

Term 3:

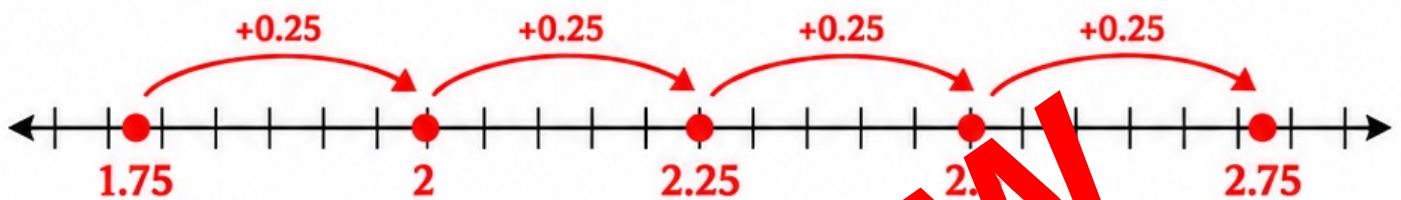
2.25

Term 4:

2.5

Term 5:

2.75



Explain why the third term has its value

The third term is 2.25: two moves of $+0.25$ from 1.75 add 0.5. Each adjacent difference is one quarter.

PREVIEW

New Rational Sequence Explanation: Rehearsal 2

Name: _____

A pupil says: 0.25, 0.5, 0.75 must always continue with 1.

1. When is 1 a justified next term?

State the intended rule and show the move.

2. Give a different explicit rule that keeps the first three terms but gives a different fourth term. State the fourth term.

Why does a short list alone not fix one unique rule?

New Rational Sequence Explanation: Rehearsal 2

Name: ANSWERS

A pupil says: 0.25, 0.5, 0.75 must always continue with 1.

1. When is 1 a justified next term?

State the intended rule and show the move.

1 follows if the intended rule is add 0.25 each time: $0.75 + 0.25 = 1$.

2. Give a different explicit rule that keeps the first three terms but gives a different fourth term. State the fourth term.

Alternative explicit rule: use +0.25 for the first two moves, then +0.5 after the third term.
Fourth term = 1.25.

Why does a short list alone not fix one unique rule?

The three given values alone do not state how the next value is constructed;
more than one rule fits them.

New Rational Sequence Explanation: Assessment

Name: _____

Date: _____

- A.** Start 0.75. Add 0.25 four times. Generate five terms.
Mark a number-line path. State the signed step as a decimal and as a fraction.
Explain how every adjacent move fits the rule.

Terms: , , , ,

Number line:



Step (signed): Decimal: _____ Fraction: _____

Explanation:

- B.** Start 3.5. Subtract 0.5 four times. Generate five terms.
Mark a number-line path. State the signed step as a decimal and as a fraction.
Explain how every adjacent move fits the rule.

Terms: , , , ,

Number line:



Step (signed): Decimal: _____ Fraction: _____

Explanation:

New Rational Sequence Explanation: Assessment

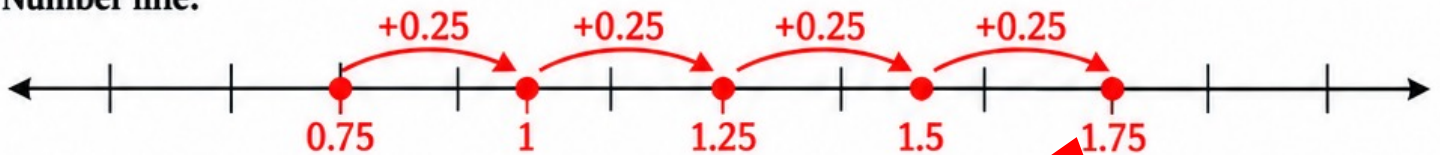
Name: **ANSWERS**

Date: _____

- A.** Start 0.75. Add 0.25 four times. Generate five terms.
Mark a number-line path. State the signed step as a decimal and as a fraction.
Explain how every adjacent move fits the rule.

Terms: **0.75**, **1**, **1.25**, **1.5**, **1.75**

Number line:



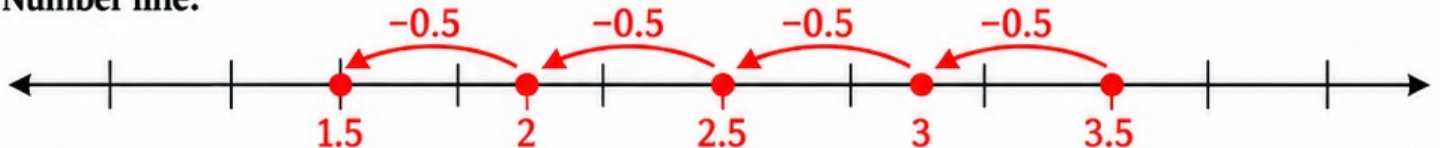
Step (signed): Decimal: **+0.25** Fraction: **1/4**

Explanation: **Each adjacent move adds one quarter (0.25).**

- B.** Start 3.5. Subtract 0.5 four times. Generate five terms.
Mark a number-line path. State the signed step as a decimal and as a fraction.
Explain how every adjacent move fits the rule.

Terms: **3.5**, **3**, **2.5**, **2**, **1.5**

Number line:



Step (signed): Decimal: **-0.5** Fraction: **-1/2**

Explanation: **Each adjacent move subtracts one half (0.5).**

Fraction and Decimal Pattern Paths: Learning Evidence Rubric

Criterion	Needs teaching	Developing with support	Target met independently
Concept and accuracy	Wrong step or diagram	Correct on a familiar path with a prompt	Correct on a fresh rational path
Application and procedure	Cannot complete the path yet	Completes with model or step prompts	Generates both required sequences
Reason and evidence	Guess or rule label only	Relevant detail; link needs a prompt	Explains each step with trace or number line
Transfer and communication	Response unclear or transfer insecure	Clear with support	Clear explanation in a matched new case

Observed evidence:

Next teaching step:

Accept a justified alternative explanation and accessible response mode.

Fraction and Decimal Pattern Paths



Purpose and success

Generate two finite sequences from π state π and n steps.

Explain the signed step and check each adjacent move.

Diagnostic: What changes in 0.25, 0.5, 0.75?

What changes in 0.25, 0.5, 0.75?



Words we need

Position: a place in the list. Term: its value.

Rule: the start and each next number.

Rational values can be written as fractions or decimals.

Locate quarters and halves on a number line.



Number-line paths

State a starting value and signed step.

Mark equal-sized moves in the correct direction.

Stop after the stated number of moves.

Check every adjacent difference.



A quarter-step increase

Start at 0.25. Add 0.25 four times.

0.25, 0.5, 0.75, 1, 1.25

One quarter equals 0.25

Each move on the number line points right.



A half-step decrease

Start at 3. Subtract 0.5 four times.

3, 2.5, 2, 1.5, 1

One half equals 0.5.

Each move on the number line points left.



Guided path

Start at 0.5. Add 0.25 three times.

Mark four terms. What value follows 0.75?

Explain each move before revealing the answer.



Guided path explained

0.5, 0.75, 1, 1.25

$0.5 + 0.25 = 0.75$; then add 0.25 again.

Every adjacent difference is +0.25.



Change the condition

Start at 2.75. Subtract 0.5 three times.

2.75, 2.25, 1.75, 1.25

This path moves left in halves. The previous path moved right in quarters.



One matching-game turn

Challenge: start 1 and add $\frac{1}{4}$.

Equivalent decimal step: +0.25.

Next terms: 1.25 and 1.5

Explain the match. Partner checks the key.



Independent challenge

Start at 2 and subtract one half twice.

Write the three-term decimal path.

Explain why the fraction and decimal steps match.



A short list has limits

0.25, 0.5, 0.75 can continue in different ways.

If the intended rule is $+0.25$ each time, next is 1.0.

A finite prefix alone does not prove a unique rule.



Repair a broken term

Claimed +0.5 path: 1.5, 2, 2.25, 3.

The first broken term is 2.25.

The corrected path is 1.5, 2, 2.5, 3.

Check each adjacent difference



Three learning routes

Support: use step cards and a partly filled track

Core: make a five-term path and explain each move.

Extension: state another rule and show where two paths diverge.



Independent assessment

Make two five-term paths from the supplied starts.
Use a quarter-step increase and a half-step decrease.
Mark number-line evidence and explain the signed steps.
Work independently; the answers are not displayed here.



Evidence and next step

Which adjacent difference proves your stated rule?

Which term did you check most carefully?

Record a specific next step based on the evidence.



The path rule

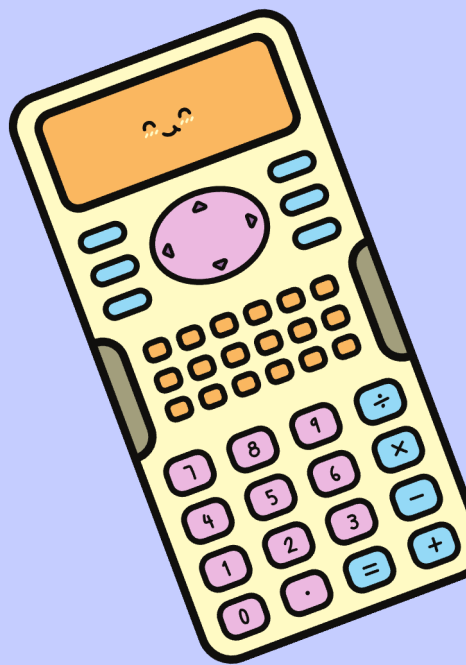
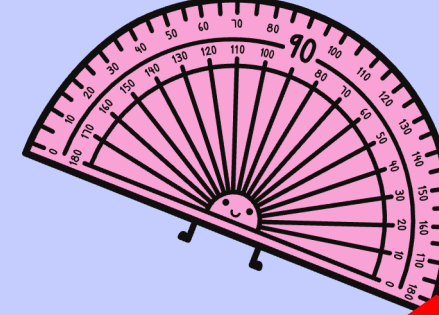
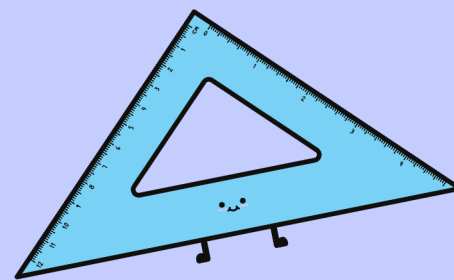
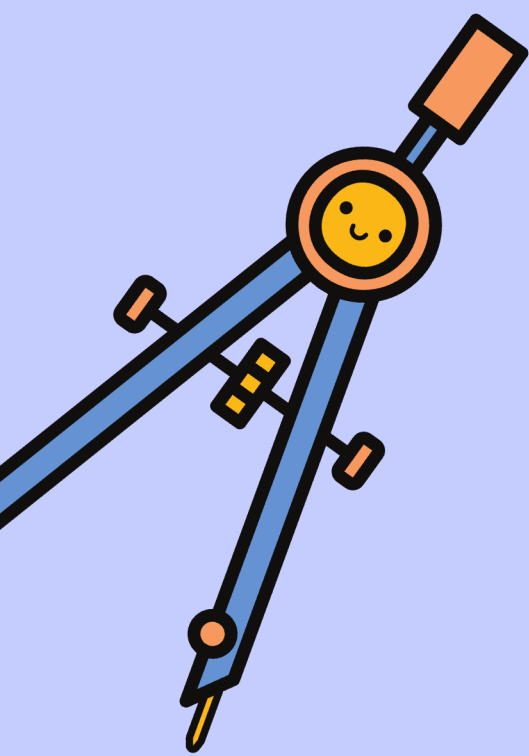
A rational path needs a start, signed step, and finite stop.

A quarter and 0.25 can name the same move.

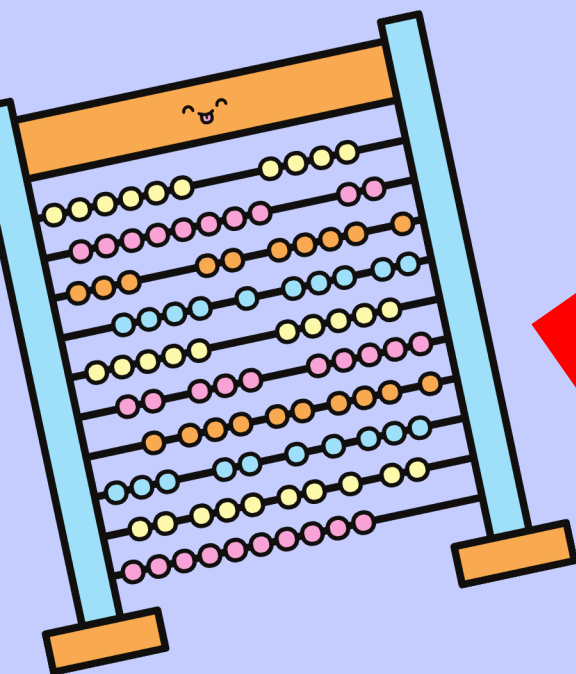
A half and 0.5 can name the same move.

Check each adjacent difference.

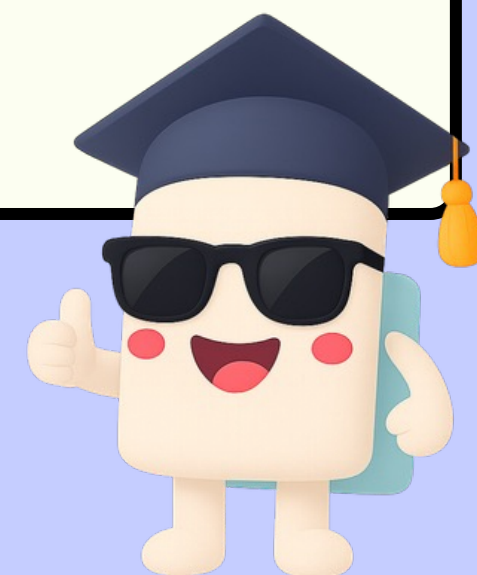
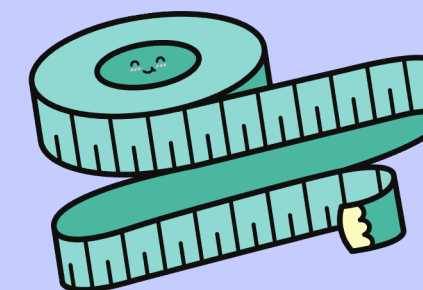
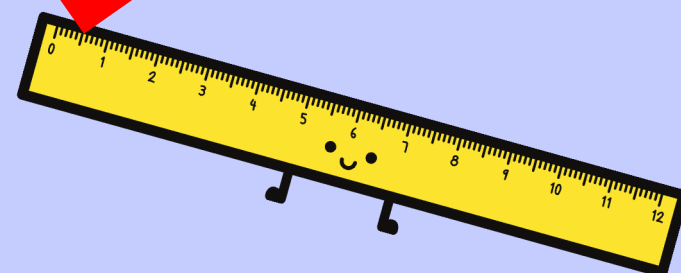




Well Done!
State the rule and check each
move.



PREVIEW



Fraction and Decimal Pattern Paths Quiz



Q1: Next term

Under the stated $+0.25$ rule, what follows
0.25, 0.5, 0.75?



AI: Next term

1. Add one quarter, or 0.25, to 0.75.



Q2: Step size

What is the step in 3, 2.5, 2?

PREVIEW



A2: Step size

Subtract 0.5 each time.

3 to 2.5 and 2.5 to 2 are both -



Q3: Equivalent steps

Is adding $1/4$ the same move as adding $1/5$?



A3: Equivalent steps

Yes. One quarter equals 0.25.



Q4: Two moves

Start 1.25. Add 0.25 twice.

Write all three terms.



A4: Two moves

1.25, 1.5, 1.75.

Both adjacent moves are +0.25



Q5: Reverse direction

Start 1.25. Subtract 0.25 twice.

Write all three terms.



A5: Reverse direction

1.25, 1, 0.75.

The negative step changes the direction.



Q6: One possible rule

A pupil says 0.25, 0.5, 0.75 must always continue with 1.
What needs to be stated?



A6: One possible rule

1 follows if the intended rule is $+0.25$ each time

A finite prefix alone can fit more than one rule



Q7: Game challenge

Start 2. Subtract one half twice.

Write the three-term decimal path.



A7: Game challenge

2, 1.5, 1.

One half is 0.5, so each move is 0.5.



Q8: Compare paths

Compare 0.5, 0.75, 1 with 3, 2.5, 2.

Give one supported similarity & difference.



A8: Compare paths

Both have constant rational steps.

The first adds 0.25; the second subtracts 0.5



Q9: Less support

Start 1.75. Add 0.25 three times.

Write four terms.



A9: Less support

1.75, 2, 2.25, 2.5.

PREVIEW



Q10: Evidence

What evidence supports your Q9 position?

PREVIEW



AI0: Evidence

Each adjacent difference is $+0.25$.

The three moves match the standard run



Q1: Repair the claim

Is 1, 1.25, 1.75, 2 a $+0.25$ path?

If not, repair it.



All: Repair the claim

No. 1.25 to 1.75 is +0.5.

Correct path: 1, 1.25, 1.5, 1.75.



Q12: Generate and explain

Start 2.5. Use -0.5 to make four terms
Explain how each move meets the rule



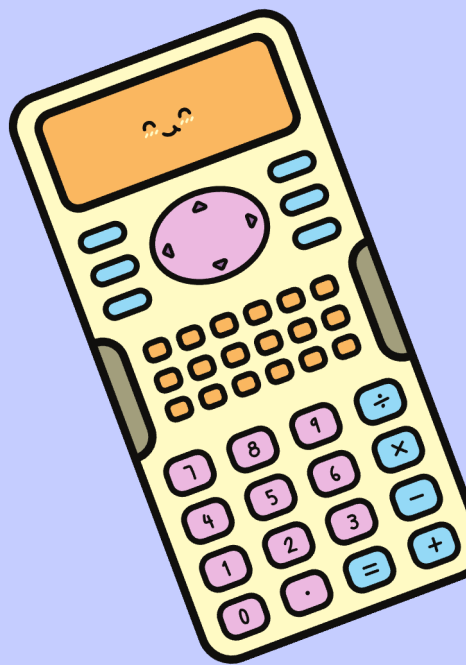
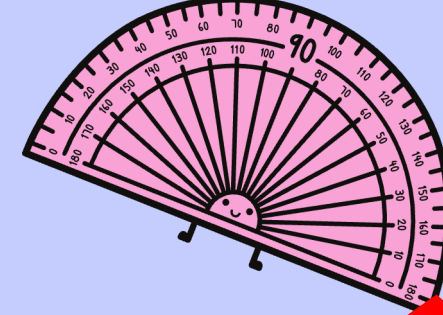
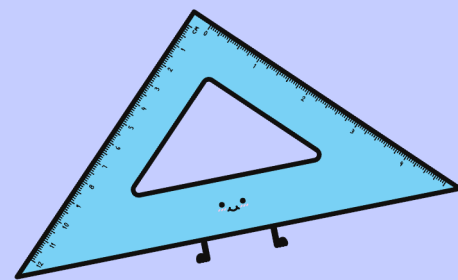
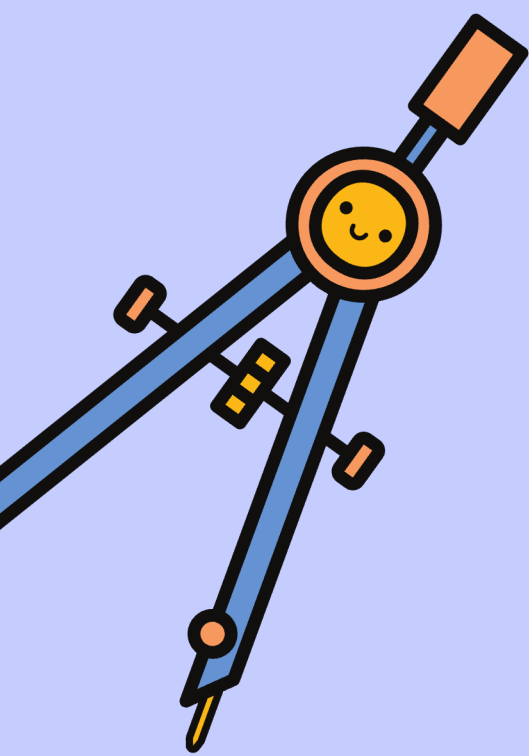
AI2: Generate and explain

2.5, 2, 1.5, 1.

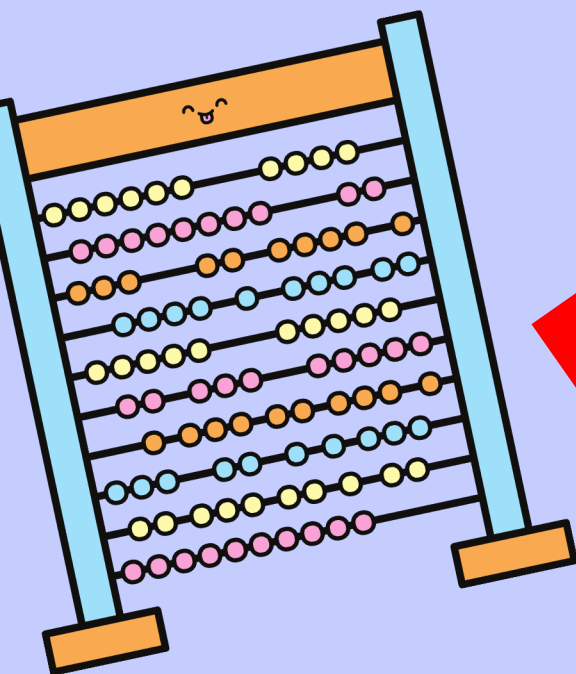
Each adjacent difference is -0.5 .

Equivalent explanation: subtract one half each time.





Well Done!
State the rule and check each
move.



PREVIEW

