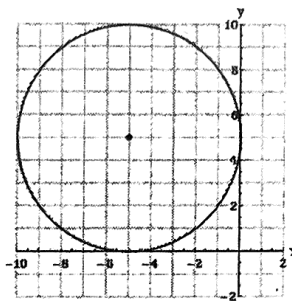


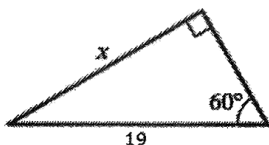
Name \_\_\_\_\_



1. (4 points) Find an equation of the circle shown.

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

2. (4 points) Find the side tan in your answer.

labeled  $x$ . You may leave sin, cos, or

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

3. (4 points) Solve the inequality  $x^2 + 11x \leq -30$ . Write your answer in interval notation.

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

4. (4 points) Sketch the graph of  $y = |x| - x$  by making a table of values.

5. (4 points) Find an equation of the line with x-intercept 6 and passing through the point (2, -3).

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

6. (4 points) Let  $f(x) = 9 - x^2$ . Find and simplify the difference quotient  $\frac{f(1+h)-f(1)}{h}$  completely.

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

7. (4 points) Solve  $\log(x) + \log(x - 3) = 1$  for x.

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

8. (4 points) Sketch the graph of  $y = \log_8(x - 8)$ . Find all the intercepts and asymptotes and label them clearly on your graph.

9. (4 points) Solve  $5^{3x-4} = \frac{1}{25}$  for  $x$ .

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

10. (4 points) Find the inverse function of  $f(x) = \frac{1}{x+3}$ .

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

11. (4 points) A table of values for  $f(x)$  is given

$x$	1	2	3	4	5	6
$f(x)$	3	4	8	1	5	0

Determine the average rate of change of  $f(x)$  between  $x = 1$  and  $x = 5$ .

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

12. (4 points) Sketch the graph of the piecewise defined function

$$f(x) = \begin{cases} 2x & \text{if } x \leq -1, \\ -(1+x)^2 & \text{if } x > -1. \end{cases}$$

13. (4 points) Simplify

$$\frac{(8x^3y^3)^{-\frac{1}{3}}}{(16x^4y^{-8})^{\frac{1}{2}}}$$

completely, writing your answer with only positive exponents.

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

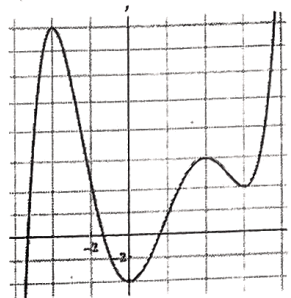
14. (4 points) A bacteria culture starts with 1000 bacteria. After 1 hour there are 2500 bacteria. Assuming the size of the culture grows exponentially, find the time required for there to be 5000 bacteria. (You may leave
- $\ln$
- ,
- $\log$
- , and (or)
- $e$
- in your answer).

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

15. (4 points) Find all solutions
- $t$
- to
- $2 \sin t + 1 = 0$
- for
- $0 \leq t \leq 2\pi$
- .

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

16. (4 points) Graph the function
- $y = 1 - \sqrt{x+6}$
- , not by plotting points, but by starting with the graph of a known function and then applying appropriate transformations.



17. (4 points) Find the the local maximum(s) of the graph.

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

18. (4 points) Perform the subtraction  $\frac{5}{x(2x-3)} - \frac{6}{(2x-3)^2}$  and simplify as one fraction.

18. \_\_\_\_\_

19. (4 points) Evaluate  $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ .

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

20. (4 points) Sketch the graph of one complete periods of the function  $y = -\frac{1}{2} \sin\left(\frac{1}{2}x\right)$ . Label all intercepts, maximums, and minimums.

21. (4 points) Evaluate  $\sin \frac{\pi}{12}$ .

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

22. (4 points) Find  $\tan t$  if  $\sin t = -\frac{4}{5}$  and  $\cos t > 0$ .

22. \_\_\_\_\_

23. (4 points) Solve  $\sin(2t) - \cos(t) = 0$  for  $t$  when  $-\pi \leq t \leq \pi$ .

23. \_\_\_\_\_

24. (4 points) Find all real solutions  $x$  to  $\frac{6}{x} = \frac{8}{7x} + 1$ .

24. \_\_\_\_\_

25. (4 points) Sketch the graph of the polynomial function  $P(x) = x^4 - x^3 - 20x^2$ . Label all intercepts.