

1. (20 pts) Starting with $f(x) = 3^x$, sketch the graph of $g(x) = -5 \cdot 3^{x-6} + 7$ in 4 steps (counting $f(x) = 3^x$ as the first step). Use $x = -1$, $x = 0$, and $x = 1$ to find 3 points in the first graph, and show how these 3 points are moved around by each step in the transformation to $g(x)$. Your final graph should also show the y -intercept and, for 5 bonus points, the x -intercept.

2. Let $f(x) = \sqrt{3x-9}$ and $g(x) = \frac{1}{x-5}$.
- (8 pts) What is the domain of f ?
 - (7 pts) What is the domain of g ?
 - Determine the following composite functions. You don't need to simplify. In fact, I recommend you do not.
 - (5 pts) $(f \circ g)(x)$
 - (5 pts) $(g \circ f)(x)$
 - (5 pts) What is the domain of $(f \circ g)(x)$? Now, you should simplify $(f \circ g)(x)$. Hint: The final domain is an interval of length $\frac{1}{2}$. Very small domain.

3. (5 pts) What is the domain of $\sqrt{\frac{(x-5)(x+2)^3}{(x-8)^2}}$?

4. (5 pts) Let $f(x) = 5^{2x-5} - 3$. Find $f^{-1}(x)$.

5. Find the geometric sums:

a. (10 pts) $5 + 10 + 20 + 40 + \dots + 320$

b. (5 pts) $\sum_{n=1}^{\infty} 3 \cdot \left(\frac{5}{7}\right)^{n-1}$

6. (5 pts) Solve $\log_2(x+14) + \log_2(x+18) = 5$.

