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Screenplay Status	TL Review
Title	Graphical representation some special linear equations
Grade	9
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Mini Takeaway	1. Equation of y = k x 2. Equation of line parallel to x-axis. 3. Equation of line parallel to y-axis. 4. Equation of x - axis 5. Equation of y - axis.
Key Takeaway	Equations of lines parallel to x - axis and y - axis
Research Doc.	Link
Pitch Doc.	Link
Word Count	1250
Presenter	Aashay Chandrakant Mane
Characters	Presenter
Locations	Drawing room
Presenter Outfit	Smart Casual
Props	Coffee Mug

Sub strand	Algebra II

SCENE: 1
INT. DRAWING ROOM - AFTERNOON
MoG: Presenter enters the frame drinking coffee out of a cup as he empties it and puts it on the table. He turns to the viewers, breaking the fourth wall.
On cue with "we have studied…" add the graph beside the presenter as shown in the reference. (ref)

PRESENTER
Oh hey everyone!
(beat)
We have studied the linear equations in two variables and how to represent them geometrically.
(beat)
Do you recall how a linear equation in two variables can be represented geometrically?

On cue with "Yes…" draw the line in the graph. (ref)

PRESENTER
Yes, as a straight line!
Let's learn something new this time.

INSERT ENDS.

SCENE:2
INT. STUDIO - BG: TEACHING BACKGROUND
Presenter is on screen with the templatized teaching background.

FSA (SECTION CARD): "Graph of Linear Equation of the form y = kx"
FSA ENDS.

MoG: On cue with "consider an equation…" add the following text.(ref)

$y = 4x$
Highlight 'x' and 'y' on cue with "linear equation in two variables.

PRESENTER

Say we have an equation y equals four x.

on cue with " By now…" highlight the 'x' and 'y'.

PRESENTER

Clearly we know that this is a linear equation in two variables.

On cue with " …Yes! We need to…" …Add a graph with four plotted points and draw a line passing through them beside the presenter as shown in the reference.(ref)

PRESENTER

So, let's represent this equation geometrically.

(beat)

But, how do we do that?

(beat)

Yes! We need to plot the points corresponding to the solutions of the given equation and join them by a line.

(beat)

And how many points do we need?

Retain the graph and on cue with "All we need…" rest of the points disappear with only two left. Highlight both the point and the line.

PRESENTER

Correct!

(beat)

All we need are just two points to draw a straight line corresponding to the given equation.

On cue with "To get the first point…" add the first row of the following table beside the presenter.(ref)

x = -1		

PRESENTER
Now, to get the first point, substitute x as negative one in the given equation and find the corresponding value of y.

Retain the table and on cue with " …we will get…" add the second and third column in the table.(ref)

x = -1	$y = 4x$ $= 4 \times -1$ $= -4$	(-1,-4)

.

PRESENTER
On substituting x as negative one here, we will get the corresponding value of y as negative four.
(beat)
Thus, negative one comma negative 4 is one of the solutions.

On cue with "So, let's put…" Add the second row of the table as shown below: (ref)

x = 1		

PRESENTER
Now substitute x as one in the given equation.

Retain the table and on cue with "This will give us…" add the second and third column as shown below. (ref)

x = 1	$y = 4x$ $= 4 \times 1$ $= 4$	(1, 4)

PRESENTER

And this will give us y is equal to four multiplied by one.

(beat)

Which is four.

(beat)

This means, one comma four is the other solution.

Retain the table and on cue with " …Let's name the…" name the coordinates (0,0) as 'O' and (1, 4) as 'A' in the third column. (ref)

$x = -1$	$y = 4x$ $= 4 \times -1$ $= -4$	A(-1,4)
$x = 1$	$y = 4x$ $= 4 \times 1$ $= 4$	B(1, 4)

PRESENTER

Let's name the first ordered pair, negative one comma negative four as 'A' and the other ordered pair one comma four as 'B'

(beat)

Which can be plotted on the cartesian plane like this.

INSERT ENDS.

SCENE:3

FSA:

On cue with "Now draw a line…" draw a line passing through them. (ref)

PRESENTER(V.O.)

And now if we draw a line passing
through both the points, A and B.

FSA ENDS.

SCENE:4

INSERT MoG:
Retain the graph and on cue with " …the required line…" highlight the line beside the presenter. [Ref]

PRESENTER(V.O.)
Now, we will get the required line,
that is the graph of the linear
equation y is equal to four 'x'.

On cue with "Yes! here…" highlight the line and the point of origin (0,0) on the graph.

PRESENTER(V.O.)
Now, have a look at this line.
(beat)
What's so special here?
(beat)
Yes! this line passes through the
origin.

On cue with "So, in general…" add the following. (ref)

PRESENTER
So, in general, the graph of the
equation of the form y is equal to k x
is a line which always passes through
the origin.[NCERT 9]

TOS:
The graph of the equation of the form y = kx is a line which always passes through the origin.

INSERT ENDS.

SCENE:5

PRESENTER

Now let's change the equation a bit…

FSA (Section card): "Equation of line parallel to *x*-axis" (ref)

INSERT MoG: On cue with "Consider another equation…' Add the following beside the presenter and add "Unique solution" under it as shown in the reference.(ref)

$y = \ - 3$

PRESENTER

Consider the equation y is equal to negative three.

(beat)

And let's see how we can represent this geometrically.

Retain the previous equation and on with "This can be…" add the following solution.(ref)

$y + 3 = 0$

PRESENTER

Here, if we just transpose the negative three to the LHS,

(beat)

this equation can be represented as y plus three is equal to zero.

(beat)

Can you recall how to express this equation as a linear equation in two variables?

On cue with "Correct! We can write…" add the following beside the presenter. (ref)

$0.x + y + 3 = 0$

PRESENTER

Correct! We can write this as zero times x plus y plus three is equal to zero.

(beat)

Now, let's find some solutions for this equation.

Add the following and highlight it under the equation.(ref)

This is a linear equation in two variables

On cue with "Step 1 says…" add the first row first column in the table as shown below: (ref)

x = 0		

PRESENTER

So, let's substitute the value of x as zero and find the corresponding value of y.

Retain the table and on cue with " …we will get…" add the second and third column in the table. (ref)

x = 0	$0.x + y + 3 = 0$ 0 × 0 + y + 3 = 0 y + 3 = 0 y = (-3)	(0, -3)

PRESENTER

And on substituting, we will get zero times zero plus y plus three is equal to zero.

(beat)

Which will give us the value of y as negative three.

On cue with “Similarly, on substituting…” add the second row’s first column as shown below:(ref)

x = (-2)		

PRESENTER
Similarly, on substituting the value of x as negative two,

On cue with “We get the value of…” add the second and third column in the table. (ref)

x = -2	$0.x + y + 3 = 0$ 0 ×(-2) + y + 3 = 0 0 + y + 3 = 0 y = (-3)	(-2, -3)

PRESENTER
We will get the value of y as negative three.
(beat)
Thus, zero comma negative three and negative two comma negative three are the solutions of this equation.

Retain the table and on cue with “Now, what did you…” highlight (0, -3) and (-2, -3).

PRESENTER
Now, what can you observe from these solutions?
(beat)
Correct!

Retain the table and on cue with “For any value…” highlight both the values of “x” and for “y” as shown in the reference.

PRESENTER
For any value of x, the value of y becomes negative three. [AP 9]

INSERT ENDS.

SCENE:6

INSERT MoG:

On cue with "Thus, we can say…" add the TOS beside the presenter.(ref)

PRESENTER

Thus, we can say that this equation has infinitely many solutions of the form 'a' comma negative three

(beat)

where a is any real number.[AP 9]

TOS:

The equation y = -3, has infinitely many solutions of the form (a, -3), where a is any real number.

INSERT ENDS.

SCENE:7

FSA: Add the plain graph in the left and the following table in the right,

On cue with "Consider the ordered pair…" name the ordered pairs (0,-3) as A and (-2,-3) as B,

Then plot the points on the graph.(ref)

$A(0,-3)$
$B(-2,-3)$

PRESENTER(V.O.)

Let's name the first ordered pair, zero comma negative three as 'A' and the other ordered pair negative two comma negative three as 'B'

(beat)

Which can be plotted on the cartesian plane like this.

On cue with "Now, draw a line…" draw the line passing through all the points and keep the arrow on both ends of the line.(ref)

PRESENTER(V.O.)
Now, draw a line passing through them,

FSA ENDS.

SCENE:8

INSERT MoG:

Retain the graph with the presenter standing beside it.(ref)

PRESENTER
What can you observe from this line?

On cue with "Yes,this line drawn is…" highlight both the line for the equation and the x-axis.(ref)

PRESENTER
We can observe that this line is parallel to the x-axis at a distance of three units from the x-axis
(beat)
and it passes through the point 0 comma negative three. [AP 9]

On cue with "In general…" add the following TOS beside the presenter. (ref)

PRESENTER
So in general, the graph of y equals k is a line parallel to the x-axis at a distance of k units from x-axis and it passes through the point zero comma k.[AP 9]

TOS:

- The graph of y = k is a line parallel to the x-axis at a distance of k units from x axis and it passes through the point (0, k)

INSERT ENDS.

SCENE: 9
FSA (SECTION CARD): "Equation of line parallel to *y*-axis"

MoG: On cue with "Now, consider an equation…" the following beside the presenter. (ref)

$x = 5$

PRESENTER
Now, let's consider another equation, x is equal to five.

Retain the equation and on cue with "This can be represented…" add the following solution beside the presenter. (ref)

$x - 5 = 0$

PRESENTER
which can also be represented as x minus five is equal to zero.

Retain the previous and add the following equation. (ref)

$x + 0.y - 5 = 0$

PRESENTER
Or x plus, zero multiplied by y, minus five equals to zero.
(beat)
And now this equation is a linear equation in two variables which has infinitely many solutions.
(beat)
So let's find out a few…

On cue with "If we substitute…" add the first column as shown below. (ref)

y = 0
y = 2

PRESENTER

On substituting the value of y as zero and two,

On cue with "we get the corresponding…" add the second and third column as shown below. (ref)

$y = 0$	$x + 0\times0 - 5 = 0$ $x - 5 = 0$ $x = 5$	(5, 0)
$y = 2$	$x + 0\times2 - 5 = 0$ $x - 5 = 0$ $x = 5$	(5, 2)

PRESENTER

We get the corresponding values of x as five.

(beat)

This means, for any value of y, x becomes five. [AP 9]

Retain the table without the second column on cue with "Thus, we can say…" add the TOS beside the presenter. (ref)

PRESENTER

Thus, we can say that this equation has infinitely many solutions of the form five comma 'a' where a is any real number.[AP 9]

TOS:

Equation $x = 5$, has infinitely many solutions of the form (5, a) where a is any real number.

PRESENTER

Now, you must be wondering, why did we substitute the values of y-coordinate instead of x-coordinate?

(beat)

It's because if we substitute the values for 'x' in this equation, say x equals two

(beat)

Then, we will get some absurd results like this.

(beat)

That is, we won't be able to find any solution as the y coordinate is being multiplied by zero.

(beat)

So for every value we substitute in the y coordinate we can easily find the x coordinate.

On cue with "Now let's draw the…" the mid column from the previous equation disappears and the new column is added as shown below. (ref)

y = 0	x = (5)	(5, 0)
y = 2	x = (5)	(5, 2)

PRESENTER

Now let's draw the graph of the equation x is equal to five using these solutions.

On cue with "So considering…" name the ordered pair (- 5, 0) as A and (- 5, 2) as B, in the last column of the following table .(ref)

y = 0	x = (5)	A (5, 0)
y = 2	x = (5)	B (5, 2)

PRESENTER

But first, let's name the first ordered pair, five comma zero as A and the other ordered pair five comma two as B

Which can be plotted on the cartesian
plane like this.

INSERT ENDS.

SCENE:10

FSA:

NOTE: A momentary pause from the presenter, when the points are marked and the lines being drawn from points and meeting at three concerned points. (ref)

PRESENTER(V.O.)
And then we draw a line passing through
them.

On cue with “Now, did you observe…” highlight the line on the graph as shown in the reference.

PRESENTER(V.O.)
Now, what can you say about this line?
(beat)
This line is parallel to the y-axis at
a distance of five units from the
y-axis.
(beat)
and it passes through the point five
comma zero.

On cue with “So, In general…” Following TOS appears beside the presenter.(ref)

PRESENTER
So, In general, the graph of the
equation x equals k is a line parallel
to the Y-axis at a distance of k units
from the y axis and passes through the
point k comma zero.[AP 9]

TOS:

The graph of x = k is a line parallel to the y-axis at a distance of k units from the y axis and passes through the point (k,0).

FSA ENDS.

SCENE:11

INSERT MoG:

Retain the graph and on cue with " …where the lines…" highlight the line beside the presenter.(ref)

PRESENTER

Let's consider another simple equation, say y is equal to zero.

Graph fades out and on cue with "what about the…" Add the following equation beside the presenter.(ref)

$y = 0$

INSERT ENDS.

SCENE:12

FSA: Display the section card "Equation of *x*-axis" as per the guidelines.

INSERT MoG:

Retain the equation and add the following solution under it,(ref)

$0.x + y = 0$

PRESENTER

Which can also be written as zero multiplied by x plus y equals zero.

(beat)

So let's try to represent this equation geometrically,

And before that let's find the solutions…

On cue with “And the solutions…” add the table beside the presenter and highlight the coordinates in the third column.(ref)

x = 3	0.x + y = 0 0 × 3 + y = 0 y = 0	(3, 0)
x = 4	0.x + y = 0 0 × 4 + y = 0 y = 0	(4, 0)

PRESENTER
On substituting the value of x as three and four,
(beat)
We will get the value of y as zero in both the solutions.

On cue with “Consider…” name the (3,0) as A and (4,0) as B, in the table as shown below.(ref)

x = 3	0.x + y = 0 0 × 3 + y = 0 y = 0	A (3, 0)
x = 4	0.x + y = 0 0 × 4 + y = 0 y = 0	B (4, 0)

INSERT ENDS.

SCENE:13

FSA: Retain the third column of the table which slides to the rightward portion of the frame and add a graph in the left and plot the points as shown in the reference. (ref)

PRESENTER(V.O.)

Let’s name the first ordered pair,
three comma zero as point ‘A’ and the
other ordered pair four comma zero as
point ‘B’
(beat)
Which can be plotted on the cartesian
plane like this.

Presenter takes a momentary pause and continues while the points are being plotted in the graph. (ref)

PRESENTER(V.O.)
And then we draw a line passing through
them.

PRESENTER(V.O.)
What did you observe here?

Retain the graph with plotted points and on cue with “We observed that…” highlight the line in the graph. (ref)

PRESENTER(V.O.)
We observed that the y-coordinate of
these points is zero and both the
points lie on the x-axis.[AP9]

On cue with “Therefore…” the graph fills the screen and the following TOS appears. (ref)

PRESENTER(V.O.)
Therefore the equation y equals zero
represents the x-axis. [AP9]
(beat)
In other words, the equation of x-axis
is y equals zero.

TOS:
The equation y = 0 represents the x-axis i.e
The equation of x-axis is y = 0.
FSA ENDS.

SCENE:14

FSA: Display the section card "Equation of *y*-axis" as per the guidelines.

INSERT MoG:
On cue with "Now let's check for the…" add the following equation beside the presenter. (ref)
$x = 0$

PRESENTER
Now, let's consider another equation x equals zero.

Retain the equation and on cue with "Which can also be…" add the following:(ref)
$x + 0. y = 0$ Linear equation in two variables.

PRESENTER
It can also be written as x plus, zero multiplied by y equals zero.

Retain the previous equation and add the following below. (ref)
➡️ **Linear equation in two variables.**

PRESENTER
Now, let's plot its graph.

On cue with "So consider…" add the following table beside the presenter and highlight (0, 2), (0, -1) and (0, -4).(ref)

On cue with "Let's name the ordered pair…" name the ordered pair in the third column as shown below.(ref)

y = 2	x + 0.y = 0 x + 0 ✕ 2 = 0 x = 0	A (0, 2)
y = (-1)	x + 0.y = 0 x + 0 ✕ (-1) = 0 x = 0	B (0, -1)

PRESENTER

On substituting the value of y as two
and negative one,
(beat)
We get the value of x as zero
(beat)
Let's name the first ordered pair, zero comma two as point 'A' and the other ordered pair zero comma negative one as point 'B'
(beat)
Which can be plotted on the cartesian plane like this.

Presenter takes a momentary pause and continues while the points are being plotted in the graph. (ref)

PRESENTER(V.O.)
And then, draw a line passing through them.

FSA: Retain the third column of the table and on cue with "Let's plot them on the graph…" add the graph on the left side of the frame as the table slides to the right side.(ref)
And plot the points on the graph as shown in the reference. (ref)

PRESENTER(V.O.)
What did you observe here?

On cue with "We observed that…" highlight the y-axis and all the points that lie on it.(ref)

PRESENTER(V.O.)
We observed that the x coordinate of the points is zero and they lie on the y-axis [AP9]

On cue with " …their x coordinate" highlight the x-axis and the (0,0) point in the middle of the line.
And on cue with "Therefore…" add the TOS as a supertitle.(ref)

PRESENTER(V.O.)

Therefore the equation x equals zero represents the y-axis.[AP9]
In other words, the equation of the y-axis is x equals zero.

TOS:
The equation x = 0 represents the y-axis i.e.,
The equation of the y-axis is x =0.

FSA ENDS.

SCENE:15

PRESENTER
So that was all about graphical representation of linear equations in two variables.
(beat)
Now, let's recall what we have learnt.
(beat)
The graph of the equation of the form y is equal to k x is a line which always passes through the origin.
(beat)
The graph of y equals k is a line parallel to the x-axis at a distance of k units from x-axis and it passes through the point zero comma k.
(beat)
The graph of the equation x equals k is a line parallel to the Y-axis at a distance of k units from the y axis and passes through the point k comma zero.
(beat)
The equation y equals zero represents the x-axis, that is, the equation of x-axis is y equals zero.
(beat)
The equation x equals zero represents the y-axis, that is, the equation of y-axis is x equals zero.

TOS:

TOS-1: The graph of the equation of the form y = kx is a line which always passes through (0,0).

TOS-2: The graph of y = k is a line parallel to the x-axis at a distance of k units from x-axis and it passes through the point (0,0)

TOS-3: The graph of the equation x = k is a line parallel to the y-axis at a distance of k units from the y-axis and passes through the point (k, 0).

TOS-4: The equation y = 0, represents the x-axis.
i.e., The equation of x-axis is y = 0

TOS-5: The equation x =0, represents the y-axis.
i.e., The equation of y-axis is x = 0

PRESENTER

We've come a long way learning about the equations both algebraically and graphically.

(beat)

But learning's not over yet, check out our problem solving videos and keep practicing.