

Name: \_\_\_\_\_ Day/Time Class Meets: \_\_\_\_\_

**Instructions:**

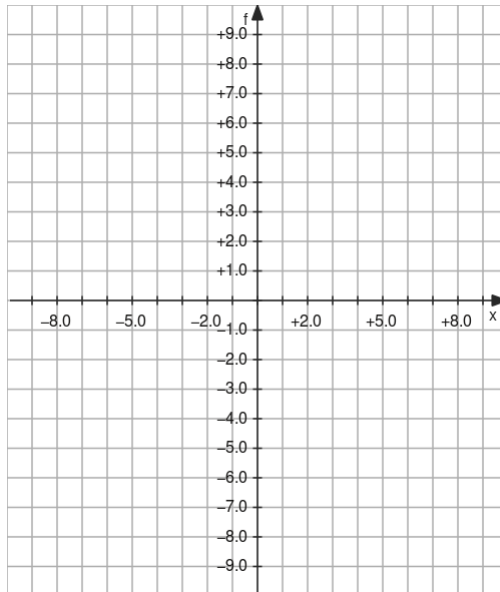
- Use pencil only.
- Work problems completely and clearly in the space provided. Place your answer(s) on the line(s) provided.
- Use backs of sheets for additional writing space, if necessary.
- Credit (partial or full) will be given only if sufficient steps leading to the solution are shown. In most problems, no credit will be given for answers only.
- No books or notes may be used on the exam.
- This exam has a total of 6 pages (including the cover page). Check to make sure you have a complete exam.
- Erase or cross out work that you do not want graded.

1. Find the slope-intercept equation of the line passing through  $(1, 6)$  and  $(2, -3)$ .

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2. (a) Graph the following equation in the space provided below:

$$f(x) = \begin{cases} 2x + 10, & \text{if } -8 \leq x < -2 \\ -x + 4, & \text{if } -2 \leq x < 3 \\ -3, & \text{if } 3 \leq x < 9 \end{cases}$$



(b) Give the interval(s) on which the function graphed below is increasing, decreasing, or constant.



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3. Simplify the following (Be sure to write your answers in the form  $a + bi$ ):

(a)  $(7 - 6i)(8 + 5i)$

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(b)  $\frac{2 + 7i}{3 + 4i}$

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4. Write an equation for the function that has a graph in the shape of  $y = |x|$  but if shifted to the right 4 units, reflected over the  $x$ -axis, and then shifted up 2 units.

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5. Find the slope intercept equation for a line that is perpendicular to  $y = 2x + 4$  and passes through the point  $(3, 5)$ .

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6. Solve  $2x^2 - 4x + 7 = 0$ .

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7. Given  $f(x) = x + 4$  and  $g(x) = \sqrt{x - 6}$ , find the following and then find the domain:

(a)  $\frac{f}{g}(x)$

(b)  $(g \circ f)(x)$

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8. Use the method of completing the square to write the equation  $f(x) = -3x^2 + 9x - 4$  in vertex form. Then find the vertex and axis of symmetry.

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9. Use the discriminant to determine whether the following equation has one real solution, two distinct real solutions, or two complex solutions (**No credit will be given for any other method.**):

$$-6x^2 + 7x + 9 = 0.$$

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10. I want to make a pen for my dog Molly in the backyard. She loves the outdoors, but also loves to jump the fence! Being a graduate student, I can only afford 48 feet of fencing. What is the maximum area I can provide for Molly to play in? What are the dimensions of her new pen?