

Precalculus Summer Review: Please complete and there will be a pre-assessment 1<sup>st</sup> week of classes.

Given:  $f(x) = x^2 - 4$

$g(x) = x + 2;$

1. find  $f \circ g(x)$

2. find  $g \circ f(x)$

3. find  $f \circ g(3)$

Sketch the following graphs:

4.  $y = x^2 + 10x + 29$

5.  $y = (x - 4)^3 + 1$

6.  $y = |x + 3| - 2$

7.  $y = \pm \sqrt{x-2} + 3$

8.  $y = \frac{1}{x+4} - 3$

State the domain and range of each function:

9.  $f(x) = \sqrt{x-5}$

10.  $f(x) = |x + 9| - 3$

11.  $f(x) = x^2 - 6x + 2$

12.  $f(x) = \sqrt{2-\sqrt{x}}$

13.  $y = 4\sin(x+2)$

Name any discontinuities, horizontal or slant asymptotes for each of the following:

14.  $y = \frac{x^2 + x - 6}{x^2 + 2x - 8}$

15.  $y = \frac{x^2 + 3x - 4}{x + 7}$

16.  $y = \frac{x - 4}{x^2 + 9x - 22}$

17. Write as a single logarithm:  $2\log_4(x-3) + \log_4(2x)$

18.  $7^{x+4} = 96$

19.  $\log_3 17 = x$

20.  $e^{3x} = 28$

Find the exact values of the following:

21.  $\sin 240^\circ$

22.  $\sec \frac{-\pi}{6}$

23.  $\tan 180^\circ$

Prove the following identity:

24.  $\frac{\cos^2 \theta}{1 + \sin \theta} = 1 - \sin \theta$

Sketch the following graphs and find the values:

25.  $f(x) = \begin{cases} x^2 - 3 & x \leq 2 \\ 2x - 1 & x > 2 \end{cases}$

A.  $f(5)$

B.  $f(1)$

C.  $(f \circ f)(-3)$

26.  $f(x) = \begin{cases} |x+3| - 2 & \text{for } x \leq -2 \\ 1 + \sqrt{x+2} & \text{for } -2 < x \leq 2 \\ \frac{1}{2}x & \text{for } x > 2 \end{cases}$

A.  $f(-7)$

B.  $f(2)$

C.  $f(6)$

D.  $(f \circ f)(2)$  E.  $(f \circ f)(-6)$

Use the following functions for questions 27 – 36.

$$f(x) = \frac{1}{2}x^3 - 7x^2 + 9x + 7 \quad g(x) = \frac{2}{3}x - 8$$

Find the solution set for the following:

27.  $f(x) = 0$

28.  $f(x) = g(x)$

29.  $g(x) = 0$

30.  $f(x) > -5$

31.  $g(x) \geq f(x)$

32.  $f(x) > g(x)$

33. Over what interval(s) is  $f(x)$  increasing?

34. Over what interval(s) is  $f(x)$  decreasing?

35. What is/are the relative maximum(s) for  $f(x)$ ?

36. What is/are the relative minimum(s) for  $f(x)$ ?

Use the following functions for questions 37 – 42.

$$f(x) = 3\cos(2x + \pi) \left[ -\frac{\pi}{6}, \frac{7\pi}{4} \right] \quad g(x) = \frac{9}{8}x - 4$$

Find the solution set for the following:

37.  $f(x) = g(x)$

38.  $f(x) \leq g(x)$

39.  $f(x) = 0$

40.  $g(x) \leq f(x)$

41.  $f(x) > 3$

42.  $g(x) = 0$

43. Find the inverse of  $f(x) = \sqrt[3]{1 + x^3}$

Solve for x.

44.  $|2x + 1| > 11$

45.  $x^2 < 3x + 10$

46. Given:  $f(x) = 3x^2 + 4$  and  $g(x) = \frac{3x + 2}{2x - 1}$ , find:

a)  $f(2)$

b)  $g(x + 3)$

c)  $g(f(a))$

d)  $\frac{f(x + 2) - f(x)}{h}$