

Answer each non-graph question CLEARLY on the provided line.

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

ID: \_\_\_\_\_

1. (4 points) Find the center and radius of the circle given by the equation  $x^2 + y^2 + \frac{1}{2}x + 2y + \frac{1}{16} = 0$ .

1. \_\_\_\_\_

2. (4 points) Find all solutions  $t$  to  $t^2 - 6t + 1 = 0$ .

2. \_\_\_\_\_

3. (4 points) Find all solutions  $\theta$  to  $2\sec^2 \theta - 4 = 0$  for  $0 \leq \theta \leq 2\pi$ .

3. \_\_\_\_\_

4. (4 points) Perform the addition and subtraction  $\frac{2}{x} + \frac{3}{x-1} - \frac{4}{x^2-x}$  and simplify completely as one rational expression.

4. \_\_\_\_\_

5. (4 points) Solve  $\log(x) = 1 - \log(x - 3)$  for  $x$ .

5. \_\_\_\_\_

6. (4 points) Evaluate  $\tan^{-1}\left(\frac{-\sqrt{3}}{3}\right)$ .

6. \_\_\_\_\_

7. (4 points) Evaluate  $\cos\left(-\frac{7\pi}{6}\right)$  radians.

7. \_\_\_\_\_

8. (4 points) Determine the average rate of change of  $f(x) = x^3 - 5x^2$  between  $x = 5$  and  $x = 10$ .

8. \_\_\_\_\_

9. (4 points) The initial size of a bacteria culture is 1000. After one hour the bacteria count is 4000. After how many hours will the bacteria population reach 7000? Assume the population grows exponentially. (You may leave  $e$ ,  $\ln$ , or  $\log$  in your answer.)

9. \_\_\_\_\_

10. (4 points) Solve  $e^{3-5x} = 16$  for  $x$ . (You may leave  $e$ ,  $\ln$ , or  $\log$  in your answer.)

10. \_\_\_\_\_

11. (4 points) Solve the inequality  $\frac{x}{x+1} > 3$ . Express your answer in interval notation.

11. \_\_\_\_\_

12. (4 points) Simplify  $\frac{f(a+h)-f(a)}{h}$  completely when  $h \neq 0$  and  $f(x) = 3x^2 - 1$ .

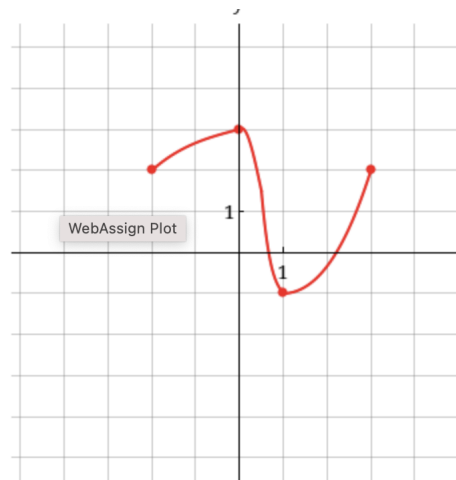
12. \_\_\_\_\_

13. (4 points) Find  $f^{-1}(x)$  when  $f(x) = \frac{1}{x+3}$ .

13. \_\_\_\_\_

14. (4 points) Find the range of  $f(x) = -\frac{1}{2}x^2 - 2x + 6$ .

14. \_\_\_\_\_



15. (4 points) Use the graph to find all the local maximum and minimum values of the function and the values of  $x$  at which each occurs.

15. \_\_\_\_\_

16. (4 points) Evaluate  $\cos\left(\frac{5\pi}{12}\right)$ .

16. \_\_\_\_\_

17. (4 points) Find  $\cos(\theta)$  given that  $\tan \theta = -\frac{4}{3}$  and  $\theta$  is in Quadrant IV.

17. \_\_\_\_\_

18. (4 points) Sketch the graph of  $F(x) = 25 - (x + 5)^2$ . Label vertex and all intercepts on your graph.

19. (4 points) Find an equation of the line passing through the points  $(-7, 3)$  and  $(10, 0)$ .

19. \_\_\_\_\_

20. (4 points) Find all solutions  $x$  to  $2 + \sqrt{9 - x} = x - 5$ .

20. \_\_\_\_\_

21. (4 points) Evaluate  $\log_2\left(\frac{1}{64}\right)$ .

21. \_\_\_\_\_

22. (4 points) Sketch the graph  $y = 2^{x-2} - 2$ . Label all intercepts and asymptotes on your sketch.

23. (4 points) Sketch the graph  $f(x) = -\log(x + 6)$ . Label all intercepts and asymptotes on your sketch. State the domain and range using interval notation.

24. (4 points) Sketch the graph of  $f(x) = x^2(x^2 - 25)$ .

25. (4 points) Sketch the graph  $y = -2 \tan\left(\frac{\pi x}{4}\right)$ .