

MATH 104 Workshop 5

Price Elasticity of Demand. Continuous Compound Interest. Exponential Growth and Decay.

If you did not attend workshop, submit solutions to problems 1,3, and 4

1. The absolute value of the price elasticity of demand for a given good priced at \$10 per item is $|E(p)| = 0.8$. What percentage change in price would cause the demand for the good to decrease by 10%?
2. The And I Oop Company is currently able to sell 3000 of its premium metal straws per week at the current price it has set. The demand for these straws is governed by the equation

$$p^3 + q + q^3 = 94,$$

where p is the price of a metal straw in dollars and q is the number of straws the company can sell at price p in thousands of straws per week (e.g. $q = 3$ means 3000 straws per week). Compute the price elasticity of demand $E(p)$ at the current price, and use it to give advice to management on whether it should increase or decrease price to maximize revenue. Recall that $E(p) = \frac{p}{q} \frac{dq}{dp}$.

3. An investment of \$100 earns continuously compounded interest so that it worth \$120 in 3 years. At what point in time was it worth \$110?
4. UBC freezes international student tuition fees (\$42K) for the next 10 years. If the rate of inflation in Canada is 5% per annum for the first 5 years and 2% per annum for the next 5 years of this 10-year period, what is the purchasing power of one international student's tuition fees for UBC in 10 years' time relative to today?
5. Suppose you open an investment savings account that earns interest at a rate of 5% per annum compounded continuously. Your initial deposit is \$5000 and you decide to put in \$250 per month. How much money will you have in this account after 30 years? In this problem, treat your monthly \$250 deposit as it if happens at a continuous constant rate, not as if you put it all in on a fixed date.