

Name: \_\_\_\_\_

Each question is worth 5 points. Show your work in the space provided and write your final answer *neatly* on the answer line. Good luck!

1. Simplify  $\left(\frac{1}{3} + \frac{3}{4}\right)\left(1 - \frac{1}{7}\right)$ .

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

2. Simplify  $\left(\frac{15}{2 + \frac{1}{2}}\right)^2$ .

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

3. Simplify  $\left(\frac{-4x^5y^{-7}}{3x^{-3}y}\right)^{-1}$  and eliminate any negative exponents.

3. \_\_\_\_\_

4. Perform the multiplication  $9x^{3/2}\left(7\sqrt{x} - \frac{6}{\sqrt{x}}\right)$  and simplify.

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

5. Evaluate  $\left(\frac{27}{8}\right)^{-2/3}$ .

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

6. Factor  $-2x^4 + 28x^3 - 64x^2$  completely.

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

7. Perform the division  $\frac{9x^2 - 1}{x^2 + 2x + 1} \div \frac{3x^2 - 2x - 1}{x^2 - 1}$  and simplify.

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

8. Perform the addition/subtraction  $\frac{1}{2} - \frac{2}{x+2} + \frac{4}{(x+2)^2}$  and simplify.

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

9. Find all real solutions of the equation  $x^2 - 8x = -13$ .

10. Find all real solutions of the equation  $\frac{9}{x} + 4 = \frac{7}{x-2}$

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

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

11. Solve the equation  $P = \frac{nRT}{V}$  for  $V$ .

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

12. Solve the nonlinear inequality  $6(x - 1) \leq x(x - 1)$ . Express your answer using interval notation.

12. \_\_\_\_\_

13. Find all real solutions of the equation  $\sqrt{8-x} + 2 = x - 4$ .

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

14. Find the center and radius of the circle with the equation  $x^2 + y^2 + 4x = 9 + 12y$ .

14. \_\_\_\_\_

15. Give an equation for the line that passes through the points  $(-1, -2)$  and  $(4, 3)$ .

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

16. Evaluate and simplify  $\frac{f(a+h) - f(a)}{h}$  when  $f(x) = 4x^2 - 3x + 9$ .

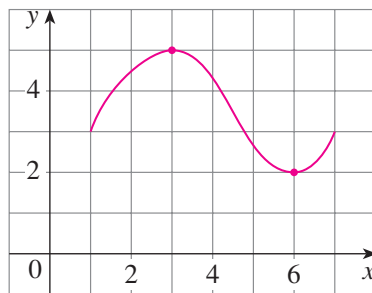
16. \_\_\_\_\_



17. Find the domain of the function  $g(x) = \frac{\sqrt{x}}{x^2 - 25}$ . Express your answer using interval notation.

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

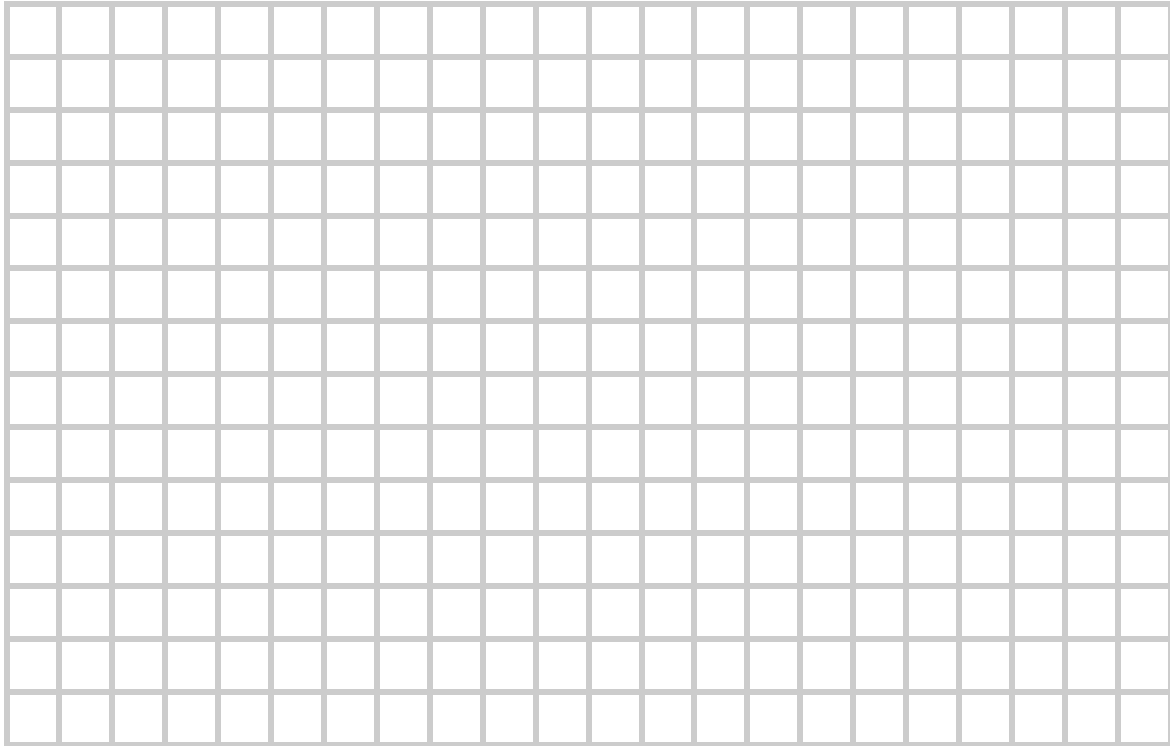
18. The graph  $y = f(x)$  is shown below. Use interval notation to state the interval(s) on which  $f$  is increasing and find the average rate of change in  $f$  from 3 to 7.



18. \_\_\_\_\_

19. Sketch the graph  $y = |2x| - x - 2$  by first completing the table of values below and then plotting points.

$x$	$y$
-4	
-3	
-2	
-1	
0	
1	
2	
3	



20. Sketch the graph of the following piecewise defined function.

$$f(x) = \begin{cases} \frac{1}{3}x + 1 & \text{if } x < 3 \\ 4 & \text{if } x = 3 \\ 1 & \text{if } x > 3 \end{cases}$$

