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

MATH190 – College Algebra and Trigonometry

Summer 2024 Sample Final Exam A

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: $(8m^2+12m-5)-(2m^2-7m-1)$

Write your answer in the box below:

2. (5 points) Evaluate the expression $\dfrac{|-4x-2y|}{3}$ at $x=-1$ and $y=-2$.

Write your answer in the box below:

3. (5 points) Using long division to find the quotient $Q(x)$ of $(x^3 - 2x^2 - 6x + 27) \div (x + 3)$.

Write your answer in the box below:

4. (5 points) Factor the expression completely: $p^2 + pq - 12q^2$

Write your answer in the box below:

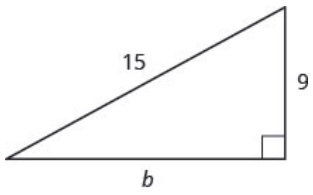
5. (5 points) Solve the polynomial equation $(3y + 5)^2 = 0$ for y.

Write your answer in the box below:

6. (5 points) Solve the linear equation $\frac{5y - 1}{3} + 4 = \frac{-8y + 4}{6}$ for x.

Write your answer in the box below:

7. (5 points) Find the length of the missing side b.



Write your answer in the box below:

$b =$

8. (5 points) Perform the indicated operation and simplify: $\dfrac{8a^2+16a}{a-4} \cdot \dfrac{a^2+2a-24}{a^2+7a+10} \div \dfrac{2a^2-6a}{a+5}$

Write your answer in the box below:

9. (5 points) Solve the absolute value equation $|3x - 4| = 8$.

Write your answer in the box below:

10. (5 points) The daily cost to the printing company to print a book is modeled by the function $C(x) = \frac{13}{4}x + 1500$ where C is the total daily cost in dollars and x is the number of books printed.Find $C(0)$. Explain what this result means.

Write your answer in the box below:

11. (5 points) Solve the rational inequality $\dfrac{x-3}{x+4} \leq 0$ and write the solution in interval notation.

Write your answer in the box below:

12. (5 points) Solve the inequality $\dfrac{3}{4}(x-8) \leq 3$ *and* $\dfrac{1}{5}(x-5) \leq 3$. 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.

$$\begin{cases} 3x - y = 0 \\ 5x + 2y = 22 \end{cases}$$

Write your answer in the box below:

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

$$\frac{2^2 x^4 x^6}{2x^5 x^{-1}}$$

Write your answer in the box below:

15. (5 points) Find the y-intercepts of the graph of the equation $x^2 - xy + y = 1$. Write your answers in coordinate point form (x, y)

Write your answer in the box below:

16. (5 points) **Use the Quadratic Formula** to solve the quadratic equation

$$2x^2 + 5x - 1 = 0$$

Write your answer in the box below:

17. (5 points) Solve the radical equation $3\sqrt{x-2}+5=17$ for x.

Write your answer in the box below:

18. (5 points) Find an equation of the line that passes through the points $(-2, 5)$ and $(-1, -3)$. Write your answer in $\mathbf{y = mx + b}$ form.

Write your answer in the box below:

19. (5 points) Let $f(x) = x^2 + 4x + 3$. Rewrite $f(x)$ in standard form by completing the square or you can use the formula $x = \frac{-b}{2a}$.

Write your answer in the box below:

20. (5 points) Sketch the graph of $f(x) = x^2 + 4x + 3$ on the grid below. Label the vertex, zeros and local minimum on your graph.