

Do NOT write your name anywhere. (Canvas will tell me who turned in the assignment.) Take pictures of your written answers and use your own software or <https://pdfcandy.com/> to create a single PDF size A4. (pdfcandy.com will convert many file types to PDF, resize PDF, merge PDF and many other things for free. However, Apple phones may require using [CamScanner](#) before using pdfcandy.com.) Failure to follow these directions will cost you 10 points.

Show all work for all mathematical questions.

1) (15 points each) For these equations, do all of the formal tests to determine if it is a valid utility function. Is it a valid utility function?

A) $U(G, H) = 16G^{1/2}H^{1/2}$

B) $U(B, V) = 12B^{3/2}V^{-3/4}$

C) $U(W, Y) = 16W^{1/2} + 16Y^{1/2}$

2) (10 points each) What transformation of the utility function would help you to maximize it more simply? Prove it is a valid transformation. Find $T(U)$.

A) $U(A, Z) = 12A^{1/2}Z^{1/4}$

B) $U(K, N) = 8K^{2/5}N^{2/3}$ (ignore that this is an invalid utility function.)

3) (35 points) Find the total cost function, average total cost, and marginal cost functions for $Q = 8K^{1/2}L^{1/4}$ when capital costs \$10/K and labor costs \$20/L.