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 $\left(3+\frac{1}{4}\right)\left(1-\frac{4}{5}\right)$.

1. ______________________

2. Simplify $\left(\frac{1+\frac{1}{4}}{1+4}\right)^2$.

2. ______________________

3. Simplify $\left(\frac{x^8y^{-4}}{16y^{4/3}}\right)^{-1/4}$ and eliminate any negative exponents.

3. ______________________

4. Evaluate $\left(\dfrac{4}{9}\right)^{-3/2}$.

4. ______________________

5. Factor $-3x^3 + 6x^2 - 3x$ completely.

5. ______________________

6. Perform the division $\dfrac{x+3}{4x^2-9} \div \dfrac{x^2+7x+12}{2x^2+7x-15}$ and simplify.

6. ______________________

7. Perform the addition $\dfrac{1}{x+3} + \dfrac{1}{x^2-9}$ and simplify.

7. ______________________________

8. Find all real solutions of the equation $x^2 = 2x + 15$.

8. ______________________________

9. Factor $x^4 - 1$ completely.

9. ______________________________

10. Solve the equation $P = 2l + 2w$ for w.

10. ______________________________

11. Solve the inequality $x^2 < 3(x+6)$. Expres your answer using interval notation.

11. ____________________

12. Find all real solutions of the equation $1 + \sqrt{6-x} = x - 3$.

12. ____________________

13. Find the radius of the circle with the equation $x^2 + y^2 + 6y + 2 = 0$.

13. ____________________

14. Find the y-intercept of the line that passes through the points $(1, 1)$ and $(5, -1)$.

14. ____________________

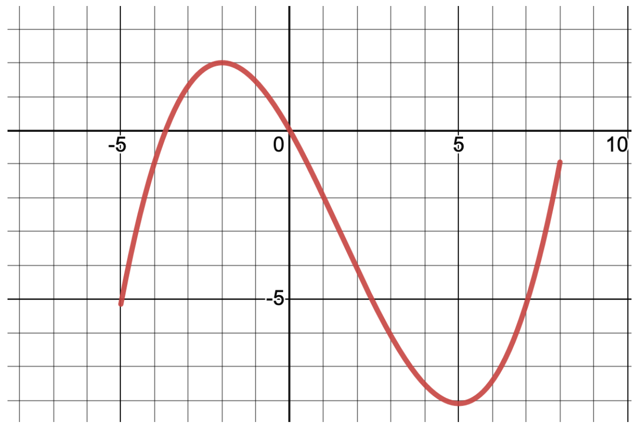
15. Evaluate and simplify $\dfrac{f(a+h)-f(a)}{h}$ when $f(x) = 2x^2 + 5x - 4$.

15. ______________________

16. Find the domain of the function $g(x) = \dfrac{\sqrt{2+x}}{3-x}$. Express your answer using interval notation.

16. ______________________

17. The graph $y = f(x)$ is shown below. List the intervals (if any) on which f is increasing.



17. ______________________________

18. Use the graph from the previous question to approximate

    (a) the net change in f from -2 to 2, and

    (b) the average rate of change in f from -2 to 2.

18. ______________________________

19. Sketch the graph $y = |x+1| + x$ by first completing the table of values below and then plotting points. State the domain and range of f using interval notation on the answer line.

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

19. ______________________________

20. Sketch the graph of the piecewise defined function $f(x) = \begin{cases} 2x+3 & \text{if } x < 1 \\ 3-x & \text{if } x \geq 1 \end{cases}$ below.