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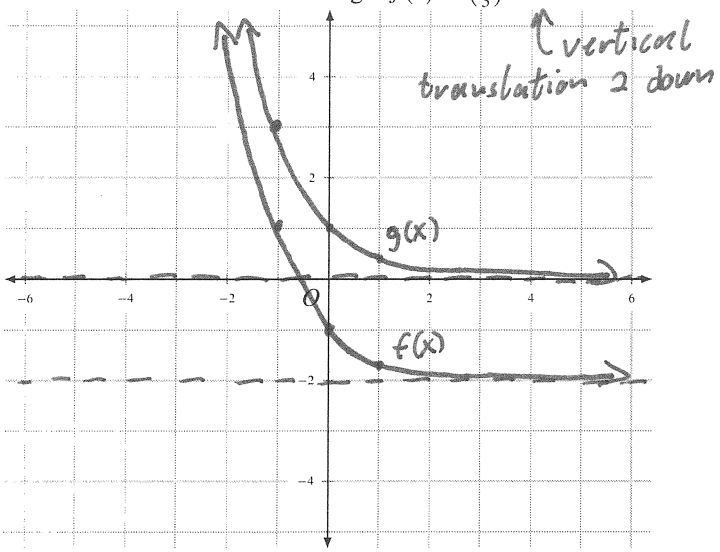
Quiz 11

This quiz is graded out of 18 marks. No books, watches, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(5 marks)* Graph the function (use 3 points) and its asymptote then state the domain and range: $f(x) = \left(\frac{1}{3}\right)^x - 2$



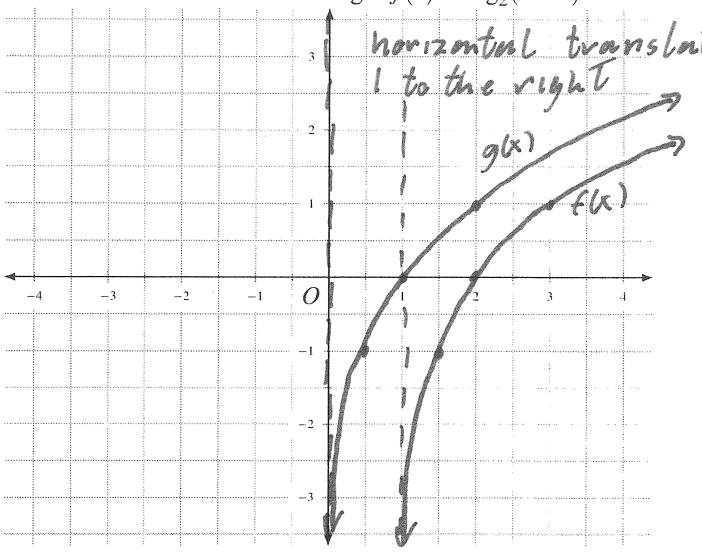
Let $g(x) = \left(\frac{1}{3}\right)^x$

x	$g(x)$
-1	$g(-1) = \left(\frac{1}{3}\right)^{-1} = 3$
0	$g(0) = \left(\frac{1}{3}\right)^0 = 1$
1	$g(1) = \left(\frac{1}{3}\right)^1 = \frac{1}{3}$

domain : $\mathbb{R}$

range : $(-2, \infty)$

Question 2. *(5 marks)* Graph the function (use 3 points) and its asymptote then state the domain and range: $f(x) = \log_2(x-1)$



Let $g(x) = \log_2 x$

x	$g(x)$
$\frac{1}{2}$	$g\left(\frac{1}{2}\right) = \log_2 \frac{1}{2} = -1$
1	$g(1) = \log_2 1 = 0$
2	$g(2) = \log_2 2 = 1$

domain : $(1, \infty)$

range : $\mathbb{R}$

Question 3. *(4 marks)* Solve for x: $27^{x-8} = \left(\frac{1}{3}\right)^{x+4}$

$$(3^3)^{x-8} = (3^{-1})^{x+4}$$

$$3^{3(x-8)} = 3^{-(x+4)}$$

$$3^{3x-24} = 3^{-x-4}$$

$$3x - 24 = -x - 4$$

$$4x = 20$$

$$x = 5$$

Question 4. *(4 marks)* Solve for x: $\log_3(x^2 - 13) = 1$

$$x^2 - 13 = 3^1$$

$$x^2 - 16 = 0$$

$$(x-4)(x+4) = 0$$

$$x - 4 = 0 \quad \text{or} \quad x + 4 = 0$$

$$x = 4 \quad \text{or} \quad x = -4$$