You have 2hr 15min. Answer each non-graph question neatly on the line provided.

Name: _____ ID: _____

1. (4 points) Simplify $\frac{1}{2} + \frac{2}{5} - 10$ completely as one reduced fraction.

1. _____

2. (4 points) Simplify $\frac{2^2 z^4 z^6}{2 z^5 z^{-1}}$ completely without using negative exponents.

2. _____

3. (4 points) Evaluate $27^{-\frac{2}{3}}$ and simplify completely.

3. _____

4. (4 points) Sketch the graph of $f(x) = -3^x + 3$. Label all asymptotes on your graph for full credit.

5. (4 points) Simplify $\frac{z^2+6z-16}{z^2-4}$.

5. _____

6. (4 points) Perform the addition $\frac{x}{(x+7)^2} + \frac{8}{x+7}$ and simplify completely.

6. _____

7. (4 points) Find the domain of $\frac{1}{\sqrt{x-3}}$. Answer using interval notation.

7. _____

8. (4 points) Sketch the graph of the piecewise function

$$f(x) = \begin{cases} 2 & \text{if } x < 1 \\ 5 - x^2 & \text{if } x \geq 1 \end{cases}$$

9. (4 points) Solve $\frac{5x-10}{5x+3} = \frac{3}{4}$ for x.

9. _____

10. (4 points) Find an equation of the line that passes through the point $(-1, -2)$ and is parallel to the line $x + 2y = 1$.

10. _____

11. (4 points) Find $f^{-1}(28)$ when $f(x) = x^3 + 1$. Simplify your answer.

11. _____

12. (4 points) Sketch the graph of $y = -(x - 7)^2$.

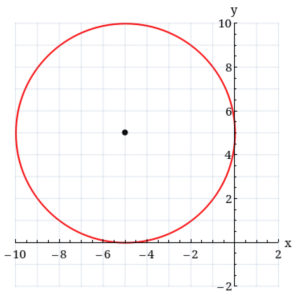
13. (4 points) Solve $-6 < 4 - 2x$ for x. Express your answer using interval notation.

13. _____

14. (4 points) Use $f(x) = 2x + 5$ and $g(x) = 3 - x^2$ to evaluate $(g \circ f)(-1)$. Simplify your answer.

14. _____

15. (4 points) Find an equation of the circle shown.



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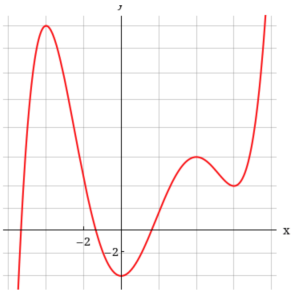
15. _____

16. (4 points) Sketch the graph of $g(x) = 1 - 4x - x^2$. Label the vertex on your graph for full credit.

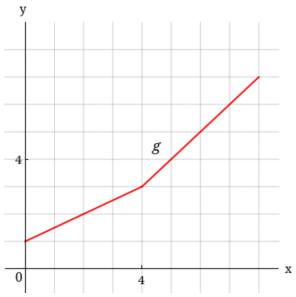


17. (4 points) Find the interval(s) where the function whose graph is given is decreasing. Express your answer in interval notation on the answer line.

17. _____

18. (4 points) Solve $F = G\frac{mM}{r^2}$ for G.

18. _____

19. (4 points) Use the graph 

to evaluate $g^{-1}(3)$

19. _____

20. (4 points) Solve $7x^2 - 63 = 0$ for x.

20. _____

21. (4 points) Multiply $(4x + 5)(2x - 6)$ and simplify completely.

A. $8x^2 + 14x - 30$
B. $8x^2 + 24x + 30$
C. $8x^2 + 39x - 30$
D. $8x^2 - 14x - 30$
E. none of these

21. _____

22. (4 points) Evaluate $\log_{100}(.1)$

A. 10

B. $\frac{1}{2}$

C. $-\frac{1}{2}$

D. $-\frac{1}{10}$

E. none of these

22. _____

23. (4 points) Find the average rate of change of $f(t) = 8t^2$ between $t = \frac{1}{4}$ and $t = \frac{1}{2}$.

A. 6

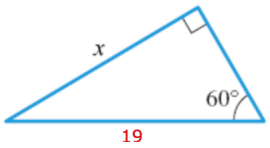
B. $\frac{3}{2}$

C. $-\frac{1}{4}$

D. $-\frac{-3}{2}$

E. none of these

23. _____

24. (4 points) Find the side 

labeled x. You may leave sin, cos, or tan in your answer.

A. $\frac{19}{\sin 60°}$

B. $19 \sin 60°$

C. $\frac{19}{\cos 60°}$

D. $19 \cos 60°$

E. none of these

24. _____

25. (4 points) Evaluate $\cos\left(\frac{3\pi}{4}\right)$.

A. $\frac{\sqrt{2}}{2}$

B. $\frac{2}{\sqrt{2}}$

C. $-\frac{\sqrt{2}}{2}$

D. $-\frac{2}{\sqrt{2}}$

E. none of these

25. _____

26. (4 points) Sketch the graph $g(x) = -\sqrt{x+6}$