

PRELIM REVIEW: PAPER 1

30 SEPTEMBER 2013

Lesson Description

In this lesson, we:

- Work through questions from the Sept 2013 Prelims focussing on functions

Questions

Question 1

(Adapted from ECDOE, Sept 2013, Paper 1, Question 6)

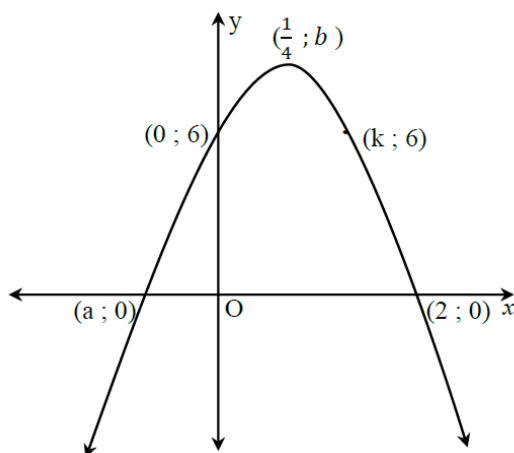
Given the function, $f(x) = \frac{3}{x-2} - 3$

- Write down the equations of the asymptotes of $f(x)$. (2)
- Determine the intercepts of the graph with the axes. (3)
- Make a neat sketch of $f(x)$. Indicate all intercepts with the axes. (4)
- Write down the equation of the axes of symmetry of f with a negative gradient. (2)
- Write down the range of $f(x) + 2$. (1)

Question 2

(Adapted from ECDOE, Sept 2013, Paper 1, Question 7)

In the figure the graph of the parabola f , intersecting the x -axis at $(a; 0)$ and $(2; 0)$ is given. Furthermore $(\frac{1}{4}; b)$ is the coordinate of the turning point of the curve of f , while its point of intersection with the y -axis is $(0; 6)$. The point $(k; 6)$ lies on the curve of f .



Determine:

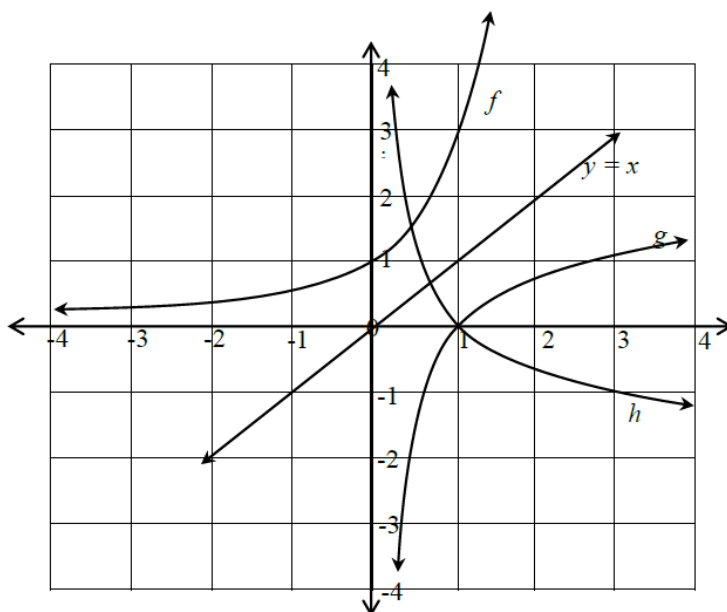
- the value of k (1)
- the value of a (1)
- the value of b (show the necessary calculations) (6)
- the equation of the tangent to the curve of f at the point $(0; 6)$ (3)

Question 3

(Adapted from ECDOE, Sept 2013, Paper 1, Question 8.1)

In the sketch, the following functions are represented:

- $f(x) = 3^x$
- $g(x)$, the reflection of f in the line $y = x$.
- $h(x)$, the reflection of g in the x -axis



- Determine the defining equations of g and h in the form $y = \dots$ (5)
- Determine with the aid of the above sketch the value(s) for x for which:
 - $f(x) > g(x)$
 - $g(x) \div h(x) = 1$

Question 4

(Adapted from ECDOE, Sept 2013, Paper 1, Question 8.2)

The following function is given: $f(x) = 2x^2$

- Determine $f^{-1}(x)$ (2)
- Is f^{-1} a function? Give a reason for your answer. (2)
- How can the domain be restricted in order for f^{-1} to be a function? (2)



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