

Name: \_\_\_\_\_ 7/19/2022

Answer each question in the space provided and write your final answer to each question on the answer line. Simplify all fractions and radical expressions. If you need more room, you can continue your work on the back of the page. Good luck!

1. (5 points) Give an equation for the line through the points  $(-1, -2)$  and  $(5, 4)$ .

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

2. (5 points) Find an equation for the line through  $\left(\frac{1}{2}, -\frac{2}{3}\right)$  that is perpendicular to the line  $6x - 12y = 1$ .

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

3. (5 points) Give an equation for the line through  $(4, -7)$  that is  
(a) horizontal;

(a) \_\_\_\_\_

(b) vertical.

(b) \_\_\_\_\_

4. (5 points) Find all real solutions of the equation  $x^2 - 8x + 1 = 0$ .

4. \_\_\_\_\_

5. (5 points) Find all real solutions of the equation  $\frac{6}{x} - \frac{3}{x-5} + 2 = 0$ .

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

6. (5 points) Find all real solutions of the equation  $\sqrt{5x+9} + 3 = x$ .

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

7. (5 points) Use interval notation to state the solutions to the inequality  $\frac{1}{3} - \frac{1}{2}x \geq \frac{1}{6} + x$ .

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

8. (5 points) Use interval notation to state the solutions to the inequality  $x^2 - 2x > 8$ .

8. \_\_\_\_\_

9. (5 points) Let  $f(x) = \frac{x^2 + 4}{5}$ . Evaluate  $f(a - 2)$ .

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

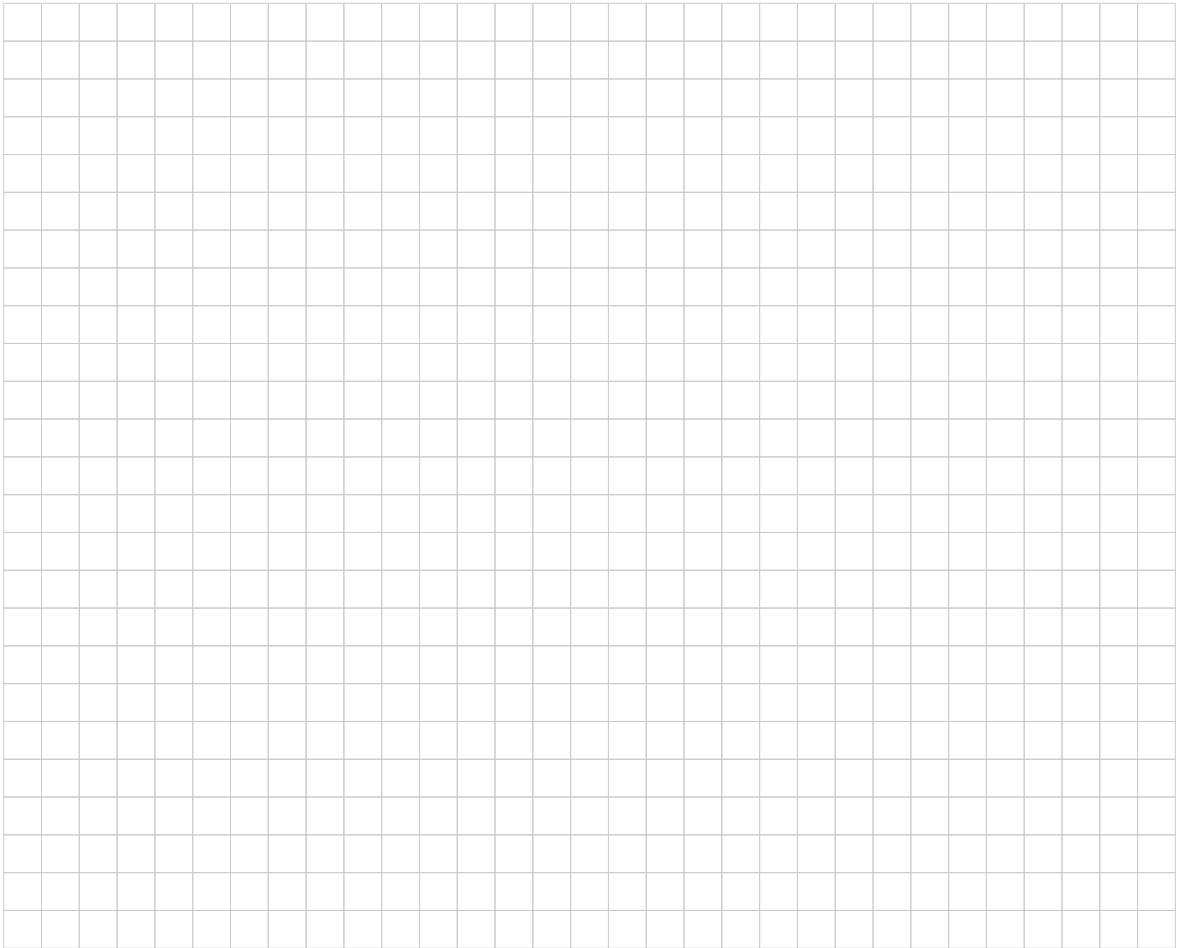
10. (5 points) Find the domain of the function  $g(x) = \frac{\sqrt{x}}{x - 6}$

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

11. (5 points) Find the inverse of the function  $f(x) = 6 + \sqrt{8 + x}$ .

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

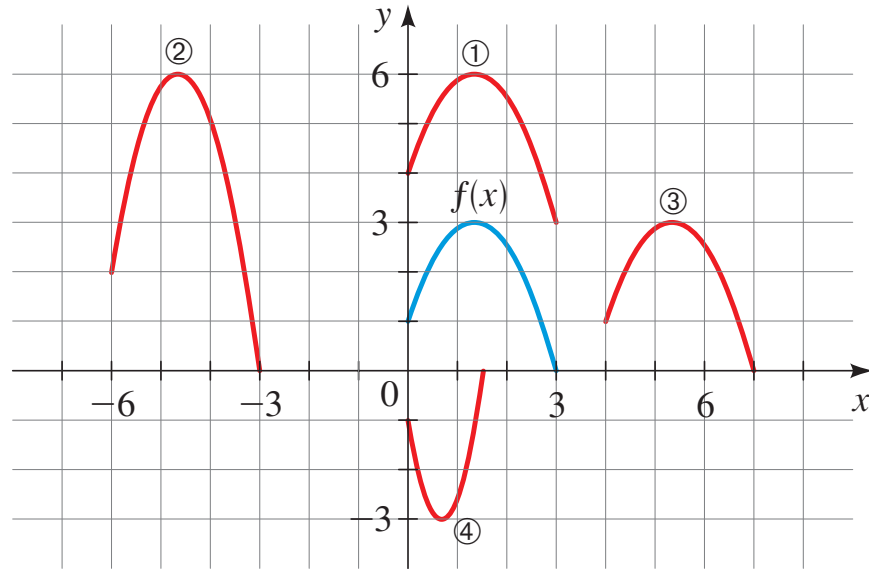
12. (5 points) Sketch a graph of the piecewise defined function  $f(x) = \begin{cases} 3 + x & \text{if } x < -2 \\ 1 + 2x & \text{if } -2 \leq x < 3 \\ 4 & \text{if } x \geq 3 \end{cases}$ .



13. (5 points) Use interval notation to state the range of the quadratic function  $f(x) = 7 - 8x - x^2$ .

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

14. (5 points) The graph of  $y = f(x)$  is given. Match each equation with its graph (# 1-4).



(a)  $y = f(x - 4)$

(a) \_\_\_\_\_

(b)  $y = f(x) + 3$

(b) \_\_\_\_\_

(c)  $y = 2f(x + 6)$

(c) \_\_\_\_\_

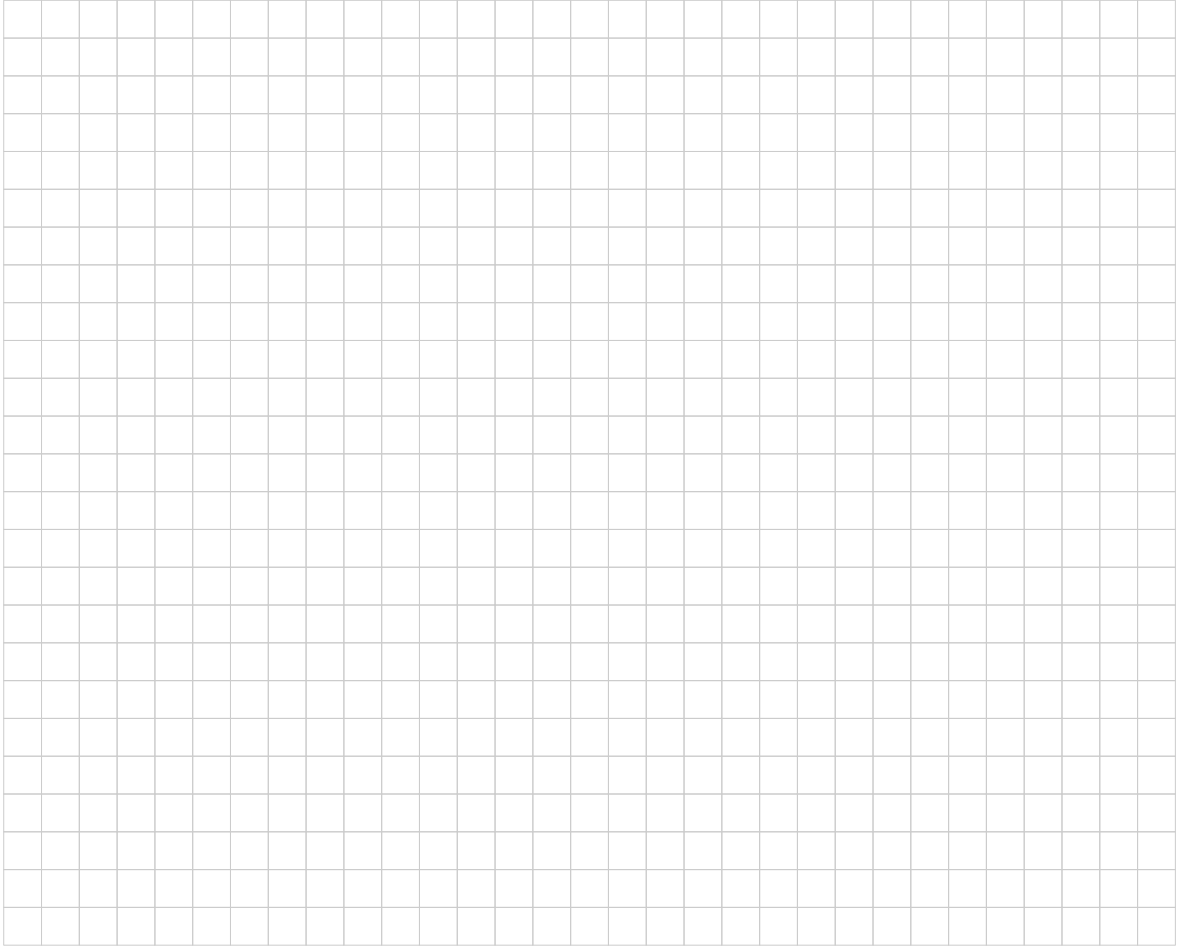
(d)  $y = -f(2x)$

(d) \_\_\_\_\_

15. (5 points) True or false:  $f(x) = \frac{2}{3x + 5}$  is the inverse of  $g(x) = \frac{2 - 5x}{3x}$ .

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

16. (5 points) Sketch the graph of  $y = 1 - \sqrt{x + 4}$  not by plotting points, but by starting with the graph of a standard function and applying transformations.



17. (5 points) Describe the end behavior of the graph  $y = -\frac{1}{3}x^5 - 6x^4$ .

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

18. (5 points) Let  $f(x) = 3x - 4$  and  $g(x) = x^2 + 2x + 5$ . Evaluate the following.

(a)  $f(g(x))$

(a) \_\_\_\_\_

(b)  $g(f(x))$

(b) \_\_\_\_\_

(c)  $f(f(0))$

(c) \_\_\_\_\_



19. (5 points) Sketch the parabola  $y = x^2 - 4x - 2$ . Label the vertex and all  $x$  and  $y$  intercepts.  
*Hint: It may help to first put the parabola in standard form.*



20. (5 points) Sketch the graph  $y = -2x^4 - x^3 + 3x^2$ . Label all  $x$  and  $y$  intercepts and indicate the correct end behavior.

