

SAMPLE PROBLEMS FOR EXAM 1

The following are sample problems for exam 1. For more sample problems look again at the homework problems (and the nearby problems in the Exercise sets in the book).

1. Find the equation of the line through $(2, 1)$ and $(6, 3)$.
2. Sketch the graph of the line with slope -2 and vertical intercept 4.
3. For the data below, give the a “linear model”, that is, the equation of a line that fits the data pretty well.

$$(0, 210), (10, 405), (20, 612), (30, 800).$$

4. Find the solution set for

$$-2x + 4 > 6.$$

5. Suppose the cost of setting up a widget factory is 100,000 dollars and the cost of producing each widget is 12,000 dollars. Give a linear model for

$$C(x) = \text{cost of making } x \text{ cars.}$$

6. Find the roots and the vertex of

$$y = x^2 - x - 6.$$

7. Sketch the graph of

$$y = 2x^2 - 3x + 1.$$

8. If profit from making x widgets is given by

$$p(x) = -x^2 + 8x + 3$$

how many widgets should be made in order to maximize profit?

9. Sketch the graphs of the functions

$$y = 2^{x-1} \text{ and } y = 2^{1-x}.$$

10. You invest M dollars in the stock market and get a return of 10 percent per year. How much will you have after three years? Explain in a sentence or two why this is more than 30 percent more than you started with.
11. Suppose it takes $\text{Log}_2(x)$ steps to find a particular entry in an ordered list. If it takes 15 steps to find an entry in a list of length x , how many steps will it take to find an entry in a list of length $2x$? Explain.

12. Solve

$$\text{Log}_{10}(2x) - \text{Log}_{10}(x + 1) = \text{Log}_{10}(3).$$

13. Solve

$$5^x = 8$$

14. Loudness in decibels is of a sound with intensity i measured according to the formula

$$D(i) = 10\text{Log}_{10} \left(\frac{i}{i_0} \right)$$

where i_0 is the intensity of the softest sound anyone can hear.

If $D(i) = 50$, solve for the intensity i .