

Name \_\_\_\_\_

- You have 20 minutes
- No calculators
- Show sufficient work

1. (4 points) A bacterial culture starts with 300 bacteria and doubles in size every 4 hours.

(a) Find a formula for the number of bacteria after  $t$  hours.

(b) At what time is the population equal to 1500 ?

2. (3 points) Determine all values of  $x$  which satisfy the equation below.

$$2 \ln(9) + 3e^x = \ln(81) + 24e^{-2x}$$

3. (3 points) The function  $h(x) = \sqrt{3 + \ln(5e^{2x} + 9)}$  is one-to-one. Determine a formula for its inverse  $h^{-1}(x)$ .