

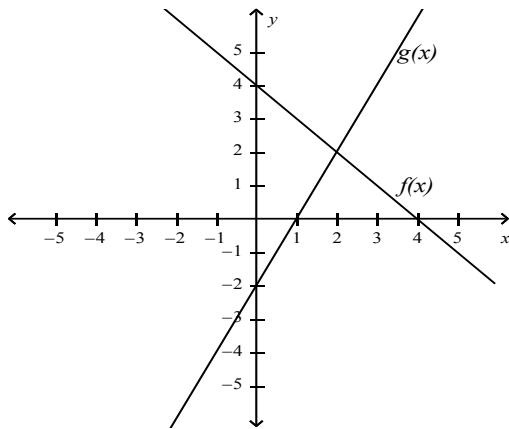
# Quiz unit 7

Name: \_\_\_\_\_

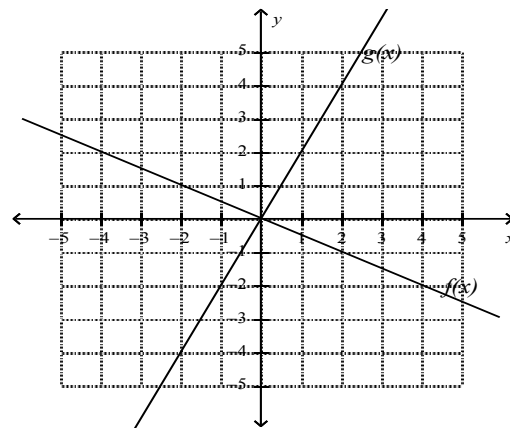
1. If  $f(x) = -3x + 5$  and  $g(x) = 9x - 2$ , what is the slope of the graph of the function  $(f - g)(x)$ ?

2. If  $f(x) = x + 4$  and  $g(x) = x - 4$ , what is the minimum value of the function  $(f \times g)(x)$ ?

3. In the graph shown, what is the value of  $(f \times g)(0)$ ?



4. The graphs of  $f(x)$  and  $g(x)$  are shown. What is  $g(f(4))$ ?

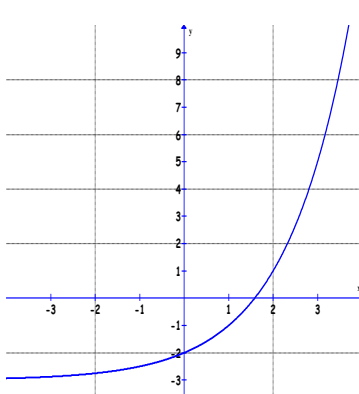


5. If  $f(x) = -12x^2 + 5$  and  $g(x) = 4x + 1$ , what is  $(g \circ f)(3)$ ?

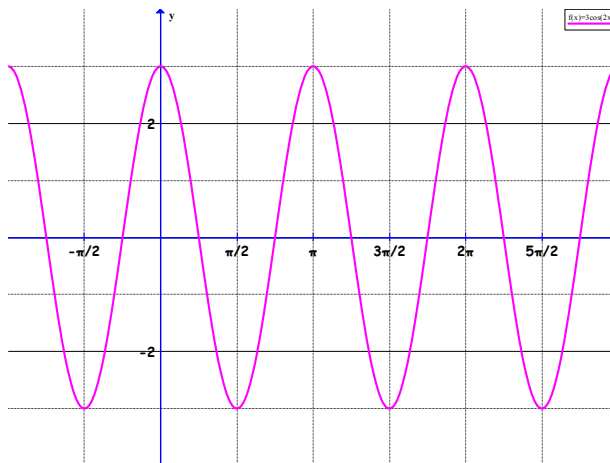
6. If  $f = \{(2,4), (5,7), (8,2)\}$  and  $g = \{(7,2), (2,6), (8,5)\}$ , determine

- a)  $g \circ f$  b)  $f \circ g$  c)  $(f \circ g)(7)$  d)  $(g \circ f^{-1})(2)$  e)  $(g \circ f)(x)$

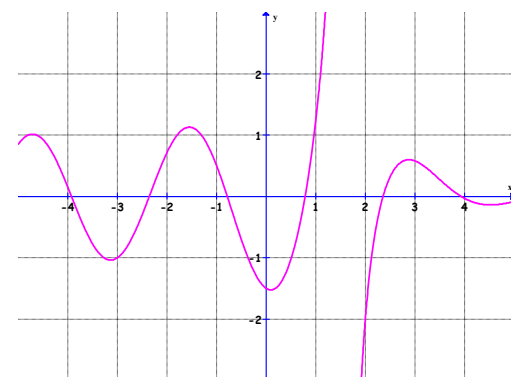
7. Given the two following functions, determine the operation of the two functions to produce the third. Practice a variety of combinations by using the graph software (padawan) Try to analyze the combinations.



$y = 2^x - 3$



$Y = 3\cos(2x)$



?

8. If  $f(x) = \sin x$  and  $g(x) = \cos x$ , what is the range of  $(f + g)(x)$ ?

a.  $\{y \in \mathbf{R} \mid -1 \leq y \leq 1\}$

c.  $\{y \in \mathbf{R} \mid 0 \leq y \leq \sqrt{2}\}$

b.  $\{y \in \mathbf{R} \mid 0 \leq y \leq 1\}$

d.  $\{y \in \mathbf{R} \mid -\sqrt{2} \leq y \leq \sqrt{2}\}$

9. If  $f(x) = \sqrt{5x+4}$  and  $g(x) = 4x + 5$ , what is the domain of  $(f + g)(x)$ ?

a.  $\{x \in \mathbf{R}\}$

c.  $\{x \in \mathbf{R} \mid x \leq -\frac{4}{5}\}$

b.  $\{x \in \mathbf{R} \mid x \geq -\frac{5}{4}\}$

d.  $\{x \in \mathbf{R} \mid x \geq -\frac{4}{5}\}$

10. If  $f(x) = \log x$  and  $g(x) = \frac{1}{x-7}$ , what is the domain of  $(g \circ f)(x)$ ?

a.  $\{x \in \mathbf{R} \mid x > 0\}$

c.  $\{x \in \mathbf{R} \mid x \neq 10,000,000\}$

b.  $\{x \in \mathbf{R} \mid x \neq 7\}$

d.  $\{x \in \mathbf{R} \mid x > 0 \text{ and } x \neq 10,000,000\}$

11. If  $f(x) = \cos^2 x$  and  $g(x) = \sin^2 x$ , what is  $(f + g)(\frac{\pi}{16})$ ?

12. If  $f(x) = \sec x$ , and if  $\tan x = 1$ , what is the value of  $(f \times f)(x)$ ?

13. Suppose  $f(x) = \frac{2}{x}$  and  $g(x) = 5x - 15$ . The graph of the function  $(f \circ g)(x)$  has a vertical asymptote at what value of  $x$ ?

14. If  $f(x) = \csc^2 x - \cot^2 x$  and  $g(x) = x + \pi$ , what is  $f(g(\frac{\pi}{4}))$ ?

15. If  $f(x) = \log x - 4$  and  $g(x) = \frac{1}{x+4}$ , for what value(s) of  $x$  is  $g(f(x))$  undefined?

16. Give an example of two functions, one of which has 2 zeros, another of which has no zeros, and the sum of which has 1 zero. Show that your functions satisfy the conditions.

17. Give an example of two functions  $f(x)$  and  $g(x)$  such that  $(f \circ g)(x)$  does not exist. Explain your answer.

## Answer Section

1. ANS: -12
2. ANS: -16
3. ANS: -8
4. ANS: -4
5. ANS: 9
6. a) (2,2), (8,3) b) (2,24) (8,10) c) 4 d) 2 e) (5,2)(8,6)
7.  $(3\cos(2x))/(2^x-3)$
8. ANS: D
9. ANS: D
10. ANS: D
11. ANS: 1
12. ANS: 2
13. ANS: 3
14. ANS: 1
15. ANS:  $x = 1$  or  $x \notin 0$
16. ANS: Answers may vary. One example is the functions  $f(x) = x^2 + 10x$  and  $g(x) = 25$ .  $(f + g)(x) = x^2 + 10x + 25 = (x + 5)^2$ , so  $f(x)$  has 2 zeros (at  $x = 0$  and  $x = -10$ ),  $g(x)$  has no zeros, and  $(f + g)(x)$  has 1 zero (at  $x = -5$ ).
17. ANS: Answers may vary. One example is the functions  $f(x) = \sqrt{x+2}$  and  $g(x) = -3$ . The range of  $g(x)$  is  $\{y \in \mathbf{R} \mid y = -3\}$ , and the domain of  $f(x)$  is  $\{x \in \mathbf{R} \mid x \geq -2\}$ . Since the range of  $g(x)$  does not overlap the domain of  $f(x)$ ,  $(f \circ g)(x)$  does not exist.