Precalculus
Homework
Factoring quadratic polynomials

1. Solve the quadratic equation.

   (a) $2x^2 - 5x + 3 = 0$.

   answer: $x_1 = 1, x_2 = \frac{3}{2}$

   (b) $2x^2 + 6x + 3 = 0$.

   answer: $x_1, x_2 = \frac{-3 \pm \sqrt{3}}{2}$

   (c) $3x^2 - 5x - 2 = 0$.

   answer: $x_1 = -\frac{1}{3}, x_2 = 2$

   (d) $3x^2 - 5x - 3 = 0$.

   answer: $x_1, x_2 = \frac{5 \pm \sqrt{61}}{6}$

2. - Compute the vertex of the parabola and the x- and y- intercepts.
   - Plot the quadratic function roughly by hand.

   (a) $x^2 - x + 1$.

   (b) $x^2 + x - 1$.

   (c) $x^2 - 6x + 9$.

   (d) $\frac{1}{2}x^2 + 2x - 1$.

   (e) $2x^2 + 3x - 5$.

3. The answer key has not been proofread, use with caution.

   (a) Find the maximal possible product of two numbers whose sum is 12.

   answer: 36

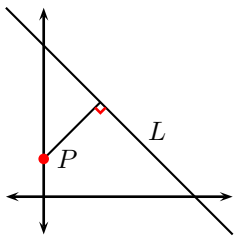
   (b) Two numbers add to 12 and when twice the square of one of them is added to the other, the result is the minimum possible. What are the two numbers?

   answer: $\frac{1}{4}$ and $\frac{47}{4}$

   (c) What is the maximal possible area of a rectangle with perimeter $20m$?

   answer: $25m^2$

   (d) Let L be the line with equation $x + y = 4$ and let P be the point $(0, 1)$. Find the point on L closest to P and find the distance between P and that point.



answer: closest point: $\left(\frac{3}{2}, \frac{5}{2}\right)$, distance: $\frac{3\sqrt{2}}{2}$