Math Review for Environmental Economics: EEP 101/ ECON 125
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Just in case you feel a little bit rusty…
Please come to our office hours if you have difficulty in solving these problems.

1) Graph $y = 8 - 4x$.

2) Derivatives: find $\dfrac{dy}{dx}$.

    a) $y = 4x^3$ [First derivative is $12x^2$]

    b) $y = ax^b$ [First derivative is abx^{b-1}]

    c) $y = x^{-1}$ [First derivative is $-1/x^2$]

    d) $y = \ln(x)$ [First derivative is $1/x$]

    e) $y = 2x^2 \ln(x)$ [First derivative is $4x(\ln(x))+2x$]

    f) $y = 4$ [First derivative is 0]

3) If q is the quantity and the total cost is represented by $TC = a - bq^3 + 2cq$, what is

    a) the marginal cost (MC)? [$MC = -3bq^2 + 2c$]

    b) the average cost (AC)? [$AC = a/q - bq^2 + 2c$]

4) What value of b maximizes the following function? What is the maximum value of the function?

    $a = -b^2 + 4b$ [First derivative is $-2b + 4$, $b = 2$ when the first derivative is equal to 0; second derivative is -2<0, so b=2 at maximum. There, a = 4.]

5) Consider the line $p = 6 - 2q$.

    a) What is the p-intercept?   [p = 6]

    b) What is the q-intercept? [q = 3]

    c) What is the area under the line (and above the q axis)? Evaluate it geometrically, using the formula for the area of a triangle. [9]

    d) Aside from the geometric way, we can calculate the area using integration. What is

    $\displaystyle\int_0^3 6 - 2q \, dq$? [$6q - q^2 = 9$]

    Why is that the integral we use in this case?