



# SEKOLAH BUKIT SION – HIGH SCHOOL

## CHAPTER TEST: FUNCTIONS

NAME		DATE	
CLASS		TEACHER	MR EMAN

ANSWER ALL QUESTIONS. PROVIDE NECESSARY WORKING.

1.

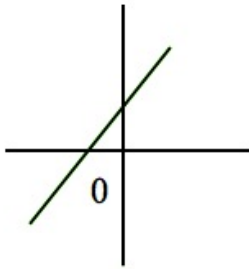


Figure 1

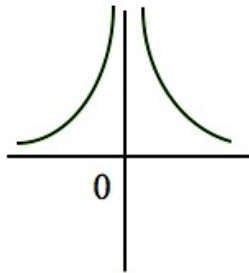


Figure 2

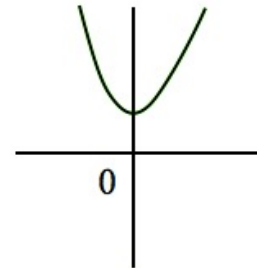


Figure 3

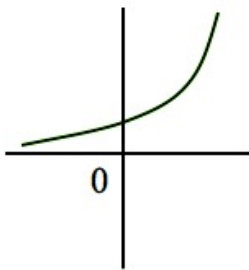


Figure 4

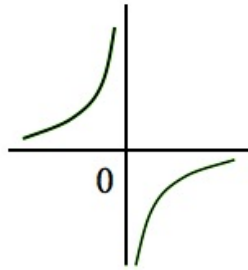


Figure 5

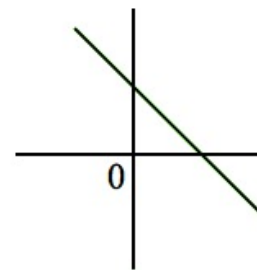


Figure 6

Which of the above could be the graph of

(a)  $y = \frac{-1}{x}$

Answer (a) Figure \_\_\_\_\_ [1]

(b)  $y = 1 - x$

Answer (b) Figure \_\_\_\_\_ [1]

(c)  $y = x^2 + 1$

Answer (c) Figure \_\_\_\_\_ [1]

Total Marks: \_\_\_\_\_

2.

(a) Given that  $f(x) = 2x + 3$  and  $g(x) = 1 - x$ ,

(i) Find  $g(-2)$

Answer : \_\_\_\_\_ [1]

(ii) Find  $f^{-1}(2)$

Answer : \_\_\_\_\_ [2]

(iii) Find  $gf(5)$

Answer : \_\_\_\_\_ [2]

(b) Given the function  $f(x) = 6 - \sqrt{5x + 1}$ , find  $f^{-1}(x)$ .

Answer : \_\_\_\_\_ [3]

Total Marks: \_\_\_\_\_

3. Using functions  $f(x) = 2x + 1$ ,  $g(x) = x^5$  and  $h(x) = \frac{1}{x}$ ,  
write the appropriate composite notations of the following composite functions.

**Example:**  $(2x + 1)^5$

**Appropriate composite notation:**  $gf(x)$

(i)  $\frac{1}{2x^5+1}$

*Answer :* \_\_\_\_\_ [1]

(ii)  $4x + 3$

*Answer :* \_\_\_\_\_ [1]

(iii)  $\frac{2}{x-1}$

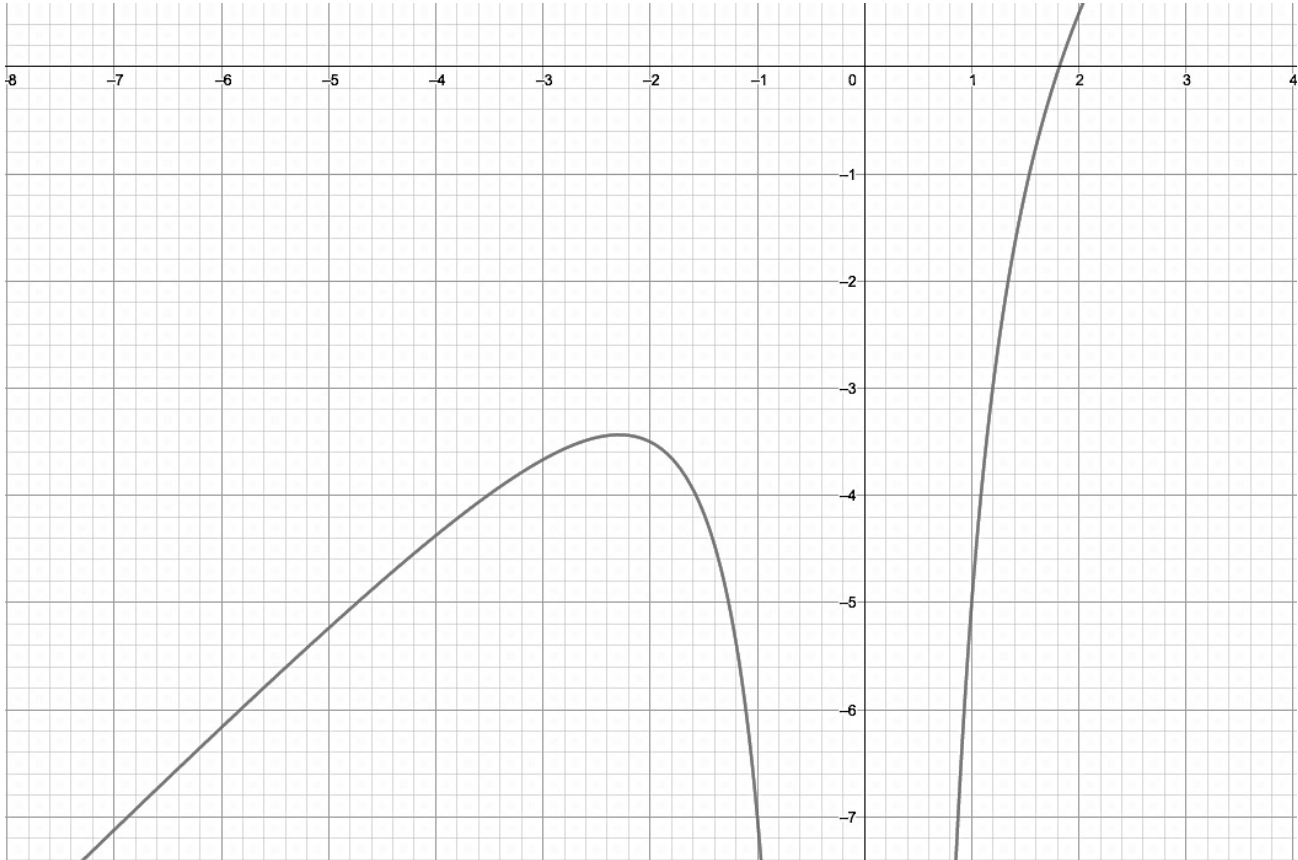
*Answer :* \_\_\_\_\_ [1]

4. Given the functions  $f(x) = 2x + 7$  and  $g(x) = x^3 - 1$ , solve  $(gf)^{-1}(x) = 1$ .

*Answer :* \_\_\_\_\_ [4]

Total Marks: \_\_\_\_\_

5. The diagram below shows the graph of the curve  $y = \frac{-6}{x^2} + x$ .



- (a) The point  $(h, -4\frac{1}{2})$  lies on the curve.  
Find all the possible values of  $h$ .

Answer : \_\_\_\_\_ [2]

- (b) The equation  $\frac{-6}{x^2} + x = k$  has **two or more solutions**.  
Write down all possible values of  $k$ .

Answer : \_\_\_\_\_ [2]

- (c) **By drawing a tangent line**, find the **gradient** of the curve at  $x = -5$ .  
**Show your entire working, leaving your answer in up to 2 decimal places.**

Answer : \_\_\_\_\_ [3]

Total Marks: \_\_\_\_\_

6. The variables  $x$  and  $y$  are connected by the equation  $y = 2^{x-2}$ .

**Without graphing,**

(a) write down the **coordinates** of the  $y$ -intercept of the curve.

*Answer :* \_\_\_\_\_ [1]

(b) explain what will happen to the graph of  $y = 2^{x-2} + 3$ .

..... [1]

(c) write down the equation of the straight line that must be drawn to solve

(i)  $2x - 2^{x-2} = -1$

*Answer :* \_\_\_\_\_ [2]

(ii)  $2^{x-3} = x + 2$

*Answer :* \_\_\_\_\_ [2]

Total Marks: \_\_\_\_\_

7. The function  $f(x) = px + q$  is such that  $f^{-1}(6) = 3$  and  $f^{-1}(-29) = -2$ .  
Find the values of  $p$  and  $q$ .

*Answer :* \_\_\_\_\_ [4]

Total Marks: \_\_\_\_\_

8. Given:  $f(x) = y = \frac{3+x}{x}$

(a) Complete the table of values below.

[2]

<b>x</b>	-5	-4	-3	-2	-1	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	2	3	4	5
<b>f(x)</b>	0.4	0.25		-0.5	-2			7	4	2.5		1.75	1.6

(b) Write down the **equation of the asymptotes** of the graph of  $f(x) = \frac{3+x}{x}$ .

Answer : \_\_\_\_\_ [1]

\_\_\_\_\_ [1]

(c) Using a scale of 2 cm to represent 1 unit on the  $x$ -axis and 2 cm to represent 2 units on  $y$ -axis, draw the graph of  $y = \frac{3+x}{x}$  for  $-5 \leq x \leq 5$ .

[4]

(d) **Use your graph to find**

(i) the value of  $y$  when  $x = 1.2$

Answer : \_\_\_\_\_ [1]

(ii) the value of  $x$  when  $y = -3.5$

Answer : \_\_\_\_\_ [1]

(e) **Using your graph, draw a suitable straight line to solve:**

(i)  $\frac{3+x}{x} = 0$

Answer : \_\_\_\_\_ [1]

(ii)  $\frac{3+x}{x} = 2$

Answer : \_\_\_\_\_ [1]

(iii)  $3 + x = x^2$

Answer : \_\_\_\_\_ [1]

(f) Find  $f^{-1}(x)$ .

Answer : \_\_\_\_\_ [3]

Total Marks: \_\_\_\_\_