Math 7A Test 3 Name:_____

Show all necessary steps clearly, neatly, systematically to receive full credit.

1. (5 pts) Write $\ln\left[\dfrac{5x^2\sqrt[3]{1-x}}{4(x+1)^2}\right]^2$ as a sum and difference of logarithms. Express all powers as factors.

2. (5 pts) Write $\frac{1}{3}\log(x-2)-\frac{2}{3}\log(x+4)+\frac{1}{3}\log(x+1)-\frac{2}{3}\log\left(\frac{4}{x}\right)$ as a single logarithm.

3. (5 pts) Solve: $-1+9\log_4(7x+8)=17$.

4. (5 pts) Solve: $9^{2x}\cdot 27^{x^2}=3^{-1}$.

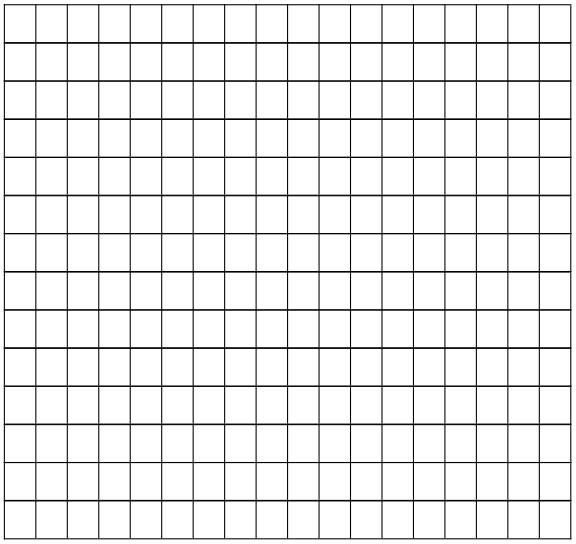
5. (5 pts) Solve: $4^{3x+3} \cdot 64^{-x} = 1$.

6. (5 pts) Let $f(x) = \left(\frac{1}{16}\right)^x$ and $g(x) = \left(\frac{1}{4}\right)^{x-2}$.

Solve $\frac{f(x)}{g(x)} = 32$.

7. (5 pts) Let $f(x) = a^x$, show that $f(A-B) = \frac{f(A)}{f(B)}$.

8. (5 pts) Consider the graph and solve the following inequality.



a. $f(x) > 0$.

b. $g(x) < 0$.

c. $g(x) \geq f(x)$.

d. $f(x) < g(x)$.

e. $f(x) \geq g(x)$.

9. (7 pts) Let $f(x) = 6x^2 - 2x$ and $g(x) = 6 + 3x$. Solve $f(x) < g(x)$.

10. (7 pts) Find the inverse function of given one-to-one function: $f(x) = \dfrac{3x+4}{2x-3}$.

11. (7 pts) Find a quadratic function $f(x) = ax^2 + bx + c$ whose vertex is (- 1 , - 9) and x-intercept (- 4 , 0).

12. (7 pts) Let $f(x) = 4x^2 - 8x + 3$.

a. Find vertex.

b. Find axis of symmetry.

c. Write in $f(x) = a(x-h)^2 + k$ form.

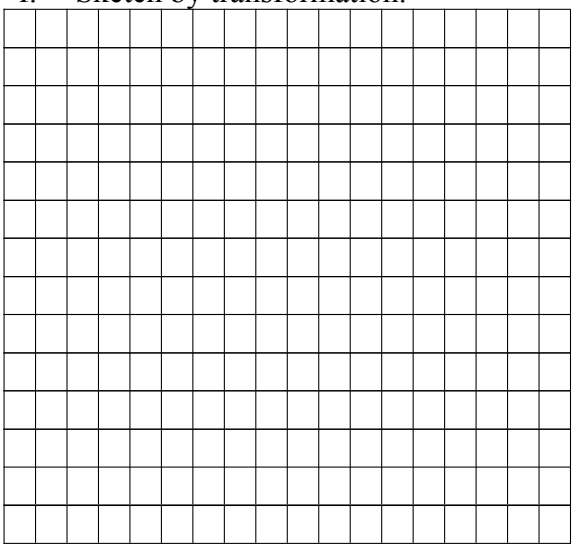
d. Find maximum or minimum function value.

e. Find increasing and decreasing interval.

Increasing: _____

Decreasing: _____

f. Sketch by transformation.



13. (7 pts) A ball is thrown vertically upward with an initial velocity of 96 feet per second. The distance s (in feet) of the ball from the ground after t seconds is $s(t) = 96t - 16t^2$.

a. When will the ball reach the maximum height?

b. What is its maximum height?

c. When will it strike the ground?

d. For what time is the ball more than 128 feet above the ground?

14. Let $f(x)=x^2+4$, $g(x)=\sqrt{x-2}$, $h(x)=\dfrac{x+4}{x-5}$, $k(x)=3\log_3(x+1)$.

a. Find domain of $(h\circ f)(x)$.

b. Find domain of $(g\circ f)(x)$.

c. Find domain of $(h\circ g)(x)$.

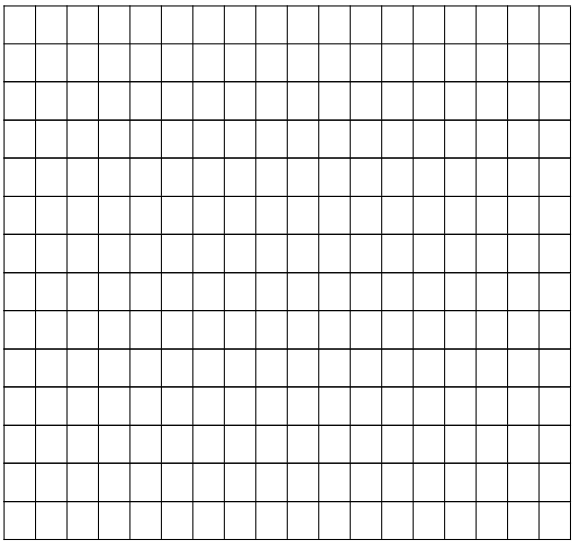
d. Find domain of $(g\circ h)(x)$.

e. Find domain of $(k\circ h)(x)$.

f. Find domain of $(h\circ g\circ f)(1)$.

15. Let $f(x) = 2 \cdot 3^{\frac{1}{2}(x-1)} - 6$.

a. Graph $f(x)$ by using transformation from $f(x) = 3^x$. State the domain and range.



b. Graph $f^{-1}(x)$ buy using the graph of part (a). State the domain and range.