**Test 2**

## Proportion, Functions, Relations & Transformations

## Semester One 2019 Year 11 Mathematics Methods

**Calculator Assumed**

|  |  |
| --- | --- |
| Name: |  |
| Teacher: |  |

**Date: Friday 12th April 7.45am**

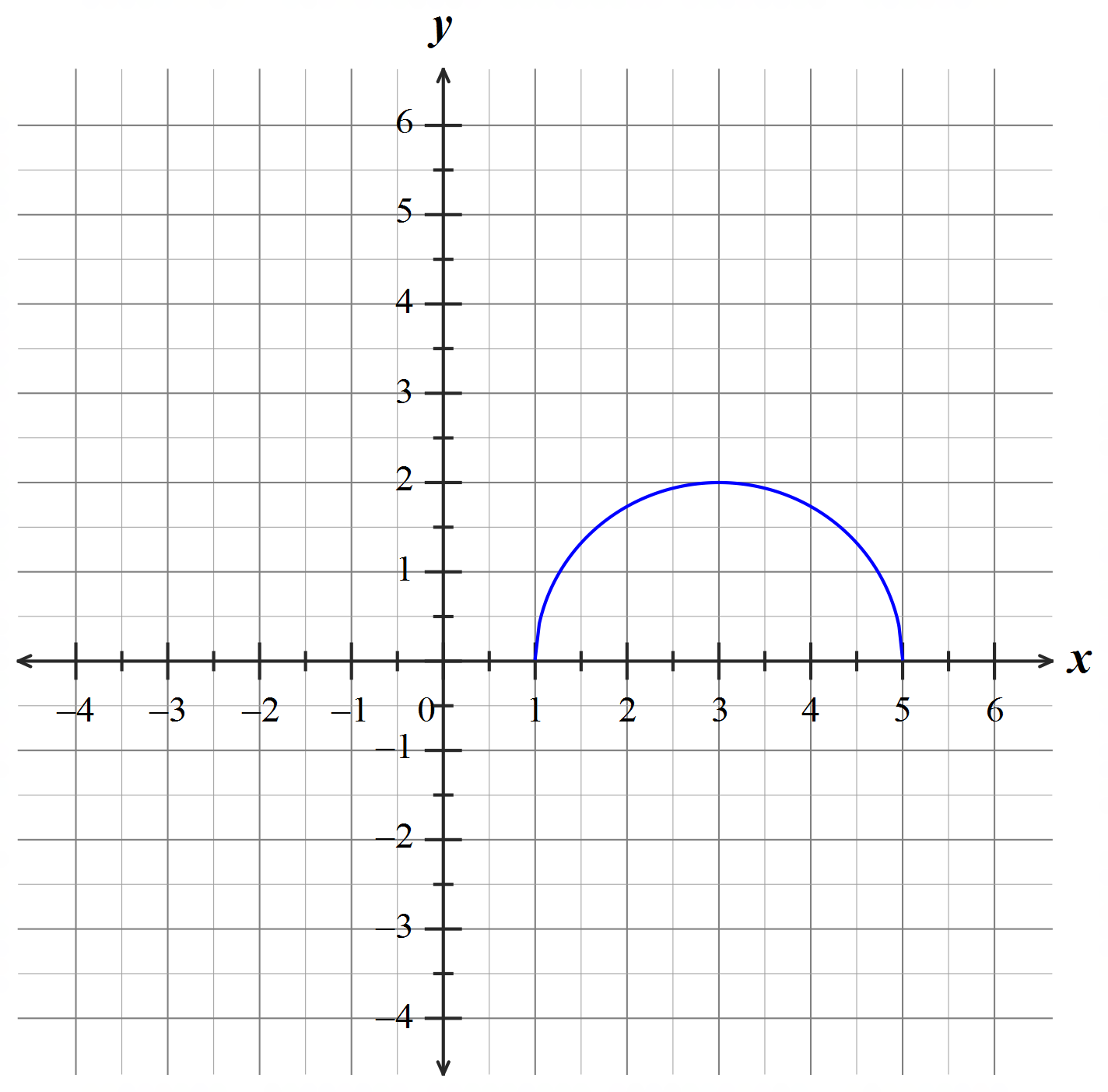
**You may have a formula sheet and 1 page (1 side) of notes for this test.**

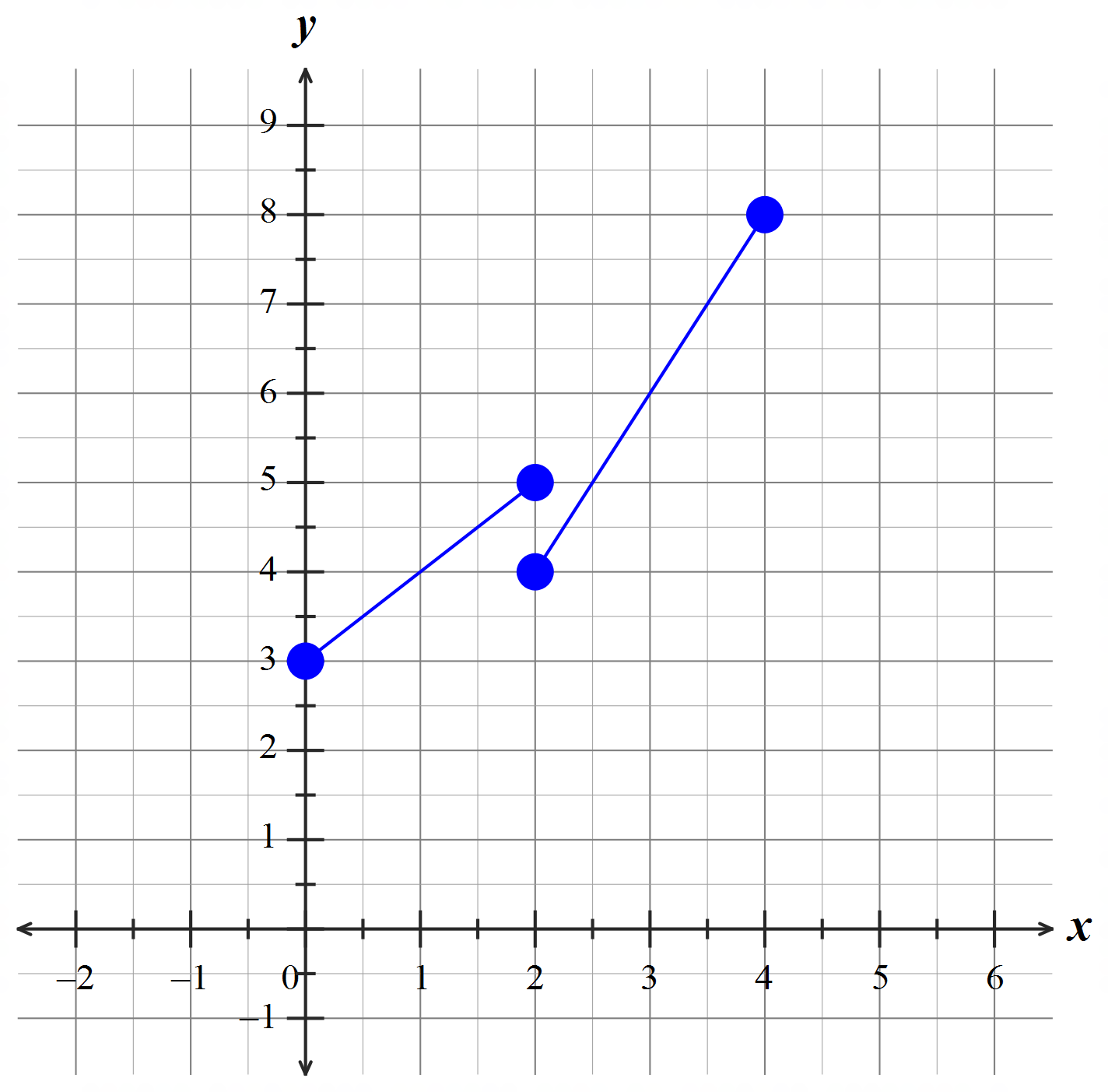
**Total\_\_\_\_\_\_\_\_\_\_\_/ 41 Total Marks:41 Time: 45 Minutes**

**Question 1** **(3 marks)**

State whether the following relations are functions.

1. **{**(0, 0), (1, 1), (1, -1), (4, 2), (9, 3)**}**

****

1. ****

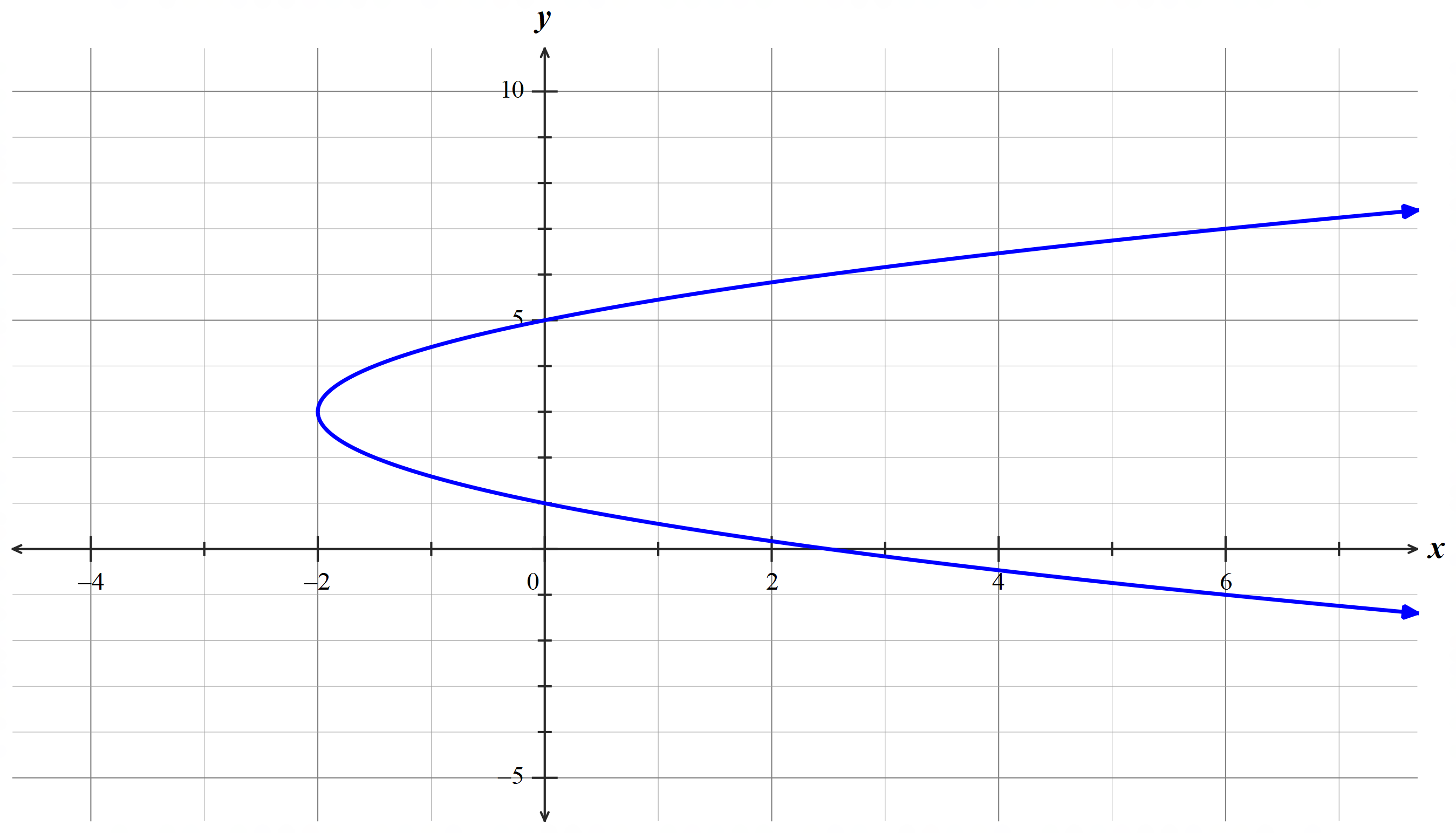
**Question 2** **(4 marks)**

Given that is directly proportional to the square of . When , , find

1. the constant of variation (2 marks)
2. the value(s) of x when y = 27 (2 marks)

**Question 3** **(8 marks)**

1. Find the radius and the coordinate of the centre of the circle with equation . Show your working. (3 marks)
2. The variables and are related as demonstrated by this graph.

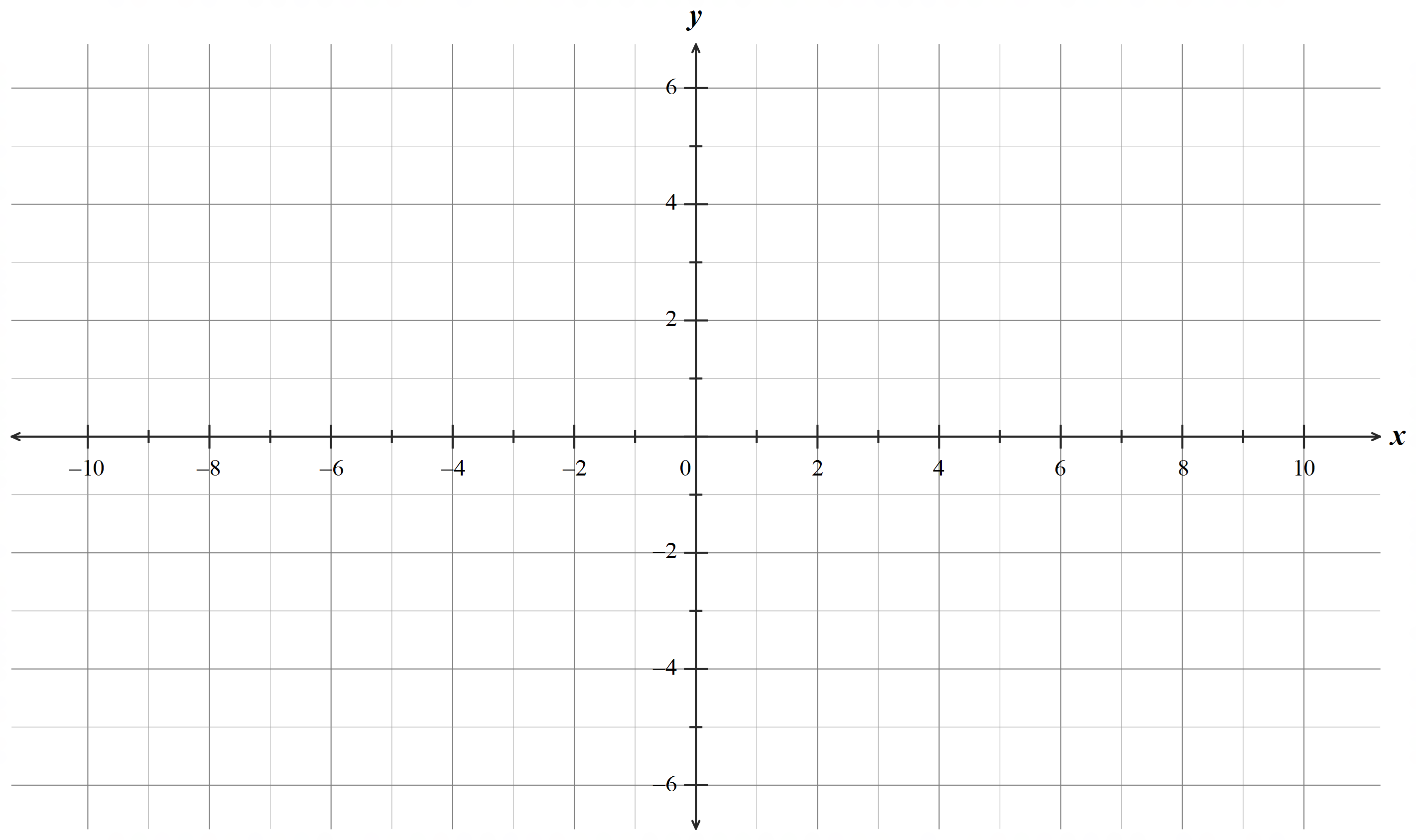


1. Determine the equation of the graph above. (3 marks)
2. State the domain. (1 mark)
3. From **(a)** and **(b)**, what features of their graphs clearly indicate that is not a function of ? (1 mark)

**Question 4** **(6 marks)**

The function is transformed into by the following sequence of transformations.

1. Sketch the following transformation of .

‘A translation 5 units in the positive -axis followed by a translation of 2 units in the positive -axis.’ (2 marks)

1. Determine the equations of the resulting function .
2. A translation 3 units in the direction of the negative -axis followed by a reflection about the -axis. (2 marks)
3. A dilation parallel to the positive -axis of factor 2 followed by a translation 4 units in the direction of the positive -axis (2 marks)

**Question 5** **(9 marks)**

Consider the functions and where and .

1. Given and , determine the rule for . (3 marks)
2. Express the rule for as a polynomial. (3 marks)
3. The coordinate lies on . Determine the coordinate for . (1 mark)
4. Describe the sequence of transformations that would transform to . (2 marks)

**Question 6** **(4 marks)**

The time (t) in hours required to construct a retaining wall varies inversely to the number of workers (w) being employed. An engineer estimates that it will take 8 workers 180 hours to construct a retaining wall. [Assume that all workers work at the same rate.]

1. If the retaining wall must be constructed in 150 hours, how many extra workers will need to be employed? (3 marks)
2. If only 6 workers are available, how long will they take to construct this wall? (1 mark)

**Question 7** **(7 marks)**

1. Express into the form . (2 marks)
2. Determine the coordinate of the -intercept. (1 mark)
3. State the asymptotes of . (2 marks)
4. Hence, determine the range of (2 marks)

**END OF TEST**