

# UNIT 13 *Graphs, Equations and Inequalities*

## Overhead Slides

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- 13.2 Finding Inequalities
- 13.3 Quadratic Functions
- 13.4 Cubic Functions
- 13.5 Reciprocal Functions
- 13.6 Non-Linear Equations
- 13.7 Iterative Method
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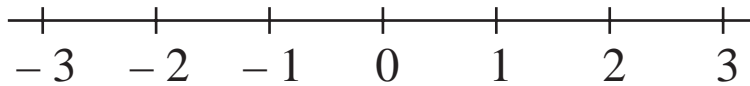
## OS 13.1

*Inequalities*

Illustrate each of these inequalities on a number line:

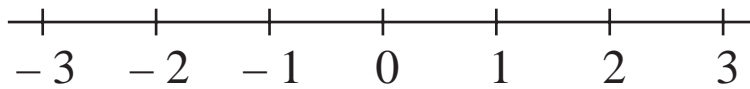
A

$$x \geq 2$$



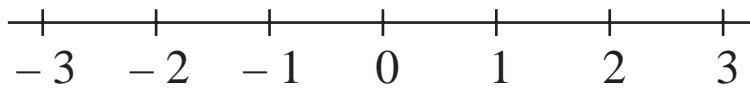
B

$$x < 3$$



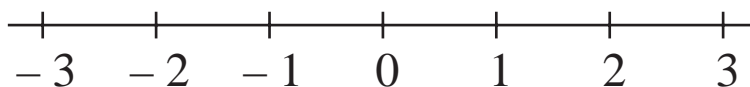
C

$$-2 \leq x < -1$$



D

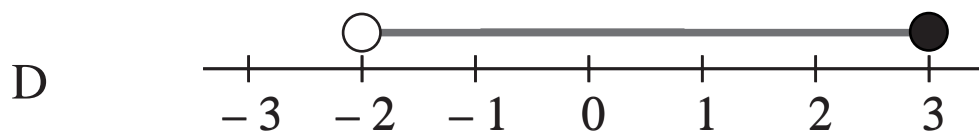
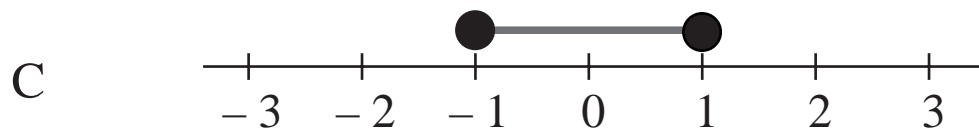
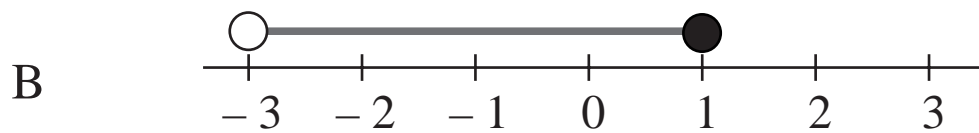
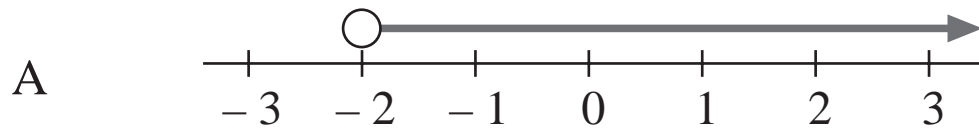
$$-3 < x \leq 2$$



## OS 13.2

*Finding Inequalities*

Write down the inequality illustrated in each diagram:



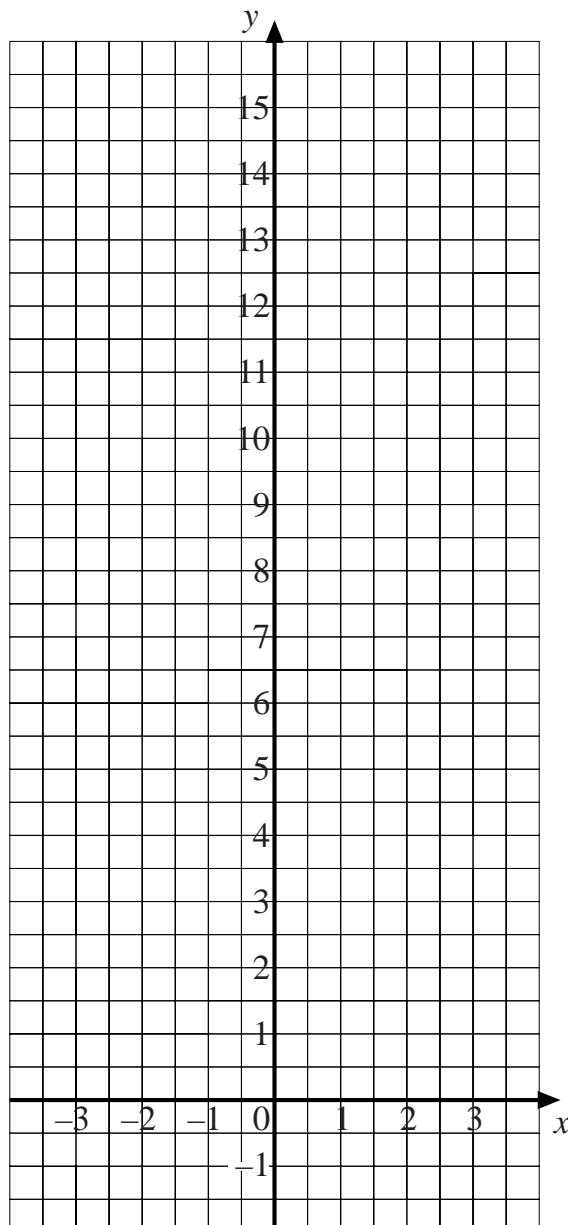
## OS 13.3

*Quadratic Functions*

Complete the table:

$x$	$-3$	$-2$	$-1$	$0$	$1$	$2$	$3$
$x^2$							
$x^2 - 2x$							

Draw the graphs  $y = x^2$  and  $y = x^2 - 2x$ .



Describe the relationship between the two curves.

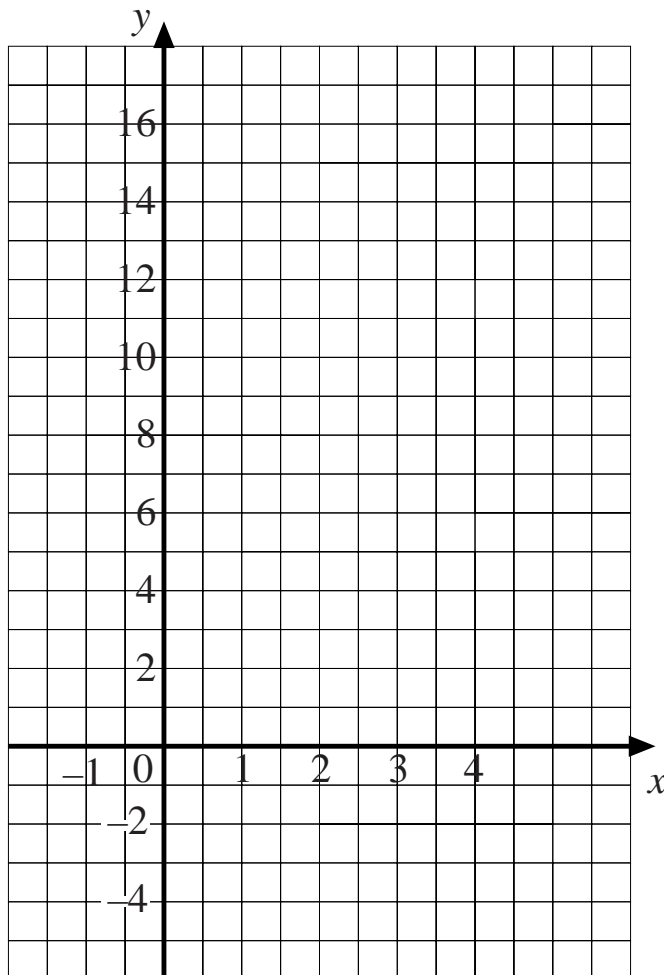
## OS 13.4

## Cubic Functions

Complete the table:

$x$	-1	0	1	2	3	4
$x^3 - 3x^2$						

Draw the graph of  $y = x^3 - 3x^2$ .



Also draw the line  $y = -2$  and write down the solutions of the equation

$$x^3 - 3x^2 = -2$$

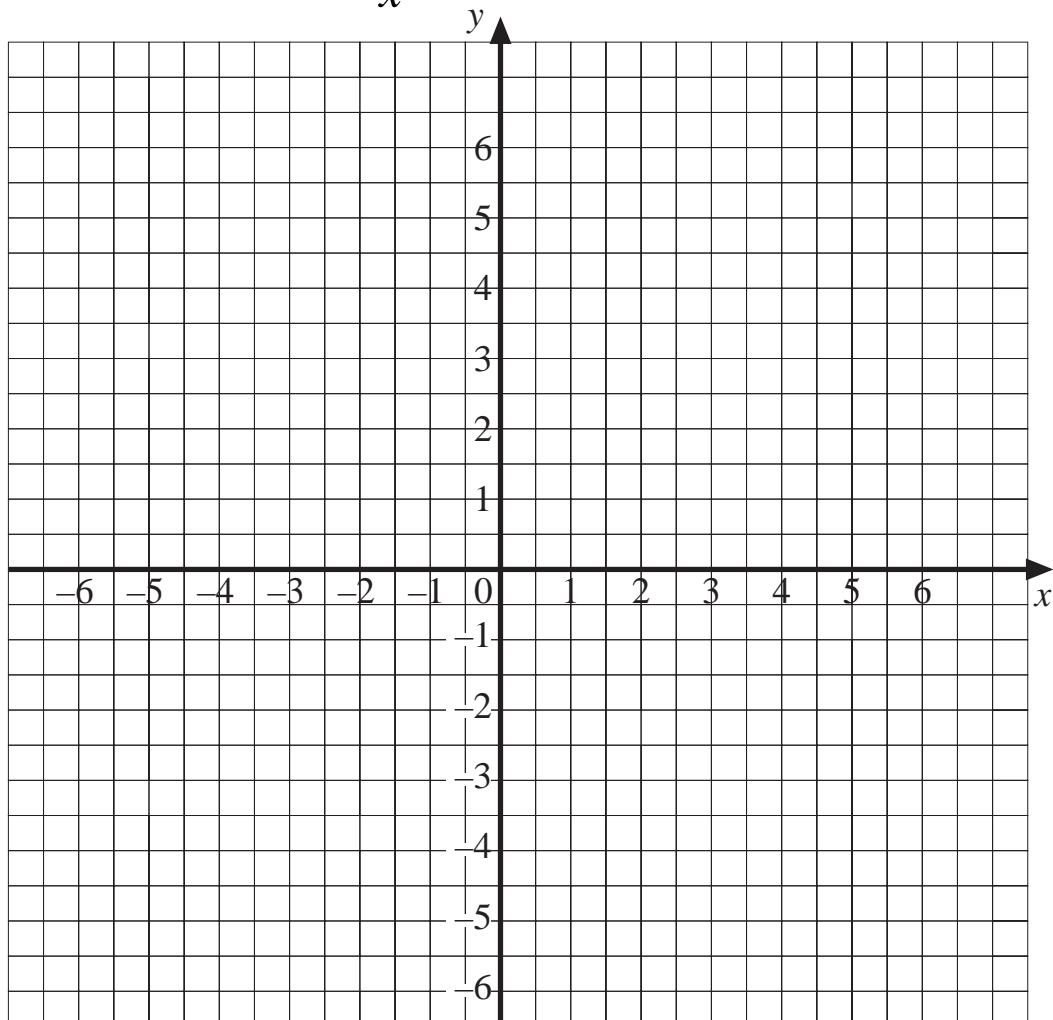
## OS 13.5

*Reciprocal Functions*

Complete the table:

$x$	-6	-3	-2	-1	0	1	2	3	6
$\frac{6}{x}$									

Draw the graph of  $y = \frac{6}{x}$ .



Also draw the line  $y = x$  and find approximate solutions for the equation  $\frac{6}{x} = x$ .

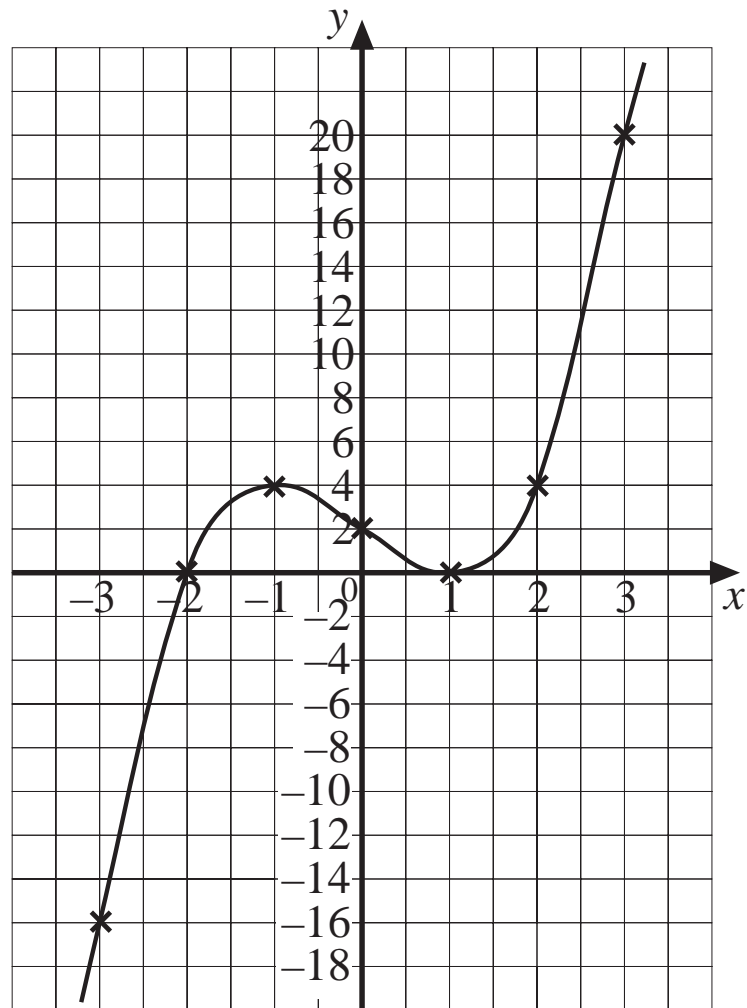
## OS 13.6

## Non-Linear Equations

The graph of

$$y = x^3 - 3x + 2$$

is shown.



Use the graph to estimate the solutions to the following equations:

$$x^3 - 3x + 2 = 4$$

$$x^3 - 3x + 12 = 2$$

$$x^3 - 3x + 2 = -6$$

## OS 13.7

*Iterative Method*

The equation  $x^3 + x = 8$  has a solution close to  $x = 2$ .

Complete the table and find  $x$  correct to 2 decimal places.

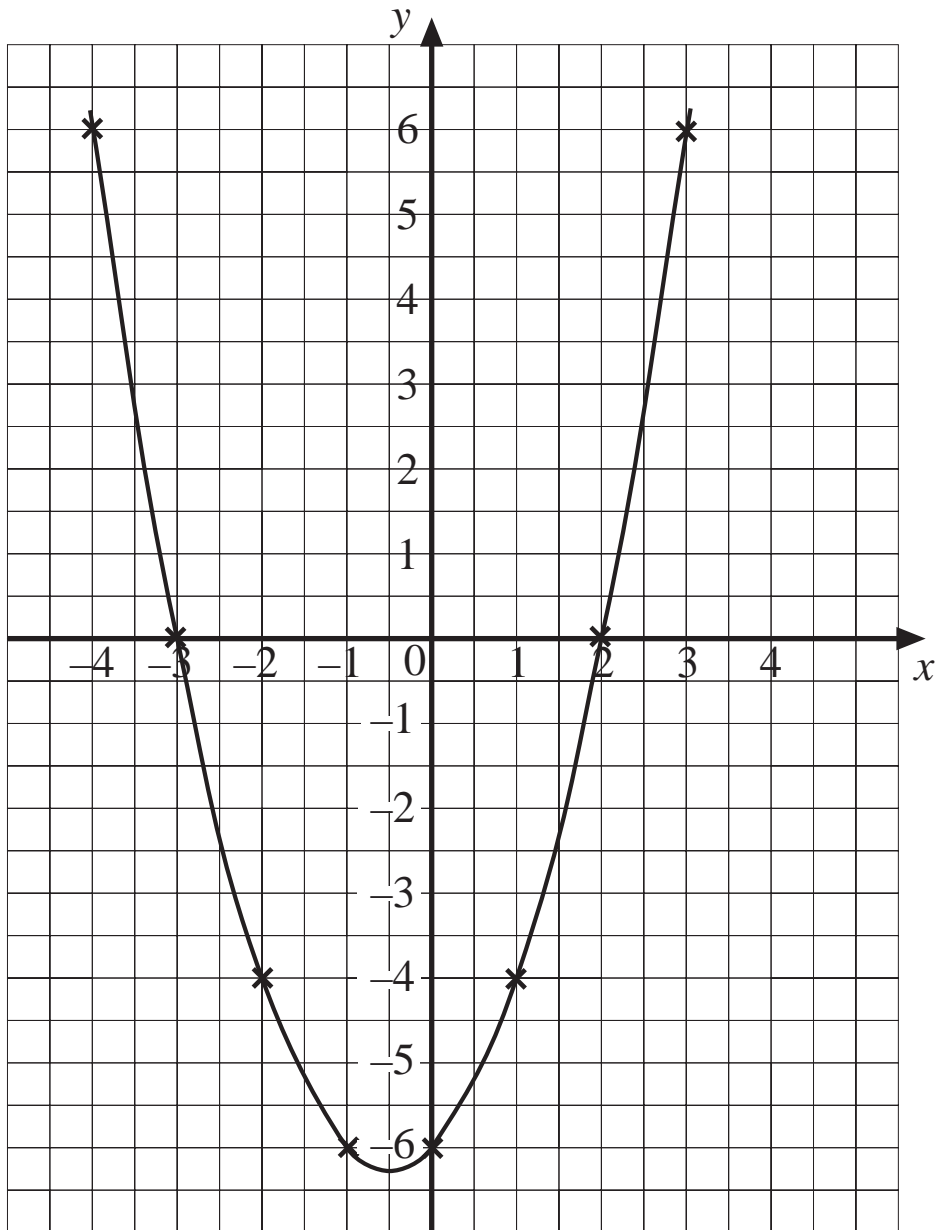
<i>Trial</i> $x$	$x^3 + x$	<i>Comment</i>
2		
1.9		
1.8		
1.85		
1.84		
1.83		
1.835		

$x =$   to 2 decimal places.

## OS 13.8

## Quadratic Inequalities 1

The diagram shows the graph of  $y = x^2 + x - 6$



Use the graph to solve these inequalities:

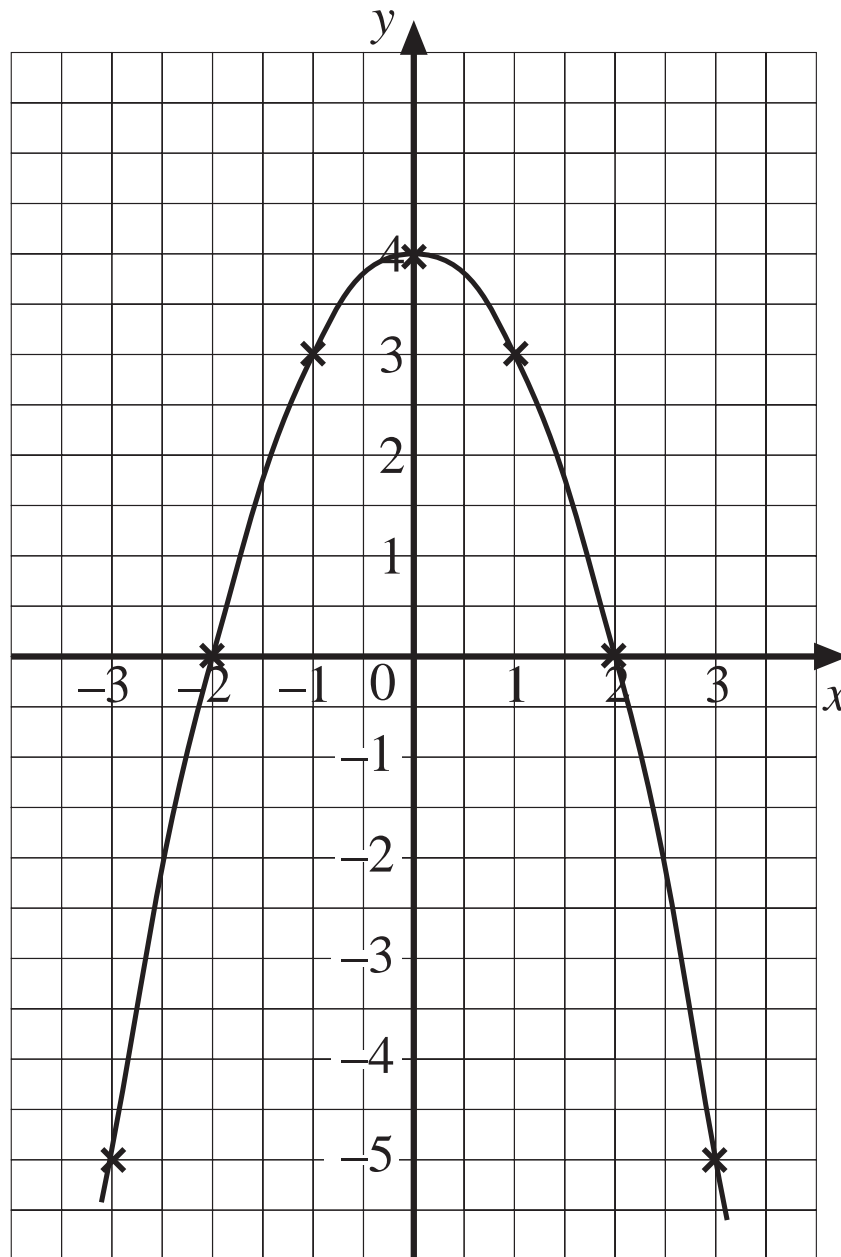
$$x^2 + x - 6 < 0$$

$$x^2 + x - 6 \geq 0$$

## OS 13.9

## Quadratic Inequalities 2

The diagram shows the graph of  $y = 4 - x^2$ .



Use the graph to solve these inequalities:

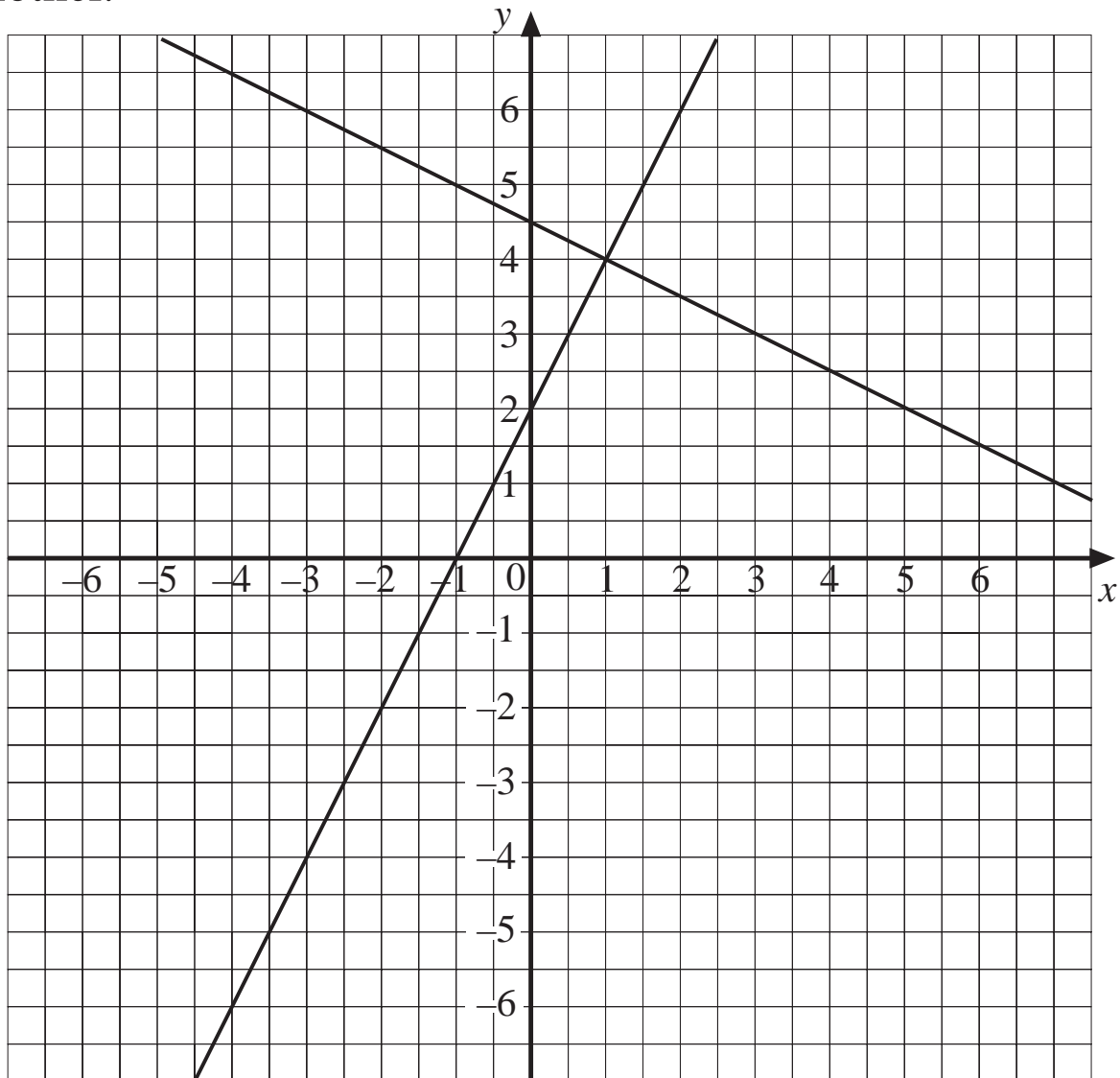
$$4 - x^2 \geq 0$$

$$3 - x^2 \leq 0$$

## OS 13.10

*Perpendicular Lines*

The graph shows two lines that are perpendicular to one another.



Determine the equation of each line.

How do the gradients compare?