Assessing pupils' progress in mathematics at Key Stage 3

Year 7 assessment package
Number/algebra

Examples of pupils' work

Year 7

Number/Algebra

LESSON 1: *Rules R Us*

Rules R Us sheet 1
Level 3

Each table shows three winning combinations.
What could the rules be? Write each rule in the correct box.

b	r
1	5
3	3
4	2

Rule: All numbers have to add up to 6

b	r
5	50
6	60
7	70

Rule: Times the number by 10

b	r
12	11
18	17
30	29

Rule: Take away 1

Each table shows three winning combinations.
What could the rules be? Write each rule in the correct box.

b	r
1	5
3	3
4	2

Rule: B+R=6

b	r
5	50
6	60
7	70

Rule: B+R BxR=x10

b	r
12	11
18	17
30	29

Rule: B-R=1

Look at the pair of tables below.
They show the same winning combination … **but their rules are different**.
What could the rules be?
Write them in the boxes then write **another two winning combinations** for each rule.

b	r
5	10
15	20
25	30

Rule: B+5=r

b	r
5	10
10	20
15	30

Rule: r ÷ 2 = B

Look at the pair of tables below.
They show the same winning combination … **but their rules are different**.
What could the rules be?
Write them in the boxes then write **another two winning combinations** for each rule.

b	r
5	10
7	8
9	6

Rule: B + R = 15

b	r
5	10
6	60
7	70

Rule: B ×R= Mult.10

Rules R Us sheet 2
Level 4

Each of these tables shows three winning combinations.
What could the rules be? Write them in the boxes.

b	r
2	10
6	6
9	3

Rule: B+R=12
R+B=12

b	r
4.5	3.5
9.5	8.5
16.5	15.5

Rule: B-1 =R
R+1 = B

Now look at the first pair of tables below.
They show the same winning combination … **but their rules are different**.
What could the rules be?
Write them in the boxes then write **another two winning combinations** for each rule.

b	r
2	6
4	4
3	5

Rule: B+R = 8
R+B = 8

b	r
2	6
4	8
3	9

Rule: R-B=4

Do the same for this pair.

b	r
8	4
6	6
7	5

Rule: B+R=12

b	r
8	4
16	12
15	11

Rule: B-R=4

Each of these tables shows three winning combinations.
What could the rules be? Write them in the boxes.

b	r
2	10
6	6
9	3

Rule: B +R= 12

b	r
4.5	3.5
9.5	8.5
16.5	15.5

Rule: B-1 =R

Now look at the first pair of tables below.
They show the same winning combination … **but their rules are different**.
What could the rules be?
Write them in the boxes then write **another two winning combinations** for each rule.

b	r
2	6
3	9
4	12

Rule: B x 3=R

b	r
2	6
3	9
4	12

Rule: R÷3=B

Do the same for this pair.

b	r
8	4
6	3
4	2

Rule: B ÷2=R

b	r
8	4
6	3
4	2

Rule: RxR=B

Rules R Us sheet 3
Level 5

Each pair of tables shows the same winning combination … **but their rules are different**.
What could the rules be?
Write them in the boxes then write **another two winning combinations** for each rule.

b	r
5	2.5
7	35
11	5.5

Rule: $\frac{B}{2} = R$ $R \times 2 = B$

b	r
5	2.5
7	4.5
10	7.5

Rule: $R + 2.5 = B$ $B - 2.5 = R$

b	r
0.1	1
3.5	35
77	770

Rule: $\frac{R}{10} = B$ $R \div 10 = B$

b	r
0.1	1
5.1	7
8.1	10

Rule: $R - 1.9 = B$ $B + 1.9 = R$

b	r
4	−4
5	−5
9.5	−9.5

Rule: $B - (B \times 2) = R$

b	r
4	−4
7	−1
1	−7

Rule: $R + 8 = B$ $R = B - 8$ $B - 8 = R$

Each pair of tables shows the same winning combination … **but their rules are different**.
What could the rules be?
Write them in the boxes then write **another two winning combinations** for each rule.

b	r
5	2.5
1.5625	8
6.25	2

Rule: $B \times R = 12.5$

b	r
5	2.5
9	4.5
6	3

Rule: $0.5 \times b = r$

b	r
0.1	1
2.1	3
3.6	4.5

Rule: $0.9 = R - B$

b	r
0.1	1
0	1.1
0.4	0.7

Rule: $1.1 = B + R$

b	r
4	−4
19	23
210	214

Rule: $B - 8 = R$

b	r
4	−4
5	−5
6	−6

Rule: $B \div R = -1$

Rules R Us sheet 4
Level 4

In how many **different** ways can you write the rule
b + r = 3?

$R + 3 = B$
$B - 3 = R$
$3 = B + R$
$3 = R + B$
$B = R + 3$
$B = 3 + R$

In Rules R Us sheet 3, the table for each rule showed three winning combinations. How many winning combinations are there for each rule? Why?

?

Here is one of the winning combinations for another rule:

b	r
4	6

What could the rule be? Write as many different rules as you can.

$B + R = 10$ $R - B = 2$
$B \times R = 24$ $2 + B = R$

In how many **different** ways can you write the rule
b + r = 3?

$3 = r + b$
$3 = b + r$
$r + 3 = b$
$b + 3 = r$
$r + b = 3$

In Rules R Us sheet 3, the table for each rule showed three winning combinations. How many winning combinations are there for each rule? Why?

I rule for 3 winning combinations
–

Here is one of the winning combinations for another rule:

b	r
4	6

What could the rule be? Write as many different rules as you can.

$b + r = 10$
$r + b = 10$
$r - 2 = b$
$b + 2 = r$

$10 = b + r$
$10 = r + b$

Rules R Us sheet 4
Level 5

In how many **different** ways
can you write the rule
$b + r = 3$?

$3 - r = B$
$3 - b = R$
~~$b - B = R$~~
$R + B = 3$
~~$B = R - B$~~
~~$3 = B = R$~~
$3 = B + R$
$3 = R + B$

In Rules R Us sheet 3,
the table for each rule showed
three winning combinations.
How many winning combinations are
there for each rule? Why?

Here is one of the winning
combinations for another rule:

b	r
4	6

What could the rule be? Write as many
different rules as you can.

$R - 2 = B$
$B + 2 = R$
$R - B = 2$
$B - R = -2$

$R \frac{1}{2} + 1 = B$
$B \times 2 - 2 = R$
$R \div 3 \times 2 = B$
$B + R = 10$
$R + B = 10$

Bl	Re
4	6
8	2
5	5

$B + R = 10$

In how many **different** ways
can you write the rule
$b + r^2 = 3$?

$r + b = 3$
$3 - r = b$
$3 - b = r$

In Rules R Us sheet 3,
the table for each rule showed
three winning combinations.
How many winning combinations are
there for each rule? Why?

There can be as
many as you
like because the
rule applies to
all numbers.

Here is one of the winning
combinations for another rule:

b	r
4	6

$= 10$

What could the rule be? Write as many
different rules as you can.

$b + r = 10$

$10 - r = b$
$10 - b = r$
$r + b = 10$

Rules R Us sheet 4
Level 5

In how many **different** ways
can you write the rule
$b + r = 3$?

$R + B = 3.$
$3 - B = R.$
$3 - R = B$

$3 = R + B.$
$3 = B + R.$
$B + R = 3$

In Rules R Us sheet 3,
the table for each rule showed
three winning combinations.
How many winning combinations are
there for each rule? Why?

There are infinity combinations for
each rule. Because are you using
decimals or negative numbers.

Here is one of the winning
combinations for another rule:

b	r
4	6

What could the rule be? Write as many
different rules as you can.

$B + 2 = R$
$2 + B = R$
$R - B = 2$
$R - 2 = B$
$R = B + 2$
$R = 2 + B$

$B \times R = 24$
$R + B = 24$
$24 \div B = R$
$24 \div R = B$

Rules R Us sheet 4
Above level 5

In how many **different** ways
can you write the rule
$b + r = 3$?

$r + b = 3$
$3 - r = b$
$3 - b = r$
$3 = r + b$
$3 = b + r$

In Rules R Us sheet 3,
the table for each rule showed
three winning combinations.
How many winning combinations are
there for each rule? Why?

there are infinite winning
combinations for each rule
as there are infinite
numbers you could use
for black

Here is one of the winning
combinations for another rule:

b	r
4	6

What could the rule be? Write as many
different rules as you can.

$b + r = 10$
$r - b = 2$
$b - r = -2$
$b \times 2 - 2 = r$
$r \times 2 - 8 = b$
$b - 4 + 6 = r$

$r - b + 4 = b$
$b \times 3 + 1 - 7 = r$
$b \times 3 \div 2 = r$
$b \times 2 \div 1 \times 3 \div 4 = r$
$b \div 2 \times 3 = r$
$b^2 \div 8 + 4 = r$

Year 7

Number/Algebra

LESSON 2: *What's my picture?*

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What's my picture? sheet 2 (continued)
Level 3

Many pairs of values of b and r are not shown on your number line picture.

Choose a b value that is not on your number line picture.   _−3_

What would its r value be?   _5_

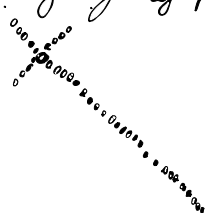Look at your pictures for b + r = 2 and b + r = 3

What is the same and what is different about your pictures?

Things that are the same
Where the black dots are.

Things that are different
The red dots

What would the picture for **b + r = 1** look like?

You can write in words, or you can do a small sketch below, or
you can draw it on your sheet called 'What's my picture? sheet 2'.

The red dots would start at 1 (at the top) and go
diagonly left, down.

Many pairs of values of b and r are not shown on your number line picture.

Choose a b value that is not on your number line picture.   _−1_

What would its r value be?   _3_

Look at your pictures for b + r = 2 and b + r = 3

What is the same and what is different about your pictures?

Things that are the same
They both cross over each other

Things that are different
The red line is shorter on B+r=2.

What would the picture for **b + r = 1** look like?

You can write in words, or you can do a small sketch below, or
you can draw it on your sheet called 'What's my picture? sheet 2'.

I will show on sheet 4.

Note: points correctly
plotted on sheet 4

What's my picture? sheet 2 (continued)
Level 4

Many pairs of values of b and r are not shown on your number line picture.

Choose a b value that is not on your number line picture.   −1

What would its r value be?   3.1

Look at your pictures for b + r = 2 and b + r = 3

What is the same and what is different about your pictures?

Things that are the same

They both meat at the same angle. ~~90~~ 90°

Things that are different

They meet at different co-ordinates. e.g
B+R=2 meets at (1, 1X)
however...
B+R=3 meets at (1·5, 1·5)

What would the picture for **b + r = 1** look like?

You can write in words, or you can do a small sketch below, or
you can draw it on your sheet called 'What's my picture? sheet 2'.

[Green = R]
[Blue = B]

Note: coloured points correctly plotted on sheet 2

It would continue in
the same pattern
however then it would
go into negative numbers
so you would have to
make your grid ~~bigger~~
bigger

Many pairs of values of b and r are not shown on your number line picture.

Choose a b value that is not on your number line picture.   0·25

What would its r value be?   1·75

Look at your pictures for b + r = 2 and b + r = 3

What is the same and what is different about your pictures?

Things that are the same

The Blackdots both
start at 0 and end
at 3.

Things that are different

B+R=3 starts at 3
and ends at O.
B+R= ~~2~~ starts at 2
and ends at −1.

What would the picture for **b + r = 1** look like?

You can write in words, or you can do a small sketch below, or
you can draw it on your sheet called 'What's my picture? sheet 2'.

The ~~~~ Red dots for B+R=1 will start at 1, go down
into the negatives and end at −2.

The Blue and Red dots will meet each other at
(0·5, 0·5).

What's my picture? sheet 2 (continued)
Level 4

Many pairs of values of b and r are not shown on your number line picture.

Choose a b value that is not on your number line picture.   0.45

What would its r value be?   1.55

Look at your pictures for b + r = 2 and b + r = 3

What is the same and what is different about your pictures?

Things that are the same	Things that are different
• The black line is the same • The lines still go diagonally. • The black always starts on zero. • The red always finishs on zero. • They both join	• The red ~~line~~ blobs are in different persisions • The join in the center in a different place.

What would the picture for **b + r = 1** look like?

You can write in words, or you can do a small sketch below, or you can draw it on your sheet called 'What's my picture? sheet 2'.

They would meet at (0.5, 0.5)
The red dots will start at 1 and end at
-2.
The black dots will be the same.

What's my picture? sheet 3 (continued)
Level 4

Many pairs of values of b and r are not shown on the number line picture.
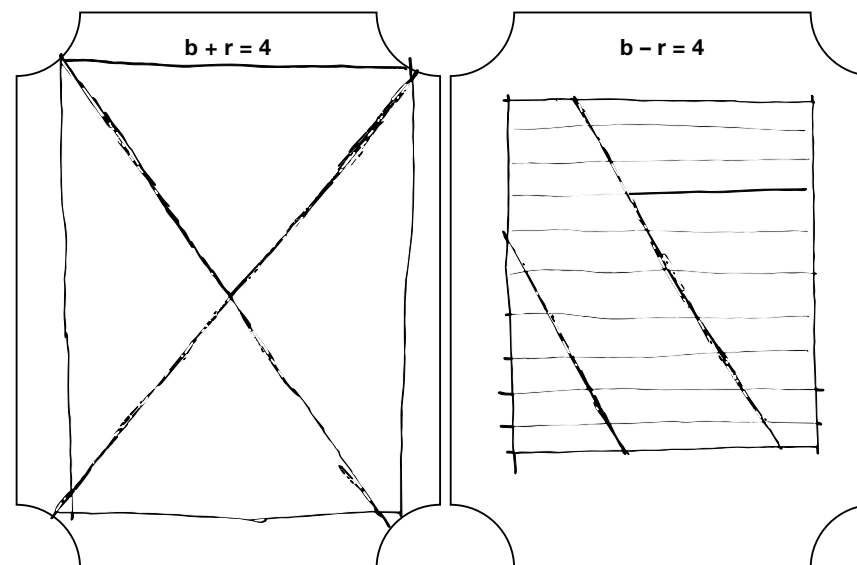
Choose a b value that is smaller than 0   - 4

What would its r value be?   5

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b – r = 1   It looks like a railway track:

What would the pictures for b + r = 4 and b – r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4

b – r = 4

What's my picture? sheet 3 (continued)
Level 4

Many pairs of values of b and r are not shown on the number line picture.

Choose a b value that is smaller than 0   _____−5_____
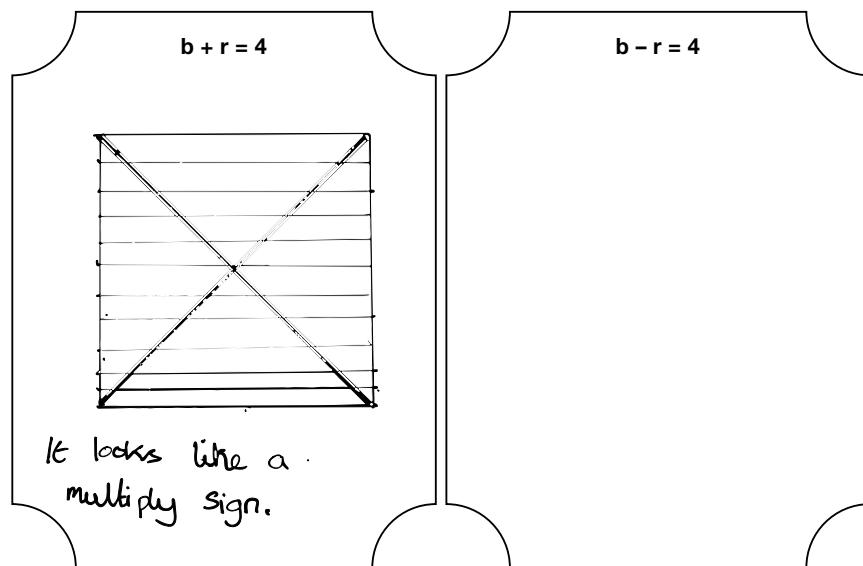
What would its r value be?   _____

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b − r = 1

A set of parnallel lines

What would the pictures for b + r = 4 and b − r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4

It looks like a. multiply sign.

b − r = 4

What's my picture? sheet 3 (continued)
Level 5

Many pairs of values of b and r are not shown on the number line picture.

Choose a b value that is smaller than 0   _____− 1_____
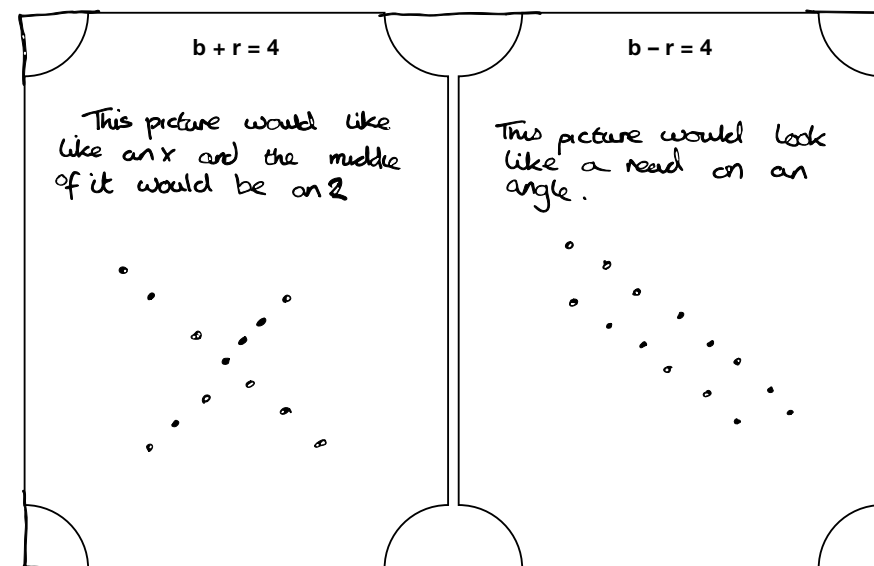
What would its r value be?   _____

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b − r = 1

The picture has 9 corners of a square between the dotts on each line. It looks like a road but on an angle.

What would the pictures for b + r = 4 and b − r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4

This picture would like like an x and the middle of it would be on 2

b − r = 4

This picture would look like a read on an angle.

What's my picture? sheet 3 (continued)
Level 5

Many pairs of values of b and r are not shown on the number line picture.

Choose a b value that is smaller than 0 .... −1 ....

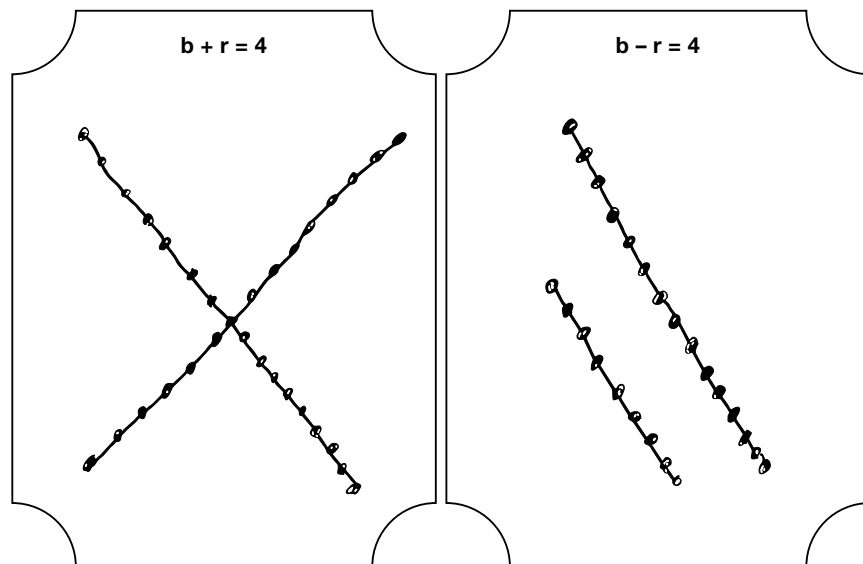What would its r value be? .... ? ....

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b − r = 1

Two parallel lines the blue one starting at 0 and running to 3, and the red line running from 0 to 2.

What would the pictures for b + r = 4 and b − r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4	b − r = 4

Many pairs of values of b and r are not shown on the number line picture.

Choose a b value that is smaller than 0 .... −0.2 ....

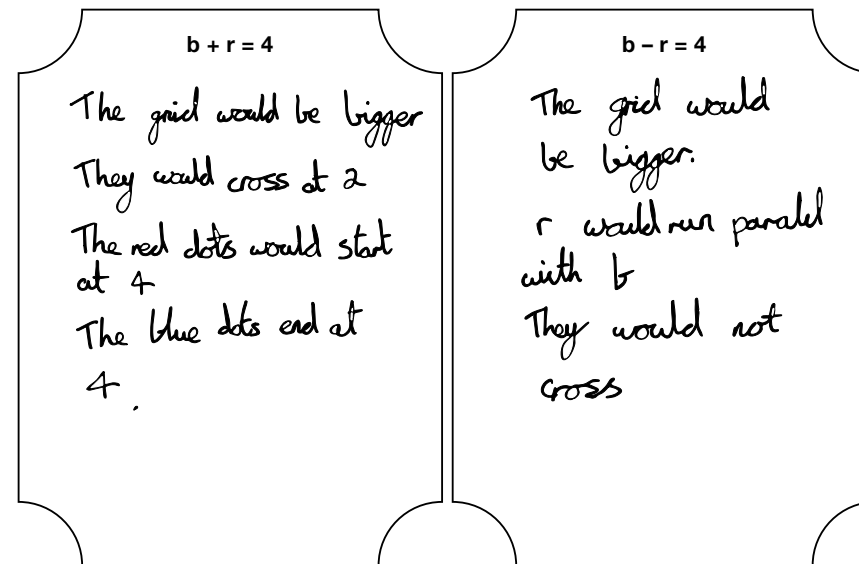What would its r value be? .... −1.2 ....

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b − r = 1

Parallel

What would the pictures for b + r = 4 and b − r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4	b − r = 4
The grid would be bigger They would cross at 2 The red dots would start at 4 The blue dots end at 4.	The grid would be bigger. r would run parallel with b They would not cross

What's my picture? sheet 3 (continued)
Level 5

Many pairs of values of b and r are not shown on the number line picture.

Choose a b value that is smaller than 0   -3
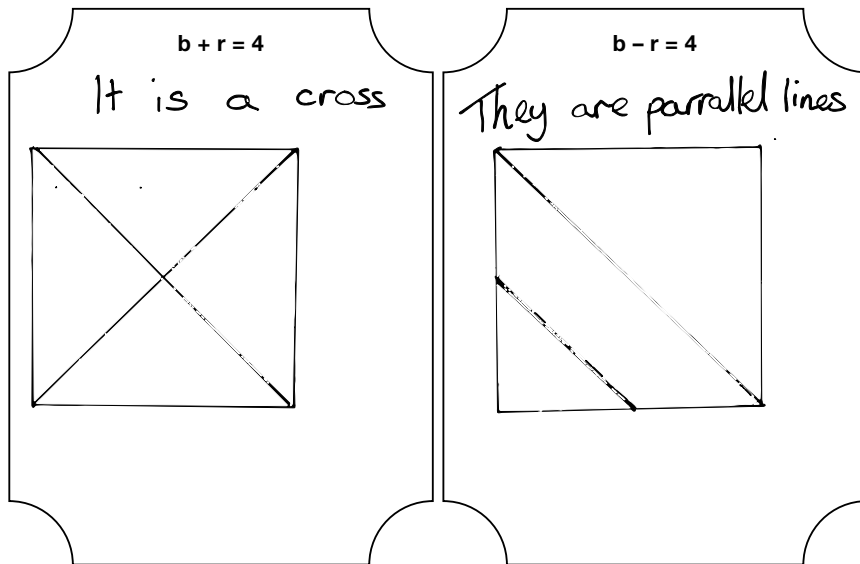
What would its r value be?   ....

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b – r = 1

parrallel lines, with 10 squares between the dots.

What would the pictures for b + r = 4 and b – r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4

It is a cross

b – r = 4

They are parrallel lines

What's my picture? sheet 3 (continued)
Above level 5

Many pairs of values of b and r are not shown on the number line picture.

Choose a b value that is smaller than 0   – 5

What would its r value be?   – 6

The picture for b + r = 3 was two lines that would cross where b and r are both 1.5

Describe your picture for b – r = 1

the two lines don't cross each other as they are Parrallel.
R is always one smaller than B

What would the pictures for b + r = 4 and b – r = 4 look like?

You can write in words, or you can do a small sketch below.

b + r = 4

the lines will cross each other at the mark 2. The graph would be 4×4 instead of 3×3.

b – r = 4

They will not cross as they will be parrallel the graph would be bigger than a 3×3 and R is 4 smaller than B