Math 195 Sample Final Exam No Electronics

Name: _____ EMPLID: _____

1. (4 points) Evaluate and simplify $\frac{2}{3}(6-\frac{3}{2})-\frac{1}{2}$ as one fraction.

1. _____

2. (4 points) Simplify completely $\left(\frac{2a^{-1}b}{a^3b^{-4}}\right)^2$ and eliminate negative exponents.

2. _____

3. (4 points) Perform the indicated operation $(3-5y)^2$ and simplify.

3. _____

4. (4 points) Verify the identity $\frac{1}{1-\sin^2 t} = 1+\tan^2 t$.

5. (4 points) Evaluate $\cos(75°)$.

5. _____

6. (4 points) Evaluate $27^{-\frac{4}{3}}$ and simplify completely.

6. _____

7. (4 points) Solve $\tan^2\theta - 3 = 0$ for all $\theta$ in the interval $0 \leq \theta \leq 2\pi$.

7. _____

8. (4 points) Perform the division $\frac{2t+4}{t-1} \div \frac{t+2}{t^2-1}$ and simplify completely.

8. _____

9. (4 points) Solve $2(7 + e^{x+1}) = 100$ for $x$. You may leave $e$ or ln in your answer.

9. _____

10. (4 points) Find the inverse function of $f(x) = \frac{2-x^3}{5}$.

10. _____

11. (4 points) Solve $\log_4(x + 12) - \log_4(x - 3) = 1$ for $x$.

11. _____

12. (4 points) 250 mg sample of a radioactive element decays to 190 mg in 60 hours. After how many hours will the sample decay to 125 mg? You may leave $e$ and (or) ln in your answer.

12. _____

13. (4 points) Find the center and radius of the circle with equation $x^2 + y^2 + 6x - 4y + 10 = 0$.

13. _____

14. (4 points) Find an equation of the line that passes through the points $(-1, -2)$ and $(7, 6)$.

14. _____

15. (4 points) Evaluate $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$.

15. _____

16. (4 points) Find all real solutions $x$ of $\frac{1}{x-2} + \frac{1}{x+2} = \frac{6}{5}$.

16. _____

17. (4 points) Solve the inequality $x^3 < x^2 + 30x$. Express your answer in interval notation.

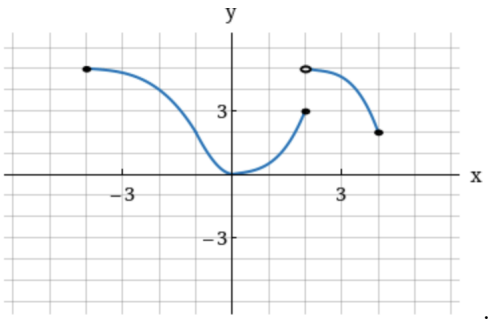
17. _____

18. (4 points) Given $f(x) = \begin{cases} 10 & x \leq 2 \\ 5 - x^2 & x > 2 \end{cases}$. Evaluate the net change $f(5) - f(-5)$.

18. _____

19. (4 points) Determine the average rate of change of $g(t) = \frac{8}{t}$ between $t = 1$ and $t = 1 + h$. Simplify your answer completely.

19. _____




20. (4 points) Find the range of the function whose graph is given . Express your answer in interval notation.

20. _____

21. (4 points) Sketch of the graph of $f(x) = -|x + 7| + 1$.

22. (4 points) For $h(x) = x + 1, f(x) = \frac{1}{\sqrt{x}}$ and $g(x) = x^2 - 4x$ find $g \circ f \circ h$.

22. _____

23. (4 points) Find the maximum value of $f(x) = -\frac{1}{2}x^2 - 4x + 10$.

23. _____

24. (4 points) Sketch of the graph of $f(x) = -2^x + 10$.

25. (4 points) Sketch one period of the graph of $y = 4\cos(\frac{1}{4}x)$.