
Homework Problems

Lecture 3

- Factor the following polynomials completely:
 - $7x^2 + 10x + 3$
 - $5x^2 - 4x - 1$
- Economists often talk about increasing returns to skill. The basic idea is that the more educated a person becomes, the more they will benefit from each subsequent year of schooling. Which equation(s) we have studied best demonstrate that effect—linear, quadratic or exponential?
- Solve for x : $4x^2 + 8x + 4 = 0$
- A membership-based organization currently has 980 members. One year ago, they had 925 members.
 - What is the percent increase in membership?
 - The new executive director of this organization has set a goal of a 10% increase in membership every year. Given that there are currently 985 members, what is the desired # of members in five years?
- Scholars have noted that age has a nonlinear effect on income. Up to age 40 or so, individuals face increasing returns to their age; in other words, you have a higher income jump from age 30 to 31 than you do from age 18 to 19; starting around age 40, however, a person's income begins to decrease—first gradually, and then increasingly rapidly in later life.
 - Sketch a graph showing the relationship between age and income.
 - Write down a possible equation for this relationship. It does not have to perfectly match your graph, but it should follow the same trend.
- You decide to buy a home. There are two mortgages to choose from: a 30-year mortgage of \$200,000 at a rate of 6.5% or a 15-year mortgage at a rate of 7.5%. How much will you have to pay over the life of both loans? Which one is a better deal?
- Solve for n : $n^2 + 7 = n$
- Today the earth's population is 6.6 billion. Assuming a growth rate of 1% per year, what will the population be in 20 years?
- A state government has just issued bonds to pay for a stadium that obligate them to pay the bondholders \$100 million in ten years. The bonds have a yield of 4%/year. How much did the state borrow?
- Solve for x and y :
$$\frac{2x - 9y}{5} = 1$$
$$-2(x - 5y) = 13$$
- K , L and W are related in the following equation: $y = K^2 L^{\frac{1}{2}} M^{-1}$. Without solving the equation, answer the following questions.
 - How does y change if K goes up?
 - How does y change if L goes up?
 - How does y change if M goes up?
- If $\log 3 = 0.477$ and $\log 2 = 0.301$, what does $\log 1.5$ equal?