Problem Set 1
Not graded; do not turn in

Answer the following for recitations, Sept. 6 and 9. Recitation Problem Sets help you on Quiz and Exam questions. The answer key will be posted on Brightspace after recitation on Monday.

A. Math Review:

1. The calculus.

    a.   If $y = f(x) = x^{\frac{1}{2}}\left(2x + 1\right)^{\frac{1}{2}}$, find dy/dx.

    b.   If $y = f(x) = \dfrac{3x^{\frac{1}{3}}}{\left(3x + 3\right)^{\frac{1}{3}}}$, find dy/dx.

    c.   If y = f(x) = ln[$x^{1/3}$] find dy/dx.

    d.   If y = f(x) = e^{3x} find dy/dx.

    e.   If $y = f(x) = \dfrac{x^{\frac{1}{2}}}{\ln x^{\frac{1}{2}}}$, find dy/dx.

    f.   If $z = f(x) = x^{\frac{1}{3}} \times e^{x^{\frac{1}{3}}}$, find dz/dx.

    g.   If y = $x^7 z^2$ find $\partial y/\partial x$ and $\partial y/\partial z$.

2. Which of the production functions below have CRTS and diminishing marginal product of both capital (K) and labor (L)? Show your work. Note: Parts d and e are especially difficult.

    a. $Y = AK^{1/2} L^{1/2}$ where A > 0
    b.   Y = A(K + L) where A > 0
    c. $Y = A(K + L)^2$ where A > 0
    d. $Y = A(BK^{1/2} + BL^{1/2})^2$ where A, B > 0
    e. $Y = A(BK^2 + BL^2)^{1/2}$ where A, B > 0