

7. [4 points]

Find all possible solutions w to the equation $\frac{2e^{9(w-1)}}{7} = 3$. Be sure to show all your steps, give your answer in **exact** form, and **circle** your final answer.

Solution: We can multiply both sides by $\frac{7}{2}$ to get

$$e^{9(w-1)} = \frac{21}{2}$$

Taking \ln of both sides then gives

$$9(w-1) = \ln\left(\frac{21}{2}\right) = \ln(21) - \ln(2)$$

and solving for w , we get

$$w = \frac{\ln(21) - \ln(2)}{9} + 1$$

8. [5 points]

Consider the function

$$R(q) = \frac{5q + 3}{4 - q}$$

Find a formula for its inverse. Be sure to show all your steps, and **circle** your final answer.

Solution: If we let $W = R(q)$, then we can set

$$W = \frac{5q + 3}{4 - q}$$

Solving for q in terms of W , we get

$$W(4 - q) = 5q + 3$$

Putting all the q terms to the same side gives

$$5q + Wq = 4W - 3$$

And using that $5q + Wq = q(5 + W)$, we divide to get

$$q = \frac{4W - 3}{5 + W}$$

Hence our function for the inverse should be

$$R^{-1}(W) = \frac{4W - 3}{5 + W}$$