BECA / Huson / 11.1 IB Math SL Name:
20 September 2017

Chapter 1 Test: Function Operations

Answer on loose leaf paper in pen, or, for the graphs, on graph paper in pencil. Show working for all problems.

1. For the function $f(x) = 2x - 7$
   (a) What is the value of $f(3)$?
   (b) Solve for x if $f(x) = 0$.
   (c) Find $f(1 - x)$.
   (d) Find the inverse of $f(x)$, $f^{-1}(x)$.
2. For the function $g(x) = x^2 - 4$ with $x > 0$
   (a) Simplify the expression $g(x - 3)$
   (b) Find $g^{-1}(x)$.
3. For the functions $f(x) = 2 - x^2$ and $g(x) = 2x - 5$
   (a) What is the value of $g(3)$?
   (b) Find $(f \circ g)(3)$.
   (c) Find $(f \circ g)(x)$.
4. Find the inverse of $f(x) = \dfrac{4x - 2}{5}$
5. Given that $g(x) = \frac{1}{3}x + 2$
   (a) Find the inverse of $g(x)$.
   (b) Graph the function $g(x)$ and its inverse on the same axes, using the scale 1 unit equals 1 cm and labeling following IB conventions.
6. For the functions defined by $f(x) = 2x$ and $g(x) = x + 4$
   (a) Find an expression for $(f \circ g)(x)$.
   (b) Find an expression for $(g \circ f)(x)$.
   (c) Solve $(f \circ g)(x) = (g \circ f)(x)$.
7. Write down the domain and range of $f(x) = x^2 - 6$
8. Using a GDC to analyze the function $f(x) = \dfrac{3x + 2}{x + 1}$
   (a) Write down the equations for the asymptotes.
   (b) Write down the domain and range of $f(x)$.

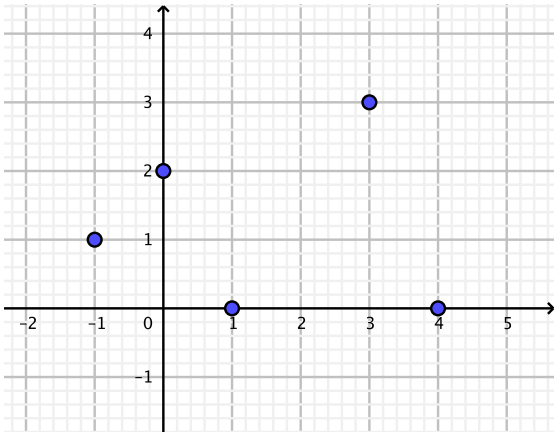

Figure 1: Write down domain and range.

9. Write down the domain and range of the function graphed in Figure 1.
10. For the function shown in Figure 2
    (a) Write down the equations for the asymptotes.
    (b) Write down the domain and range of the function.

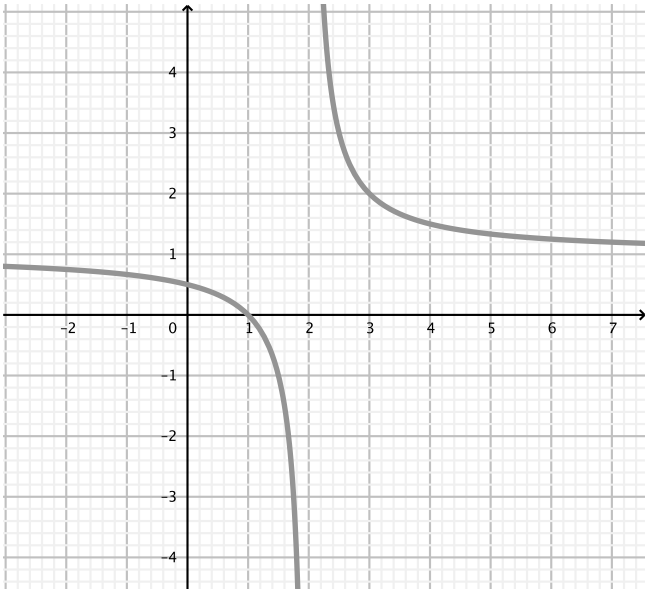

Figure 2: Determine asymptotes.

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Graph accurately in pencil using a straight edge or smooth curve.

11. Given the graph of the function $f(x)$ shown in Figure 3

    (a) Label points on the function representing $f(-1) = -2$ and $f(4) = -1$

    (b) Graph the inverse of $f(x)$ on the same axes. Label the inverses of the points named in part (a)

    (c) Write down the domain and range of $f(x)$.

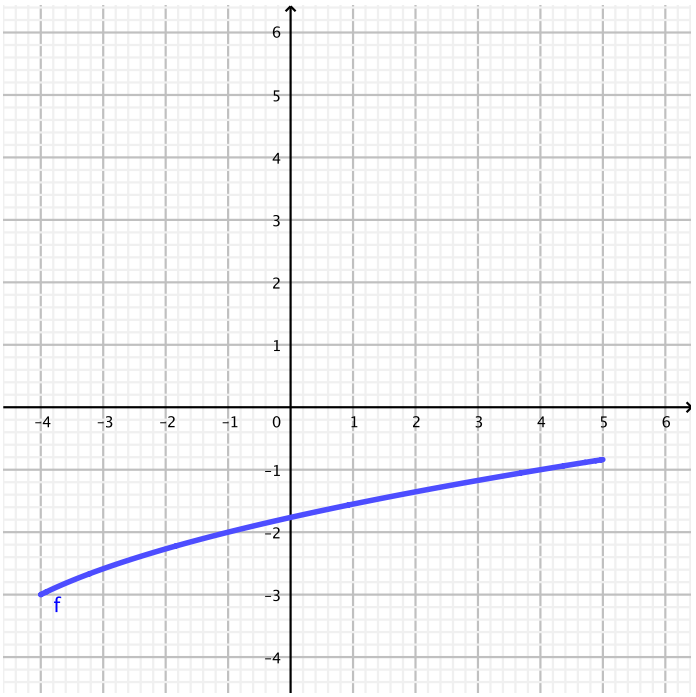

Figure 3: Label given points and plot inverse.

12. Consider the function $f(x) = x^3 - 4x^2 - 3x + 18$.

    (a) Find the values of $f(x)$ for a and b in the table below:

x	-3	-2	-1	0	1	2	3	4	5
$f(x)$	-36	a	16	b	12	4	0	6	28

    (b) Using a scale of 1 cm for each unit on the x-axis and 1 cm for each 5 units on the y-axis, draw the graph of $f(x)$ for $-3 \leq x \leq 5$. Label it clearly using IB conventions on the graph paper provided (other side).