Division of Science | The City College of New York | Department of Mathematics

MATH190 – College Algebra and Trigonometry

Summer 2024 Sample Final B

First Name:	Last Name:
EMPLID:	

Directions:

- **NO** notes, calculators, or other electronic devices allowed.

All electronic devices must be turned off and placed out of sight or they will be confiscated for the duration of the exam.

- Read each problem carefully. Unless otherwise instructed, be sure to show your work.
- Remember that it is your ***responsibility*** to answer each question clearly and in a way that convinces the grader that you understand how to solve each problem.

- GOOD LUCK!

Answer all 20 questions. ***You must show all of your work*** as neatly and clearly as possible and indicate the final answer in the provided region for each **non-graph** question. For all **graph** questions, you should sketch your graph on the grid provided.

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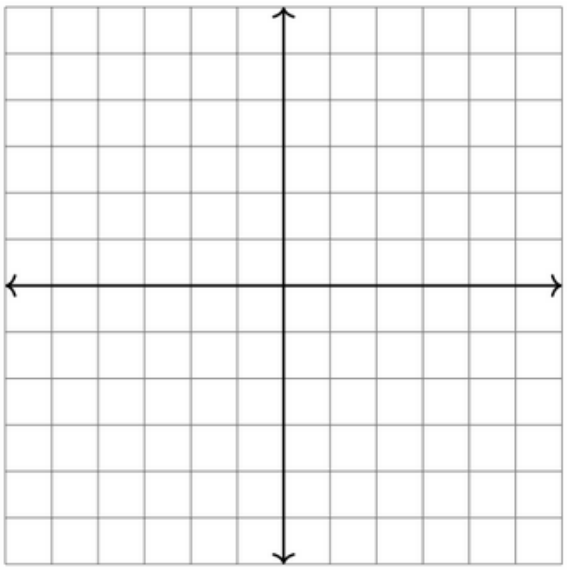
1. (5 points) Perform the indicated operation and simplify: $2x(1-x^3)+5x^2(x^3-x)$

Write your answer in the box below:

2. (5 points) Consider the linear equation $4x+2y=-8$.
   (a) (3 points) Sketch the graph of the equation on the grid below. Clearly label the intercepts on your graph.



   (b) (2 points) Find the slope of the linear equation.

3. (5 points) Use the Remainder Theorem to find the remainder:
$f(x) = x^3 - 8x + 7$ is divided by $x + 3$

Write your answer in the box below:

4. (5 points) Factor the expression completely: $(a^2 + 1)^2 - 7(a^2 + 1) + 10$

Write your answer in the box below:

5. (5 points) Solve the equation $\dfrac{x}{x-2} + \dfrac{1}{x+2} = \dfrac{8}{x^2-4}$ for x

Write your answer in the box below:

6. (5 points) Solve the radical equation $\sqrt{2x-1} = \sqrt{3x-5}$ for x.

Write your answer in the box below:

7. (5 points) The members of the senior class are planning a dance. They use the equation $r = pn$ to determine the total receipts. What is n expressed in terms of r and p?

Write your answer in the box below:

$n =$

8. (5 points) Perform the indicated operation and simplify: $\dfrac{x^2}{x^2-4} - \dfrac{x+1}{x+2}$

Write your answer in the box below:

9. (5 points) Solve the linear equation $3(x-4)+5=10$ for x.

Write your answer in the box below:

10. (5 points) Find an equation of the line that passes through the points $(2,-2)$ and is parallel to the line $2x-4y=3$. Express your answer in $y=mx+b$ form.

Write your answer in the box below:

11. (5 points) Solve the quadratic inequality $x^2 \leq 2x + 8$ and write the solution in interval notation.

Write your answer in the box below:

12. (5 points) Solve the inequality $\frac{1}{2}x - 3 \leq 4$ *or* $\frac{1}{3}(x - 6) \geq -2$. Write your solution in interval notation.

Write your answer in the box below:

13. (5 points) Solve the system or show that it has no solution.

$$\begin{cases} x + 4y = 6 \\ -2x + y = -3 \end{cases}$$

Write your answer in the box below:

14. (5 points) Simplify the expression below and eliminate any negative exponents.

$$\left(\frac{a^5 b^{-5}}{b^2}\right)^4$$

Write your answer in the box below:

15. (5 points) Find the x-intercept(s) of $y = \sqrt{9 - x^2}$. Write your answers in coordinate point form (x, y)

Write your answer in the box below:

16. (5 points) Suppose $f(x) = 3x^2 - x + 13$. Find and fully simplify $f(x + 5)$.

Write your answer in the box below:

$f(x + 5) =$

17. (5 points) Assume all variables are nonnegative. Simplify $(5\sqrt{7x^2})(3\sqrt{2x^8})$ completely.

Write your answer in the box below:

18. (5 points) Find the domain of the function $f(x) = \sqrt[6]{7x+2}$. Write your answer using interval notation.

Write your answer in the box below:

19. (5 points) How many real solutions does the quadratic equation $6m^2+3m-5=0$ have?

Write your answer in the box below:

20. (5 points) Sketch the graph of $g(x) = -2x(x-4)$ on the grid below. Label the vertex, zeros and local maximum on your graph.